



North Dakota Geological Survey

# The Potash Members of the Prairie Formation in North Dakota

By Ned Kruger



REPORT OF INVESTIGATIONS NO. 113 NORTH DAKOTA GEOLOGICAL SURVEY Edward C. Murphy, State Geologist Lynn D. Helms, Director Dept. of Mineral Resources 2014

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#### ABSTRACT

New data on the stratigraphy of the Prairie Formation potash deposits was generated from 545 geophysical well logs in northwestern North Dakota. Descriptions and isopachs are presented for six potash-containing members (in ascending stratigraphic order: the Esterhazy, White Bear, Belle Plaine, Patience Lake, Mountrail and White Lake Members).

The combined gross thicknesses of the Esterhazy and White Bear Members exceeds 40 ft (12 m) in wells along the Nesson Anticline in western Burke and Mountrail, and eastern Divide and Williams counties, reaching a maximum of 43 ft (13 m) gross thickness. Net thickness is greatest in western Burke County with a maximum net thickness of 29 ft (8.8 m).

The combined gross thickness of the Belle Plaine and Patience Lake Members exceeds 40 ft (12m) in wells near and east of the Nesson Anticline, however these areas correspond with declining Belle Plaine accumulation and a thickening of the halite interbed separating the two members. Net thickness is greatest in western and central Divide County and reaches a maximum of 26 ft (7.9 m) in northwest Divide County.

The Mountrail Member overlies the Patience Lake Member by an average of 93 ft (28 m). It reaches a maximum thickness of 12 ft (3.7 m), with thickest deposits occurring in central Mountrail, eastern Williams, and southern Divide counties.

A previously unidentified potash layer of limited extent and thickness overlies the Mountrail Member by an average of 46 ft (14 m). It reaches a maximum thickness of six feet, with deposits primarily occurring in north-central Mountrail County. This layer has been named the White Lake Member.

Quantitative log evaluation utilizing gamma ray, caliper, neutron density, and sonic travel time data was performed on a recent potash exploration well to estimate concentrations of sylvite and carnallite in the potash layers. Results are compared to laboratory derived concentrations from the well. Quantitative log evaluation may be useful in planning an exploration program. Log analysis indicates that carnallite is present in the White Bear Member throughout most of Burke County, and is also present in the Patience Lake Member in western Burke County.

#### INTRODUCTION

This report updates a previous report of the North Dakota potash deposits of the Devonioan-age Prairie Formation by Anderson and Swinehart (1979) and includes an update of the stratigraphy of the Esterhazy, White Bear, Belle Plaine, Patience Lake, Mountrail, and White Lake potash-containing members. Anderson and Swinehart described the North Dakota potash deposits, which are extensions of the rich deposits mined in Saskatchewan, as a resource of 50 billion tons underlying an area of 11,000 square miles (28,500 km<sup>2</sup>) in northwestern North Dakota. Since the publication of the Anderson and Swinehart report, many additional oil and gas wells and a new potash exploration well have been drilled into the Prairie Formation.

Previous descriptions of the Esterhazy Member in North Dakota included both the Esterhazy and White Bear Members. This report includes a section on the gross and net thickness of the two members combined, which provides greater continuity with the original report.

Similarly, previous descriptions of the Belle Plaine Member in North Dakota included deposits of the Patience Lake Member. A section on the combined gross and net thicknesses of Belle Plaine and Patience Lake Members is also included.

Potash production in North Dakota will require solution-mining methods owing to the depths of the deposits, which exceed 5,600 ft (1,700 m). Conventional shaft-mining for potash is generally not considered beyond a depth of 3,500 ft (1,065 m).

#### **GEOLOGIC HISTORY OF POTASH UNITS**

During deposition of the Winnipegosis Formation in the early Devonian, the development of a reef complex restricted the flow of open ocean waters in the southern Northwest Territories of Canada to the northwest-southeast trending Elk Point Basin (fig. 1). Two structural divides in the northwestern and central portions of the Elk Point Basin formed three sub-basins. These divides further restricted water from passing into the southernmost sub-basin, an area which included parts of Saskatchewan, southeastern Manitoba, northwestern North Dakota, and northeastern Montana. As a result, inflowing water was at times likely concentrated in potassium as it reached the Saskatchewan sub-basin (Holter, 1969; Garrett, 1996; Yang et al, 2009; Murphy, 2011).

The Prairie Formation deposits in North Dakota conformably overlie the Winnipegosis Formation. Potash beds are present throughout most of the salt basin, but are sometimes absent over pinnacle reefs (Oglesby, 1987) or in areas subjected to erosion or dissolution. The typical progression of evaporite deposition from brines of the Elk Point Basin consists of gypsum or anhydrite followed by halite, sylvite, and finally carnallite, though introduction of fresh waters into the system could reverse the sequence and result in alternating beds of halite and potassium salts.

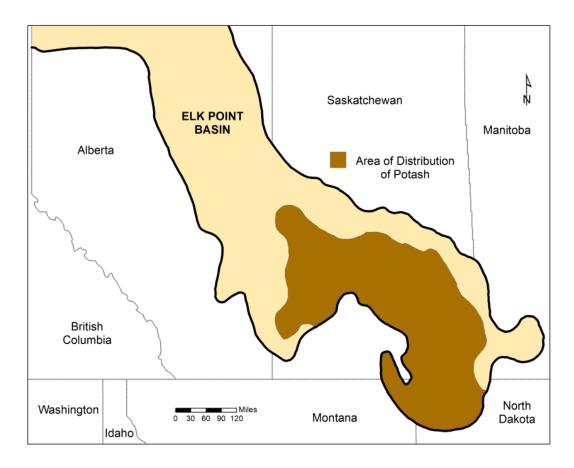


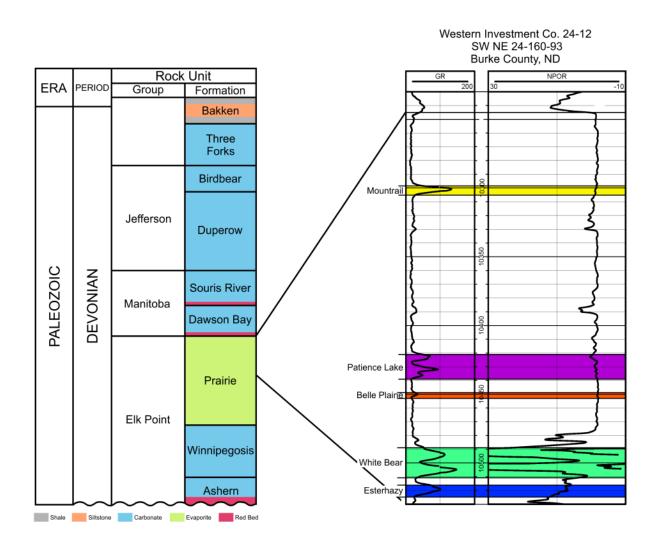
Figure 1. Devonian Elk Point Basin (modified from Holter, 1969)

The salts of the Prairie Formation in North Dakota are conformably overlain by the carbonates of the Dawson Bay Formation. The Second Red bed, a clay-rich zone at the base of the Dawson Bay Formation, may have helped preserve the Prairie Formation salt deposits from greater dissolution from the seawater (Anderson and Swinehart, 1979) (fig. 2). Localized thickening of the Second Red bed or other overlying formations is observed where dissolution of the underlying evaporites formed paleo-lows (Heck and Burke, 1991).

#### **METHODS**

The study area encompasses the limits of the Prairie Formation salt deposits located in northwestern North Dakota. Wireline logs from 545 borings, primarily from oil and gas exploration, were examined.

Potash-bearing beds were identified on gamma ray logs. Potash salts contain the element potassium, the radioactive isotope of which ( $^{40}$ K) releases gamma radiation during the process of decay. This is recorded on the gamma log as a deflection to the right from the baseline level (fig. 2). The amplitude of the deflection is dependent on the concentration of the potash salts and other factors, and can exceed the scale of the log track.



**Figure 2.** Devonian stratigraphy of the Williston Basin, U.S.A. with a log section including the potash zones of the Prairie Formation in the Western Investment Company No. 24-12 well in Burke County, North Dakota. The gamma log is present on a scale of 0-200 API units in the left column of log section.

Other useful logs for distinguishing potash containing zones include caliper, sonic, and density logs. Potash salt is dissolved more readily by the drilling fluid, which is often saturated with sodium chloride (halite), resulting a widening of the borehole in potash zones. Concentrated potash salts have lower densities than halite, and also tend to have higher sonic transit times or erratic sonic recordings, possibly due to washout of the potash salts during drilling (Elowski, 1980).

Potash members were correlated to the extent they were observed throughout the Williston Basin region of North Dakota and to potash intervals previously mapped in southeastern Saskatchewan. Thickness was measured from the gamma ray curve trough at the base of each member and upward to the peak of its highest layer of potash mineralization. Recorded thicknesses may differ from actual minable thickness due to a sometimes gradual increase or decrease in potash mineralization. Because of the relative proximity of the Esterhazy and White Bear Members, and the Belle Plaine and Patience Lake Members, isopachs of the two groupings were created representing combined gross thickness and net thickness. Net thickness was measured by subtracting the thickness of halite or clay interbeds within the gross thickness interval, leaving only the potash.

#### Maximum gamma ray measurements

The maximum gamma ray recordings for potash members of each well are presented in isopach maps to illustrate the observed ranges of potassium concentrations. No corrections were made to the gamma ray measurements to account for the drilling mud weight or borehole size, which may result in a decreased measurement when a heavy drilling mud is used or as the borehole widens. It should also be noted that the gamma ray tracks in some wells logs were cut off at 120 or 200 API units. In these cases the maximum gamma ray measurement was understated.

Formation and member tops picked for the control wells are provided in the appendix. The appendix also includes identifiers, location, elevation, Prairie Formation thickness, member thicknesses, and member maximum gramma ray count information for each control well.

#### Map production

All isopach and gamma ray maps were based on well-control data only. The maps were generated using PETRA [ver. 3.7.1] geological software. Isopach maps were generated using a grid size of 415 rows and 553 columns. A grid size of 369 rows and 484 columns was used for gamma ray maps. The contour lines are computer-generated and had minimal adjustments made by the author.

#### **DETAILED STRATIGRAPHY**

The Prairie Formation salt deposits are located at depths ranging from approximately 5,600 ft (1,700 m) below the surface in northwestern Bottineau County to greater than 12,500 ft (3,800 m) in southern McKenzie County and northwestern Dunn County (fig. 3). The thickness of the Prairie Formation generally follows the development of the Williston Basin, with thickest salt accumulations near the center of the basin along the eastern flank of the Nesson Anticline. The maximum salt thickness observed in North Dakota exceeds 650 ft (200 m) in southern Burke County. Deposits gradually thin outward to a feather's edge at approximately 5-20 miles (8-32 km) from the southern boundary of the Prairie evaporites and at the solution edge at the eastern boundary.

There are six potash-containing members of the Prairie Formation in North Dakota. The following descriptions begin with the lowest stratigraphically, and progress upward through the formation.

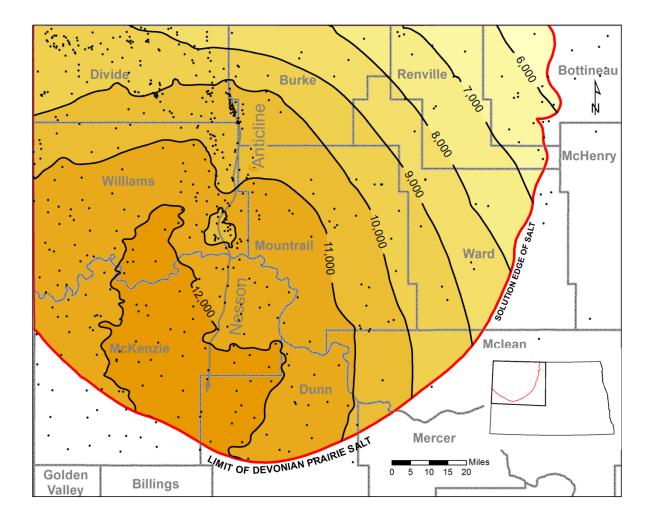


Figure 3. Depth from surface (in feet) to top of the Prairie Formation in North Dakota.

#### **Esterhazy Member**

The Esterhazy Member is the lowermost potash-rich interval of the Prairie Formation. The Esterhazy Member was identified in 253 wells. Its occurrence in North Dakota is most frequently observed as one potash bed, but it also can appear as two or more beds with interbeds of halite or clay. The Esterhazy Member is absent in large portions of Divide and Williams counties and from northeast Mountrail County through much of Renville and northwestern Bottineau counties. The Esterhazy Member reaches a maximum gross thickness of 16 ft (4.9 m) with the thickest areas of deposits occurring in southwestern Divide, northwestern and southeastern Williams, northeastern McKenzie, and southern Mountrail counties (fig. 4). The depths to the Esterhazy Member range from 6,004 to 12,674 ft (1,830 to 3,863 m).

Gamma ray measurements are depicted in figure 5. Gamma ray recordings were off the scale of the graph (200 API units) in 13 wells located in eastern McKenzie, northern Dunn, central Divide, and southeastern Mountrail counties.

#### White Bear Member

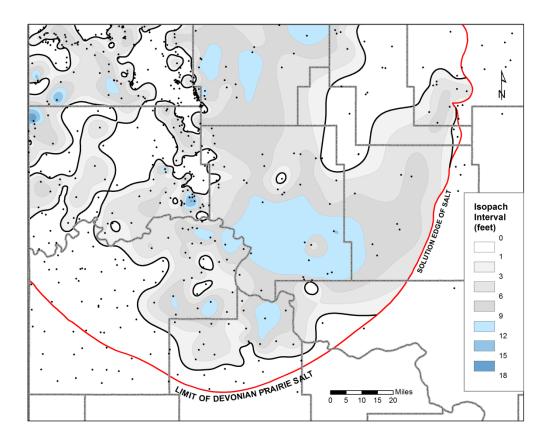
The White Bear Member overlies the Esterhazy Member by an average of 9 ft (2.7 m), and an observed range of 2 to 32 ft (0.6 to 9.8 m). The White Bear Member was not previously identified in North Dakota but was lumped into the Esterhazy Member. In this study, it was traced from Saskatchewan into North Dakota and identified in 421 wells. The White Bear Member is observed between the depths of 10,077 ft (3,071 m) and 10,100 ft (3,078 m) in the Aalund No. 4-35 well located in NW¼NW¼, sec. 35, T 162 N., R 99 W., Divide County (fig. 6). It commonly appears as two or three potash-rich beds, separated by interbeds of halite or clay. The White Bear Member is the most expansive of the potash-containing members in North Dakota, extending southwestwards from the salt solution edge in western Bottineau County into northeastern Dunn County and northern McKenzie County. It is absent in portions of eastern Divide County, mainly along the Nesson Anticline trend, as well as in parts of northern Williams, northwestern Ward, northeastern Renville, and western Bottineau counties. The White Bear Member reaches a maximum thickness of 29 ft (8.8 m) with thickest accumulations located east of the Nesson Anticline near the western borders of Burke and Mountrail counties. Thick deposits are also observed in northwestern and southern Williams County, and southwestern Divide County (fig 7). Depths to the White Bear Member range from 5,636 to 12,579 ft (1,718 to 3,834 m).

Gamma ray measurement are depicted in figure 8. Gamma ray recordings were off the scale of the graph (200 API units) in 82 wells.

#### **Belle Plaine Member**

Of the four potash beds identified in Canada, the Belle Plaine Member is the least extensive both in area and thickness in North Dakota. Deposits are largely limited to Divide, Burke, and northwestern Williams counties, though sporadic zones are also present in McKenzie, Mountrail, and Renville counties. The Belle Plaine Member was identified in 185 wells. The Belle Plaine Member overlies the White Bear Member by an average of 29 ft (8.8 m), and by an observed range of 14 to 43 ft (4.3 to 13 m). It generally appears as one or two potash-rich beds separated by a halite interbed. It reaches a maximum thickness of 18 ft (5.5 m) in northwestern Divide County (fig. 9). The depth to the Belle Plaine Member ranges from 7,131 to 12,544 ft (2,174 to 3,823 m).

Gamma ray counts are depicted in figure 10. The gamma ray did not exceed the scale of the graph within the Belle Plaine Member on any of the logs.



#### Figure 4.

Isopach map of the Esterhazy Member of the Prairie Formation in North Dakota. Black dots are control wells.

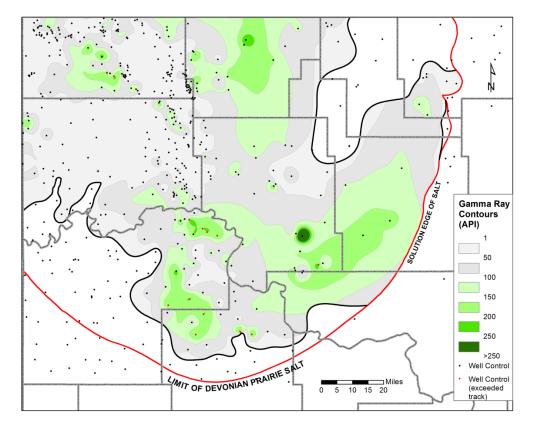
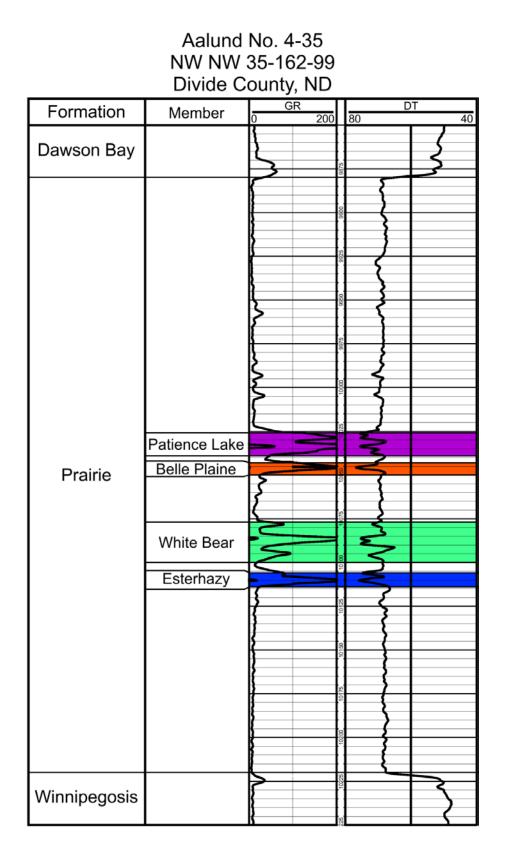
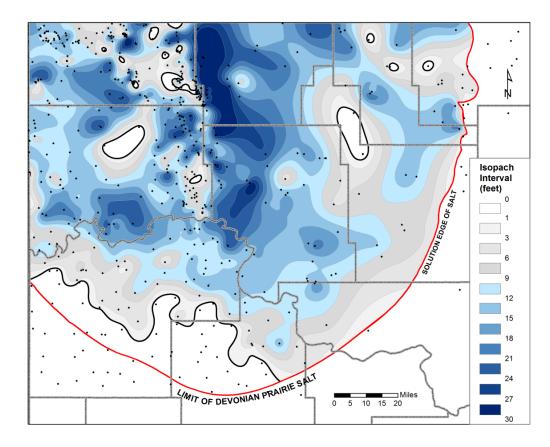
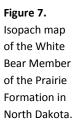


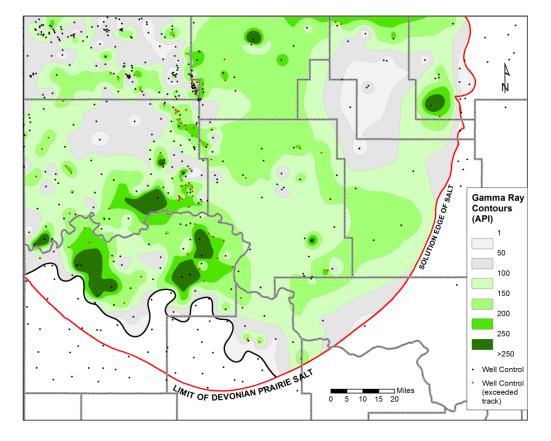
Figure 5. Gamma ray map of the Esterhazy Member of the Prairie Formation in North Dakota. Black dots are control wells. Red dots indicate control wells where the gamma count was beyond the scale of the log. Gamma-ray measurements were not corrected for boring size or mud weight.



**Figure 6.** Log section of the Aalund No. 4-35 well, Divide County, showing potash members of the Prairie Formation in North Dakota.







#### Figure 8. Gamma ray map of the White Bear Member of the Prairie Formation in North Dakota.

#### **Patience Lake Member**

The Patience Lake Member was not previously identified in North Dakota but was lumped into the Belle Plaine Member. In this study, it was traced from Saskatchewan into North Dakota and identified in 381 wells. The Patience Lake Member is observed between the depths of 10,026 ft (3,056 m) and 10,050 ft (3,063 m) in the Aalund No. 4-35 well (fig. 6). It occurs as one or more potashrich beds separated by interbeds of halite or clay. Clay seams appear to be more prevalent in and above the Patience Lake Member then they are elsewhere in the Prairie Formation. Where the Belle Plaine Member is present, the Patience Lake Member overlies it by an average of 11 ft (3.4 m), and by an observed range of 2 to 29 ft (0.6 to 8.8 m). The Patience Lake Member overlies the White Bear Member by an average of 45 ft (13 m). It is absent in parts of Divide County and along the Nesson Anticline and also in pockets near its depositional edge in Renville and McKenzie counties. The Patience Lake Member reaches a maximum thickness of 27 ft (8.2 m) in northern Williams County, with thick accumulations also occurring in eastern Divide, western and central Burke, and central Mountrail counties (fig. 11). Depths range from 6,622 to 12,505 ft (2,018 to 3,812 m)

Gamma ray measurements are depicted in figure 12. Gamma ray recordings went off the scale of the graph (200 API units) in 32 wells located in central and southeastern Divide, eastern Williams, and northeastern Mountrail counties.

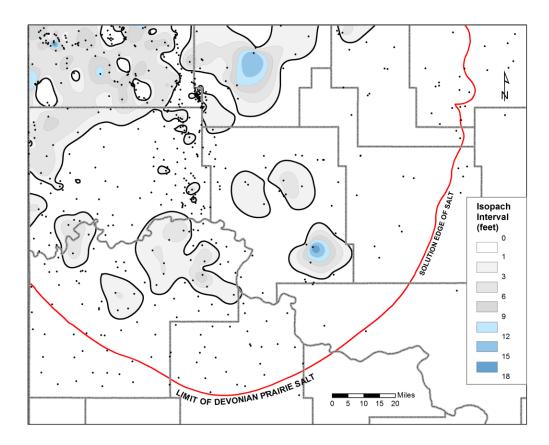
#### **Mountrail Member**

The Mountrail Member overlies the Patience Lake Member by an average of 93 ft (28 m), and by an observed range of 68 to 143 ft (21 to 44 m). The Mountrail Member was recognized in 169 wells. It is limited in areal extent and does not extend into Canada. The Mountrail Member reaches a maximum thickness of 12 ft (3.7 m), with thickest deposits occurring in central Mountrail, eastern Williams, and southern Divide counties (fig. 13). The Mountrail Member ranges from 6 to 106 ft (1.8 to 32 m) below the top of the Prairie Formation. The depths to the Mountrail Member range from 9,198 ft (2,804 m) in northwestern Divide to 12,353 ft (3,765 m) in southeastern Williams County. Its economic potential is limited by its vertical separation from the lower potash members (fig 2).

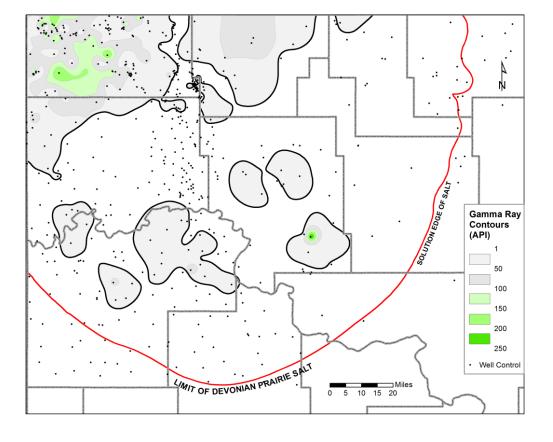
Gamma ray measurements are depicted in figure 14. Gamma ray counts exceeded the track of the graph (200 API units) in 15 wells located in eastern Williams, central Mountail, northeastern McKenzie, and southern Williams counties.

#### White Lake Member

A previously unknown potash layer was identified in 9 wells located in northeastern Williams and northern Mountrail counties (fig. 15). This layer is given the name White Lake Member and is established for the potash bed between depths of 10,618 ft (3,236 m) and 10,624 ft (3,238 m) in the Laredo No. 26-1 well located in SW¼NE¼, sec. 26, T. 156 N., R. 91 W., Mountrail County (fig. 16). The layer overlies the Mountrail Member by an average of 46 ft (14 m), and a range of 31 to 90 ft (9 to 27 m). The maximum thickness observed is 6 ft (1.8 m). Because of its limited extent and thickness, isolation from other potash beds, and moderate to low gamma ray signature, it is not expected to be economically important.

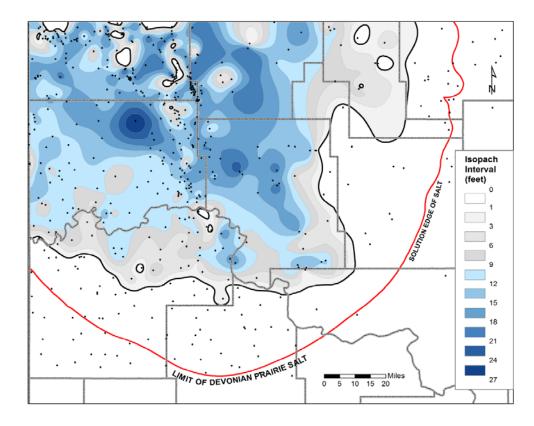


### Figure 9. Isopach map of the Belle Plaine Member of the Prairie Formation in North Dakota.



#### Figure 10.

Gamma ray map of the Belle Plaine Member of the Prairie Formation in North Dakota.



**Figure 11.** Isopach map of the Patience Lake Member of the Prairie Formation in North Dakota.

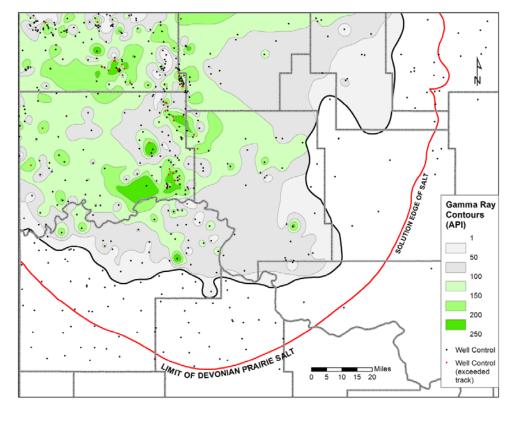
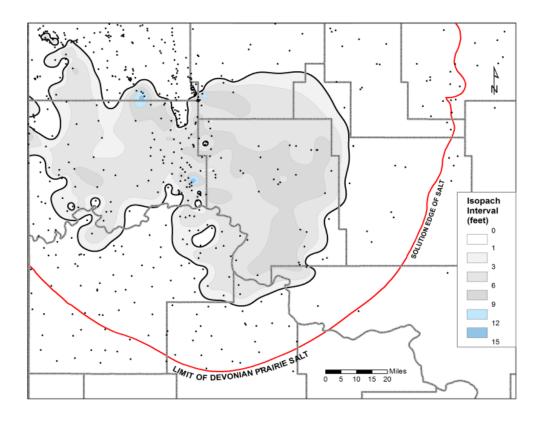


Figure 12. Gamma ray map of the Patience Lake Member of the Prairie Formation in North Dakota.





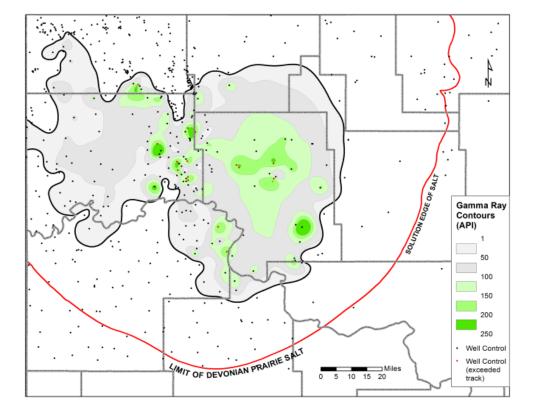


Figure 14. Gamma ray map of the Mountrail Member of the Prairie Formation in North Dakota.

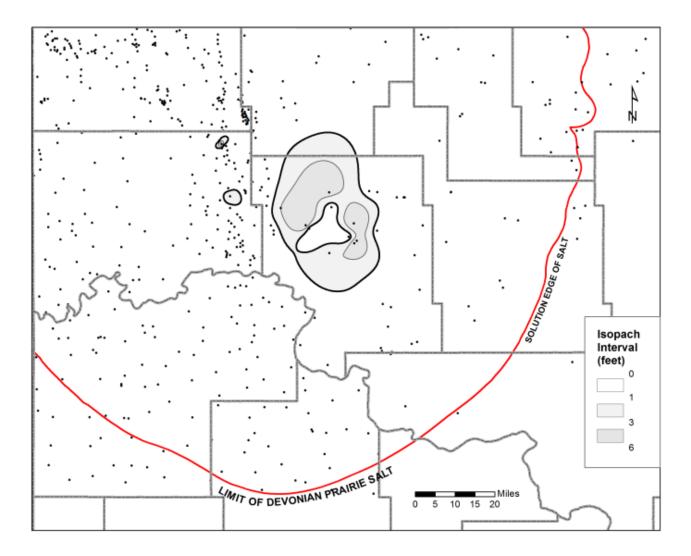
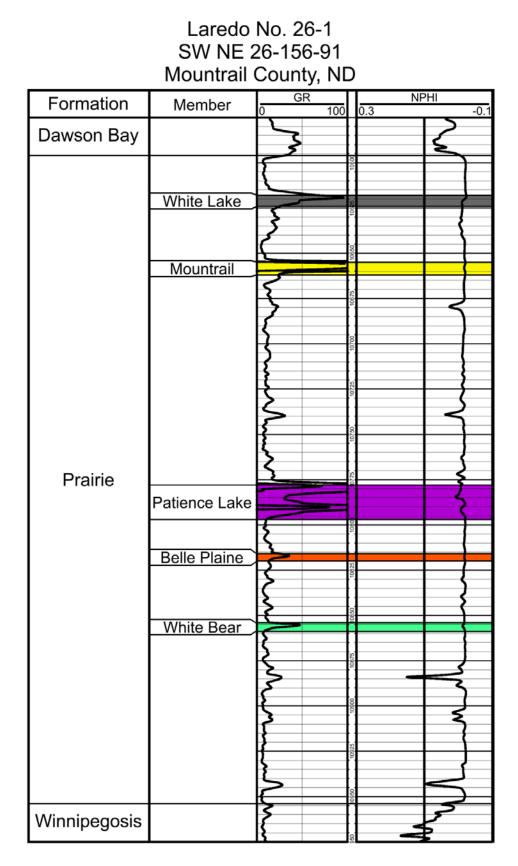


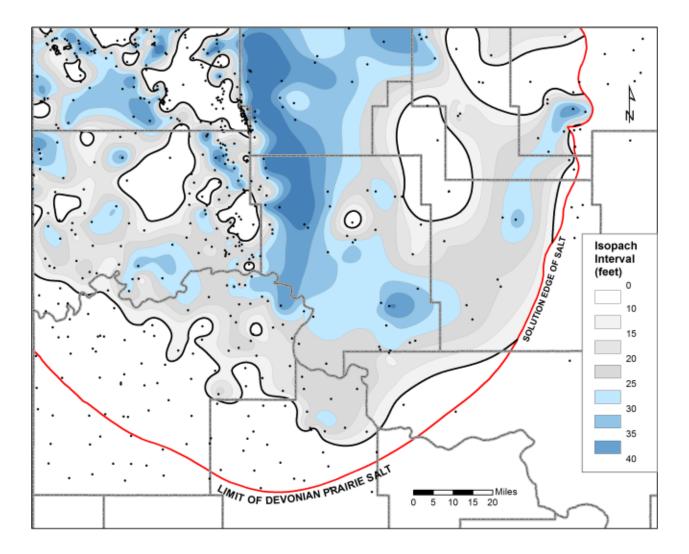
Figure 15. Isopach map of the White Lake Member of the Prairie Formation in North Dakota.



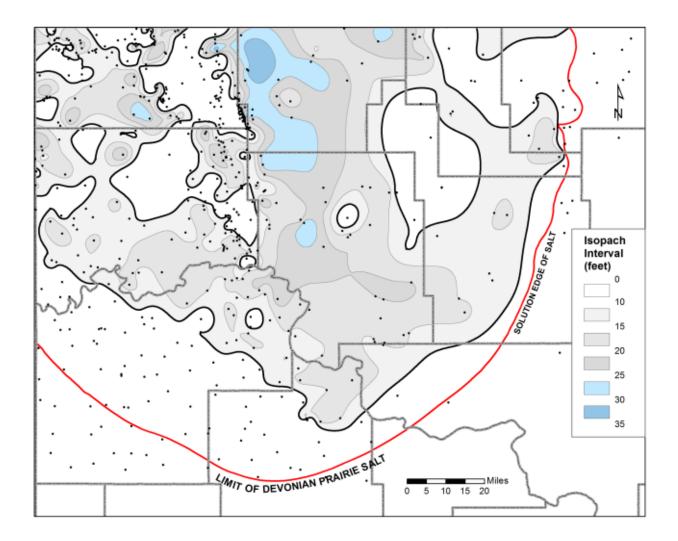
**Figure 16.** Log section of the Laredo No. 26-1 well, Mountrail County, showing potash members of the Prairie Formation in North Dakota.

#### **GROSS & NET THICKNESSES OF ADJACENT LAYERS**

The cumulative gross thickness of Esterhazy and White Bear Members exceeds 40 ft (12 m) in wells along the Nesson Anticline in western Burke and Mountrail and eastern Divide and Williams counties, reaching a gross thickness maximum of 43 ft (13 m) (fig 17). The maximum observed cumulative net thickness of the Esterhazy and White Bear Members is 29 ft (8.8 m) with the thickest net accumulations concentrated in western Burke County. Net accumulations over 25 ft (7.6 m) in thickness are also observed in south-central Divide, northeastern Burke, and northwestern Mountrail counties (fig. 18).

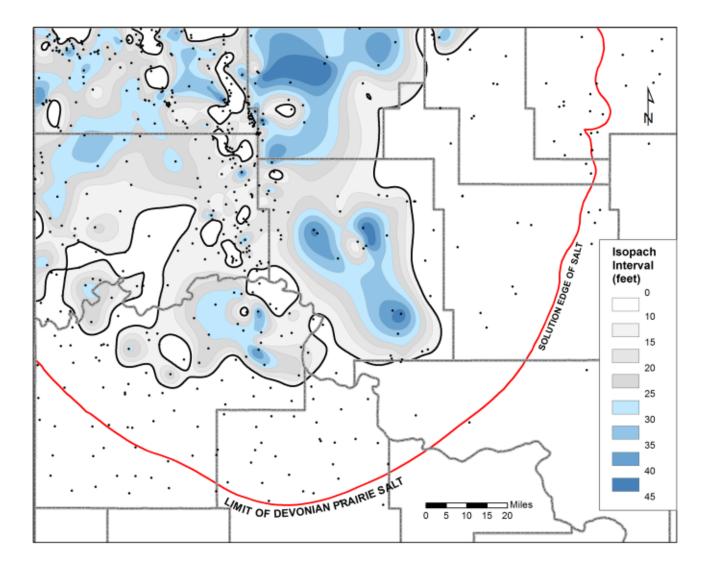


**Figure 17.** Isopach map of the gross combined thickness of the Esterhazy and White Bear Members of the Prairie Formation in North Dakota.



**Figure 18.** Isopach map of the net combined thickness of the Esterhazy and White Bear Members of the Prairie Formation in North Dakota.

The observed cumulative gross thickness of Belle Plaine and Patience Lake Members exceeds 40 ft (12 m) in nine wells located in eastern Divide, central and western Burke, northeastern Williams, and central Mountrail counties (fig. 19). However, these areas generally are along or east of the Nesson Anticline where the halite interbed separating Belle Plaine from the Patience Lake thickens. The Belle Plaine Member is sporadic, thin, and has low gamma ray measurements in these regions. The maximum observed cumulative net thickness of Belle Plaine and Patience Lake Members is 26 ft (7.9 m) in northwestern Divide County with thick net accumulations occurring locally in western and central Divide and western Burke counties. (fig. 20).



**Figure 19.** Isopach map of the gross combined thickness of the Belle Plaine and Patience Lake Members of the Prairie Formation in North Dakota.

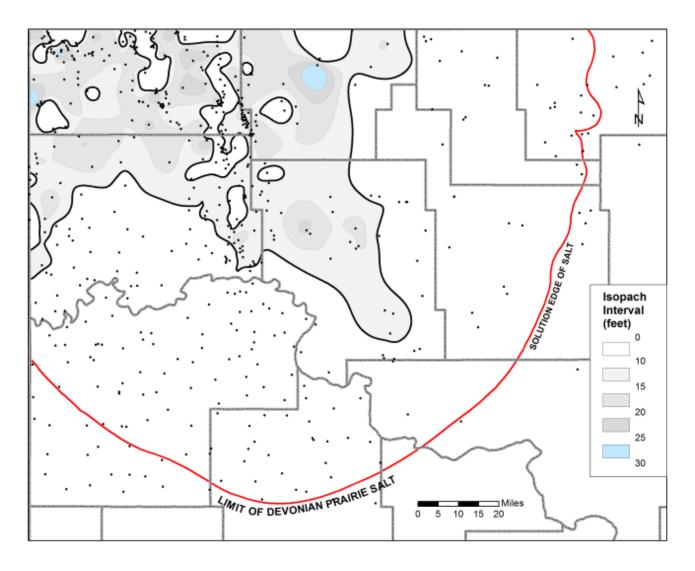
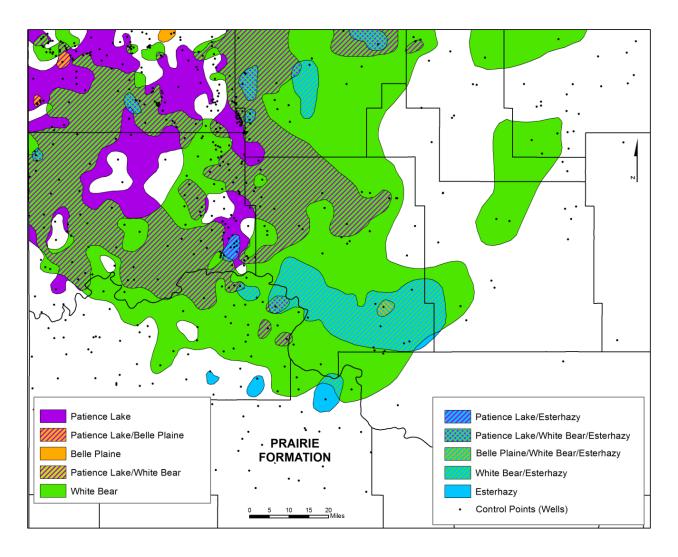


Figure 20. Isopach map of the net combined thickness of the Belle Plaine and Patience Lake Members of the Prairie Formation in North Dakota.

#### **COMPOSITE MAP**

A composite map depicting areas where the Esterhazy, White Bear, Belle Plaine, and Patience Lake Members each attain thicknesses greater than 9 ft (2.7 m) and gamma ray counts greater than 100 GAPI at some point of the thickness interval is presented in figure 21. The lines are hand drawn interpretations based on figures 4, 5, and 7 through 12.



**Figure 21.** Composite map representing areas where individual potash members are 9 ft (2.7 m) or greater in thickness and record a gamma ray count of 100 GAPI or greater.

#### STRATIGRAPHIC POSITION OF POTASH ON GAMMA LOGS

West of the Nesson Anticline in Divide County, the potash members straddle the mid-point of the Prairie Formation, with the Patience Lake/Belle Plaine Members above and the White Bear/Esterhazy Members below. Approximately 40-50 ft (12-15 m) of halite separates the Belle Plaine Member from the White Bear Member in this area. East of the Nesson Anticline the Prairie Formation thickens and the potash layers become positioned higher in the Prairie Formation as the distance from the anticline increases (figs. 22 & 23).

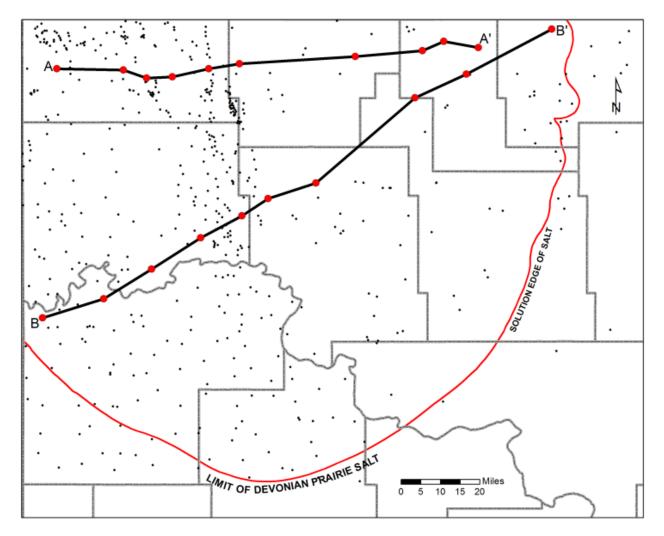
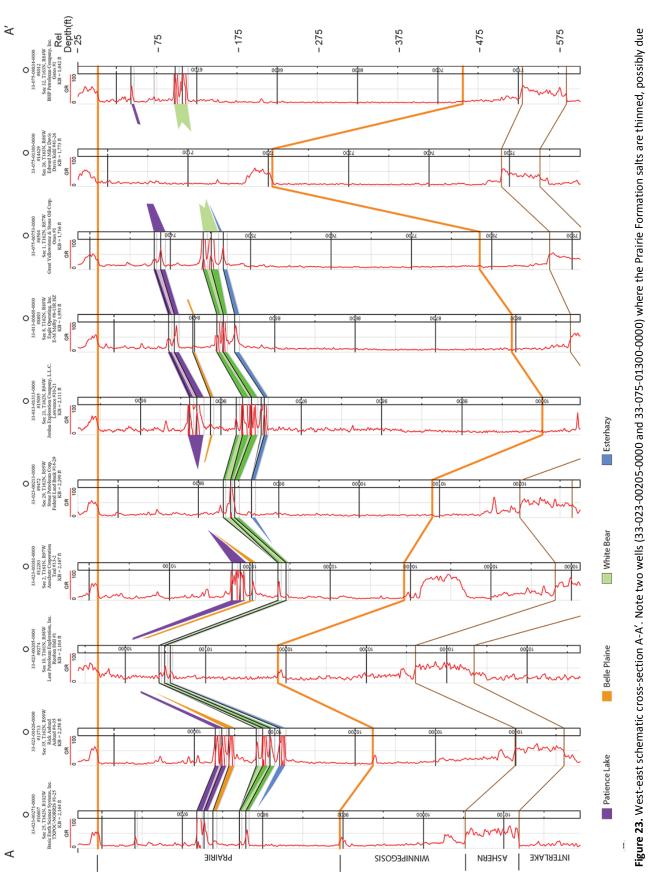
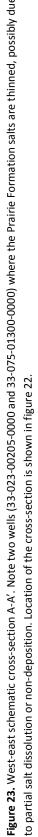
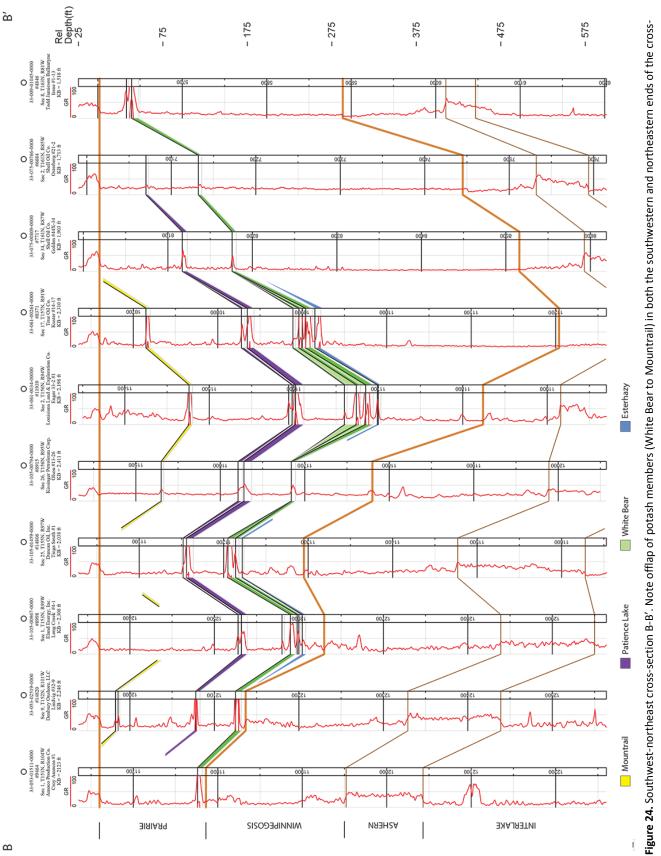


Figure 22. Study area showing the locations of cross-sections.

In northwestern McKenzie County, the White Bear Member is located near the bottom of the salt section. Potash layers progress upward through the salt section in a northeasterly direction, with the White Bear Member approaching the top of the Prairie Formation in northwestern Bottineau County (fig. 24).









Southeast of the Nesson Anticline, the Patience Lake, Belle Plaine, White Bear, and Esterhazy Members go from being centrally situated within the salt section to gradually lower in the section as it thins out toward the southeastern corner of Mountrail County. Throughout much of McKenzie County, the Esterhazy and White Bear Members occur near the base of the Prairie Formation. Figures 2, 6, 16 and 25 through 27 illustrate selected log sections through the potash layers of the Prairie Formation.

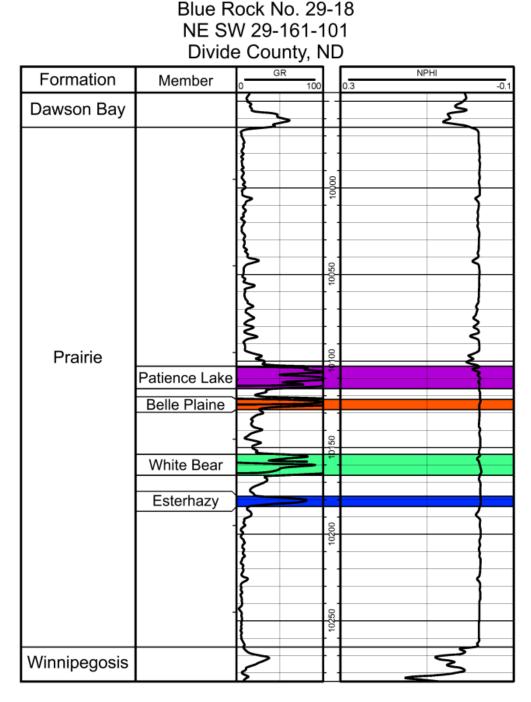


Figure 25. Log section of the Blue Rock No. 29-18 well, Divide County, showing the Prairie Formation.

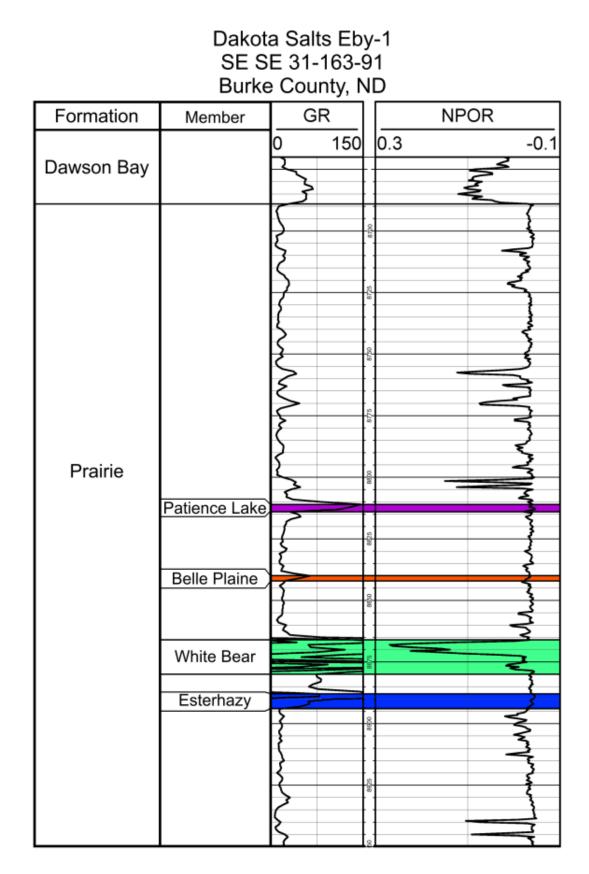
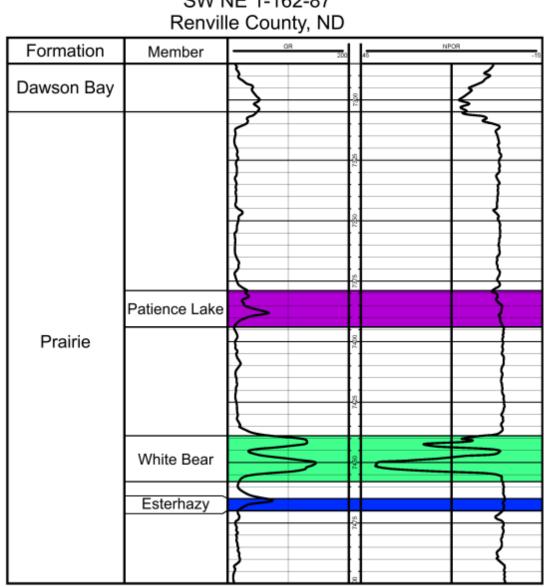


Figure 26. Log section of the Dakota Salts Eby-1 well, Burke County, showing the potash members of the Prairie Formation.



# Great Yellowstone & Stone Oil Corp. Ones #1 SW NE 1-162-87 Renville County, ND

**Figure 27.** Log section of the Great Yellowstone & Stone Oil Corp. Ones #1 well, Renville County, showing the potash members of the Prairie Formation.

#### **MINERALOGY OF THE POTASH DEPOSITS**

The lack of significant coring and sampling activity through the Prairie Formation means there is limited mineralogical data for the Prairie Formation from North Dakota deposits. However, available data indicates the North Dakota deposits consists primarily of halite (NaCl) and the potassium containing salts, sylvite (KCl) and carnallite (KMgCl<sub>3</sub>·6H<sub>2</sub>0) along with insoluble material consisting of mainly of clay, but also possibly anhydrite and dolomite. This is consistent with the more widely studied Canadian equivalent Prairie Evaporite and is also supported by core analysis reports from the Dakota Salts Eby-1

and Kalium Chemical Ltd Ewing #3-3 potash exploration wells. Common in these reports are descriptions of coarse beds of halite, clear to buff and having a range of colors including white, yellow, orange, brown, and green; sometimes with clay-filled fractures and occasional blebs of sylvite. Potash intervals include medium coarse to fine sylvinite with brick-red skins and green clay flakes; and carnallite ranging from massive to coarse or very coarse and present in violet, red, orange, and copper coloring. Occurring intermittently throughout the halite and potash beds are bands of clay, typically 0.1-0.3 ft (0.3-0.9 m) thick, but occasionally exceeding one foot (0.3 m) in thickness. The prevalence of clay increases above the Patience Lake Member throughout much of the study area. Two clay seams occurring between the Patience Lake and Mountrail Members appear to be sufficiently distinctive and widespread as to be useful as marker beds.

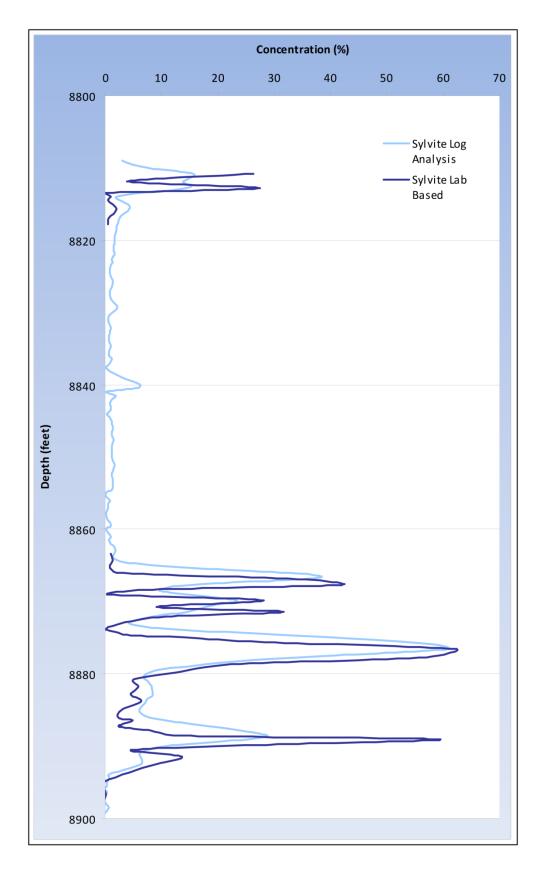
While the lack of core and sample data through the potash-containing beds limits the amount of available mineralogical data, estimates which may provide useful information for the planning of an exploration program can be made from widely available geophysical log data. The recent potash exploration test well in north-central Burke County, Dakota Salts Eby-1, has provided data from which estimates of the concentrations of carnallite and sylvite may be determined.

Quantitative log evaluation was performed using the method described in Crain and Anderson (1966) and Crain (2014), which utilizes the gamma ray log with a correction for borehole size and drilling mud weight, the neutron density log, and borehole compensated sonic log. Log data was entered into a spreadsheet at half-foot intervals and evaluated for concentrations of halite, sylvite, carnallite, and insoluble material. An adjustment to all neutron log measurements was made to best fit the log-derived carnallite concentrations to laboratory measurements. The sylvite and carnallite calculations, based on the log analysis, were plotted over the corresponding laboratory-derived measurements (figs. 28 and 29).

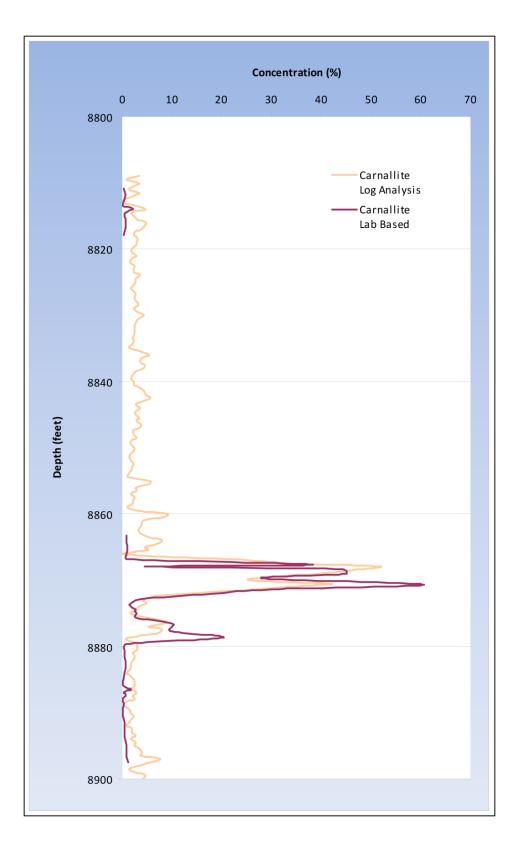
Where lab values exceed those from log analysis, the discrepancy may be due to a sample collected from a thin layer with higher radioactivity than the salt layers above and below it. The gamma ray logging tool is unable to isolate thin layers of high radioactivity and as a result, the recorded measurement at any point represents an average of a two- to three-foot interval. Thus, thin layers with high radioactivity become slightly widened and reduced in amplitude in the gamma ray measurements that are used in the log analysis calculations.

Neutron logs indicate that carnallite is likely present throughout most of Burke County. Carnallite appears to be most prevalent in the White Bear Member, but is also present in the Patience Lake Member near the western border of the county.

In her report on potash deposits in Saskatchewan, Fuzesy (1982) notes "where a member is enriched in carnallite its thickness is about 30 per cent greater than average." There is some indication that this localized thickening due to carnallite also occurs in North Dakota. Additional log evaluation studies are being conducted to estimate total potassium oxide ( $K_20$ ) concentrations as well as the percent values of sylvite and carnallite in the potash zones thoughout the basin.



**Figure 28.** Comparison of quantitative log analysis-derived sylvite concentrations to laboratory derived concentrations from the Dakota Salts Eby-1 well in Burke County.



**Figure 29.** Comparison of quantitative log analysis-derived carnallite concentrations to laboratory derived concentrations from the Dakota Salts Eby-1 well in Burke County.

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# Appendix

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9. 5	(DIM)	10430	9428	9501	9747	9594	10666	9706	9786	9795	9701	11051	12265	9580	9556	11175	9463	9388	9365	11900	9263	9682	9879	11346	9580	9740	9648	12174	12241	12467	11020	11010	10324	12272	12167	11156	0696	10310	12000	12031	10456	11925	12018	12390	12515	12013	12116		11179	10990	11636	11946	8666	11012	12650
	(DM)			0686	9638			9597	9671	9496		10995		9433	9425		9358	9292		11834	8952	9576	9718		9452	9630	9548	11/30	DC+TT	12402		10904	1006	12228	12084		9559		11950			11883	11935	12306			12038	11584	11065	10930	11552			11382	12577
-	(DW) (DW)											10987								10846			9715																			2200	0000			11950			11060					11377	
	(DM)		9158	9370	9614	9472	12386	9574	9650	9475		10979		9413	9403	11073	9337	9269	9205	11827	8938	9554	9696	11221		9605	9517	11412	77477		10897	10891	10193	12219	12071	10717	9546	10170	10834		10306	11872	11926		12431	11940	12031	11570	11050	10915	11544	11876		11370	12568
	(MD)		9151			9467				9464				9407	9397	11063	9331	9264		11818	8928		9692	11210	9431				12159		10889	10881	5005	12210		10708	9534		11933			11866	11922		12424	11932	12023		11043	10904	11536			11362	12560
WB-C	(UM)		9143					9568								11056					8920	9550	9687	11201	9422	9600	9512		12150		10882	10873	1000	12205		10698	9528											11551	11031		11527	11861		10880	
BP-A	(MD)		9098	9329	9572	9430	12352	9530	6096	9431				9382			9293	9227		11794	8896	9523	9651		9388	9564	9479	11375	C/CTT			10839	0700	12181			9493	10132	11898				11893				9864			10876				11328	12529
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LURFACE SURFACE KB		2104	1928	2194	2260	2120	2322	2219	2222	2072	2028	1012	2595	2115	2079	2314	2147	2210	2045	1882	1909	2304	2301	2332	2128	2242	2176	2262	2171	2364	2391	2347	2079	2089	1987	2272 2285	2006	2102	1876	2293	2379	2099	2432	2507	2074	2127	2248	2282	2400	2372	2241	1900	2378	2036	2162
EFACE SITUDE E		24607	13279	.71012	.71926	.89825	-103.0660.2	79064	62625	-103.0407	-103.0544	-102.92771	-103.34653	-103.87731	-103.50014	-102.99633	-103.86145	-103.96592	-103.49221	-103.0146 -102 95958	-103.06242	80092	.75223	.83646 57407	59325	.71179	66509	.35128	.45033	-103.0598	.01165	01246	-103.3305	-103.5315	.05406	09509	33089	.33042	21977	84239	.02964	166091	768892	.90635	.26845	-102.5473	-103.7254	80306	.01804	01783	88924	57489	.06806	00827	-103.2166
IDE LONG		10893 48.4563 -103.54237 10004 48 7366 -103 34607	48.9193 -103.13279	48.97 -103.71012	48.9146 -103.71926	48.9049 -103.89825	71081 EU1- CU1/.84	48.9216 -103.79064	48.9071 -103.62625			101- 563 201- 270	994 -103			201-102					48.954 -103	48.9501 -103.80092	48.9073 -103.75223	48.4251 -102.83646 47 7201 -102 57402	48.9506 -103.59325	48.9185 -103.71179	48.9287 -103.66509	47.4938 -103.35128	48.2792 -103.45033	591 -10	48.5657 -103.01165	48.5486 -103.01246	COT- 071		47.6937 -103.05406	48.6569 -103.09509 48.4763 -104.03943	48.9029 -103.33089	48.7813 -103.33042	48.1882 -103.01722 48.1092 -103.77912	47.8392 -103.84239	48.7622 -103.02964	47.8936 -102.66091	47.9748 -102.98897	47.7221 -102.90635			48.225 -103.7254 48.8752 -103.74159	48.37 -102.80306	48.5156 -103.01804	48.5808 -103.01783	48.1773 -102.88924	48.2239 -103.57489	48.3995 -102.06806	48.0834 -103.00827 48.5844 -103.02937	944 -10
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		EIDSVOOG 1 CENERGY-BERCO-HAMISC	1	9	1	CONOCO STATE HANSON	3-33	CONOCO LEININGER 27	35 1	N 17-1	, ,	41-1 22-01	TS-RASE	1-25	1-34	 		N 5-1	1	3-21	CNCT-1	ATE 1	SS 41-35	STATE	11-18-1	-30-1	SWAMPY-MOSSER 21	RT 12 33-13	cT-cc	DSEC CLEMETS-OLSON	ю		1 0	1	DERAL	22-2	ERSON	1-7	3-13	HAIDE	1	FORT BERTHOLD TRIBES	П 1	10-13	1-31	~	XP-CC	5	3	3-24	Ε 1	UST A	-29	MISSOURI BREAKS UNIT MCCDY 22-24	1-10
WELL NAME		CENEDGV-BEDC	A.T. HEIDE A 1	STATE 1-44-6	AHAB 23-30 1	DCO STAT	PEDERSON 3-33	DCO LEIN	CONOCO MOE 35	ROUSE WILSON 17-1	SMITHBERG 1	HUNIZINGEK 1-19 FFRGUSON 32-22	DSEC CLEMENTS-RASE	<b>BROCKMIER 11-25</b>	ENERSON 11-34	LEONARDO FEE	WEHRMAN 1	NIERENGARTEN		W. KAMP 3-21 WISNESS A 77-13	CLARA KOSTEK NCT-1	OAKMONT STATE	STATE-WIGNESS 41-35	WHITE EARTH STATE BELL 14 1	PEDERSON 11-18-1	MOSSER 32-30-1	MPY-MO	FEDERAL-HEART 12 DACTEDNAY 33-13	THORNESS 5-12	CLEMET	HAMLET UNIT 3	SEATON 31-1 SLISAN 3.75.1	OTTESON 12-19 1	STOKKE 22-22 1	MOBY DICK FEDERAL	EVENSON FEE 22-2 ARCO MAE BEE 1	ARCHIE S. PETERSON	OBRIEN SWD 1-7	HARTSOCH 3-13 HANSEN 1-3	BULL BUTTE-SHAIDE	HEUER 41-20 1	FORT BERTHO	ROLFSRUD UNIT 1	ANDERSON 10-13	JOHNSRUD 1-31	SANISH 1-23	GLEN 1-30 GRIINDSTAD 22-9X	NESET 1	EILEEN 41-13	GOURLEY 43-24	SVEEN 2-22 GOLDEN BUTTE 1	ROLFSTAD TRUST	ALVSTAD 31-29	MISSOURI BREAK MCCOY 22-24	GUNDERSON 1-10
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WINNIPEG OSIS FM (MD) 10820	5614	11824	12070	9488	11903	11256	11524	10910	11887	10887	10444	10482	10970	11102	10367	11136	11021	10285	110872	10392	11070	11066	10280	10064	9588	12344	11173	11349	11759	9176	10404	12233	11697	11585	11315	10791	11285	10236	106/7 8911	12351	11000	12410	10633	11155	11183	10933	9990	11018
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WB-B (MD) 10660		11674	12053	9186	11830	11126	11943	10692	1000	11565	10284	10307	10665	10957	10180	10994	10895	9932	10668	10235	10712	10900		10686	00001		11043					12142 9653	11626	11459	11187	11616	11137		10269		11011	12308		11032	11034	10768	9848	10899
WB-C (MD)		11660		9178		11119	11456		10111	10644			10656	10950			10885	9923	10661		10703	10890					11034					9646										12300			11027		9844	10885
8P-A (MD)			12020	9149			11432	10665		11519		10265		10264			10852			10203	10684		10109				10668			8817	10235	9628							10236		11773	\$//11	10206		10992	10744	9795	10850
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SURFACE SURFACE KB LATITUDE LONGITUDE ELEVATION 48.6458 -103.04011 2314	1466	2198	2144	1924	2155	2504	2159	2329	2417	2415	2309	2340	2392	2319 2373	2389	2466	2324	2243	2387	2167	2387	2329	2080	2225	1955	2514	2365 2418	1910	2144	1905	2128	2283	1940	2316 2378	2369	2319	2474	2336	2447 2049	2371	2494	2242	2433	2266	2306	2381	2352	2331
IRFACE IGITUDE 3.04011	-100.85488	-102.72792	-103.6439	-103.11127	-102.7094	-102.94775	-102.97051	-102.86099	-103.52014	-102.88247 -103.97566	-103.04436	-103.03396 -103.05605	-102.856	-103.06212 -102.90379	3.03233	3.00279	3.02806	2.96628	102.89225	3.24223	2.86147	2.95925	-103.3274	-103.43924 -102 8801	3.04557	2.91028	2.92044	4.02807	3.52033	-103.0617	3.34204	2.60671	-103.909	-103.4503 103.05073	-103.0073	2.92622	2.87813	3.02213	2.72511	3.07137	2.86901	3.48242	2.65087	2.33894 2.91446	3.11673	3.01766	3.00494 03.4402	3.05604
HUFFACE SURFACE ATITUDE LONGITUDE 48.6458 -103.04011	48.5983 -10	48.3618 -10		48.9058 -10			48.0794 -10 47 8746 -1			48.635 -10 47.991 -10	48.7403 -10	48.7449 -10 48.7398 -10		48.748 -103.06212 48.5228 -102.90379	48.7819 -103.03233	48.5295 -103.00279	48.5447 -103.02806 48.5447 -103.02806	48.8345 -102.96628	48.6308 -102.89225 49 5295 -102.89225		48.679 -102.86147	48.5876 -102.96904 48.3395 -102.95925	48.7729 -1	48.8477 -103.43924 48.6297 -102.8801		47.7877 -102.91028	48.425 -102.92044 48.6356 -102.87255	47.8311 -104.02807	47.543 -103.52033	4/.540/ -103.6848/ 48.9723 -103.0617	48.7329 -103.34204	47.7556 -102.60671 48.8088 -102.71646	48.0176	47.9181 -103.4503 48 3894 -103 05073	48.4323 -1	48.6676 -102.92622 48.042 -102 92622	48.4547 -102.87813	48.8037 -103.02213	48.7489 -102.72511 48.4186 -101.82222	47.778 -103.07137	47.909 -102.86901	48.1526 -103.48242	48.7308 -102.65087	48.3079 -102.33894 48.421 -102 91446	48.6134 -103.11673	48.6495 -103.01766	48.31b3 -1U3.00494 48.8634 -103.4402	48.5996 -103.05604
		11939 48.		12002 48.			12026 48.		-	12062 48 12065 47		12085 48. 12086 48.		12114 48 12119 48			12174 48.		12261 48.			12302 48. 12305 48.		12318 48.			12363 48 12366 48	4		12417 48.		12450 47.		12522 47.		12557 48.	~		12692 48. 12694 48.		12726 47			12790 48. 12790 45	~	12825 48.		
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WELL NAME NYGAARD 4		ENGER 33-2 1	FLB MORRIS 11-23	P. E. ROSENQUIST A	E 1 T	H. BORSTAD 3-3	W.H. HUNT SILURIAN	PETERSON 2	FEDERAL 11	STROMBECK DISHON STATE	BERNICE 1	RIVERS 1 OSBORNE 1	SPANGRUD	WSP 21-30 WILLIAMS 12-13	FLB - FREDRICKSON	SKARDERUD 2-7R	SEATON 1-2	WITTY FEE 41-26	JENNIE HANSON 1	TEAL 13-2	BLANEY 17-1	OLSON 4-21 NELS ANDERSON 1	WALL ST.	ANDERSON 20-11 STROMRECK FLR 1	BHP KERMIT 13-32	DELMER RINK 1	ASTRID ONGS WOLD 1	C. MILLER 1	BULL MOOSE 11-23	STOKKE 11-6	WILDROSE STATE	TWO CROW 1-5 BHP 1-M35	ANDERSON 6-1	HYSTAD 4-11 GRAVGAARD 1-76	SAGASER 1-7	20401 JV-P SSU 123H	KNOSHAUG 6-22	VERNON TANBERG	AARDVARK 27-1 ERICKSON 1-18	O. V. STENEHJEM	GOVT. T. G. DOROUGH	1 201		LAREDO 26-1 PEDERSON 14.33	HANSON 22-8	BEKKEDAHL 44	ANDERSON 11-17	SVENDSBYE 12-14
UWI/API 330230035900	330490015100	330610034000	330530215200	330230036300 330730036300	330530216300	331050127300	330530216600 330610034400	330130117000	330530217000	33013011/200 331050127900	330230036700	330230036900 330230037000	330130117400	330230037300 331050129100	330230037400	331050130100	331050130500	330230037800	331050132000	330230038100	330130118800	331050132200 331050132400	330230038200	330230038300 330130119000	330230038400	330530222400	331050134000 330130119300	330530223100	330530223200	330230038700	330230038800	330250044000 330130119800	331050135300	330530225000 331050136000	331050136300	330230038900	330610037800	330230039000	331010037900	330530229800	330530230200	331050138100	330130121200	330610039400 331050138600	331050138800	330230039300	330230039400	331050139300

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2 2	(API) (F	10	2	30	12	170	156	200	12	68	169	10	0	1	101	49	~	52	25	10	15	D ;	155	0	200	118	97 F	220	63	•	103	63	0	0		0 0	0 9	ы 126	21	200	0	125	73 15	10	18	148	135	n 02	25	15	15	0	0	65	20	50	25	0	35
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AAX MA EST G Y THICK	() (FEET)	201	9	200	15	122	500	000	35	197	200	22	0 2	96 1	ct 061	150	25	173	20	200	50	0 6	200	•	200	200	224	220	160	84	200	158	•	0		0 0	0 5	202	115	200	200	135	105	10	25	200	500	000	27	44	69	0	0	200	96	200	707	0	200
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PRAIRIE FM THICKNESS	(FEET)	436 338	354	634	335	265	444	312	473	495	566	456	366	441	460	230	466	239	395	465	448	180	560		183	295	202	342	247	473	233	385	84	217	430	78	69 Vec	301	242	216	227	335	391	386	468	341	352	316	463	426	371	140	151	369	465	331	516 516	196	563
5. 1	(MD)	10682	10250	10845	11440	10752	10687	10203	10724	10843	10901	10716	10387	10628	10830	11543	10670	11172	10595	10659	10786	10000	10963		11578	11822	26811	10222	11083	8093	12312	9661	11771	7205	9643	11280	11862	10188	11295	10492	12137	10338	11141	9764	10670	11157	10908	11403	10688	10690	10951	11820	11728	11216	10850	11261	10722	12074	10005
W EST-A	(UM)			10469		10670	10456			10576	10572					11492		11108	10443	10422	10567		10637			11742	11164				12242						CLAF	10092				10236	11012			11056	10792							11092			10432		9650
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-	(DM) (DM)	10447 11074	10128	10454		10652	10444	10088	10479	10563	10559	10472	0000	10392		11480	10426	11100		10401	10548	20001	10622		11500	11730	11147	10094		7710	10939	9522			9421		7400	10078	11214	10457 ###		10227	11575	CICTT	10414	11045	10783	11283		10466	10817			11083	10596	11124	3036 10416		9632
WB-A	(QW)	10440 10447 11074		10444 10454		10645 10652		CLP01 10088				10472		10392	10577		10422 10426			10393 10401	10548		10612 10622				1181/ 11823	10085 10094		7705 7710					9413 9421			/440 /458 10069 10078					10988 10998 11571 11575				10778 10783	11283		10457 10466				11073 11083		-	10408 10416		9620 9632
WB-8	(dW) (dW)		10121	10436 10444		10645	10430 10438	10073 10079				10472									10548					11722	1181/	10077 10085				9506 9514			9413			10064 10069	11205	10452	12125	10209 10218	10978 10988	TICTT		11028 11036				10457					10588	11109 11116 1	10400 10408 1		9613 9620
BP.A WB-C WB-B WB-A	(dW) (dW)	10440		10436 10444		10645	10438	10042 10073 10079			10550	10472			10415 10577		10422			10393	10548		10612			11722		10085			12220	9514			9378 9413 9421			/445 10032 10064 10069	11205		12125	10176 10209 10218	11571	TICTT		11036		11241 11283							10588	11109 11116 1	10408		9620
WB-C WB-B WB-A	(aw) (aw) (aw) (aw)	10408 10434 10440	10086 10121	10404 10436 10444		10619 10645	10430 10438	10039 10042 10073 10079		10521 10555	10524 10543 10550			10415	C1901	11473	10415 10422	11071		10387 10393		CCC01	10604 10612			11722	11//8 1181/	10043 10077 10085			10929	9468 9506 9514			9378 9413		2445	/445 10032 10064 10069	11205	10425 10452	12125	10173 10176 10209 10218	10945 10978 10988 11536 11571	T/CTT DCCTT		11009 11028 11036	10778	11241	4	10429 10457	10785			11073	10588	11085 11109 11116 1	10375 10400 10408 1		9581 9613 9620
PLA 8P-8 6P-A WB-C WB-8 WB-A	(aw) (aw) (aw) (aw) (aw) (aw)	10391 10408 10434 10440 11021	10071 10086 10121	10404 10436 10444	11265	10605 10619 10645	10430 10430 10438	10030 10039 10042 10073 10079	10426	10497 10521 10555	10490 10524 10543 10550	10412	10189	10337 103415	10406 10415 10524	11423 11473	10366 10415 10422	11049 11071		10339 10339	10492	CCC01	10555 10604 10612		11494	11668 11722	11/18 11/81 11/81/	10034 10043 10077 10085		7705	10929	9458 9468 9506 9514			9413		2445	7391 7445 7445 7445 7445 70022 10030 10032 10069	11156 11205	10403 10425 10452	12078 12125	10163 10173 10176 10209 10218	10930 10945 10978 10988 11510 11536 11571	9519 9511 9512	10358	10977 11009 11028 11036	10729 10778	11220 11241	10389	10412 10429 10457	10772 10785			11015 11073	10538 10588	11062 11085 11109 11116 1	10352 10400 10400 10408 1		9613 9620
PLC PL8 PLA 8P-8 8P-4 WP-C WP-8 WP-4	(aw) (aw) (aw) (aw) (aw) (aw)	10382 10391 10408 10434 10440 10440 10440	10061 10071 10086 10121	10389 10404 10436 10444	11258 11265	10605 10619 10645	10430 10438	10030 10039 10042 10073 10079	10426	10497 10521 10555	10490 10524 10543 10550	10404 10412	10182 10189	10337	10406 10415 10524	11478 11478 11473 11473	10356 10366 10415 10422	11041 11049 11071		10339 10387 10393		CCC01	10604 10612		11494	11661 11668 11722	11/63 11/78 1181/ 11/040 11/065	10026 10034 10043 10077 10085		7705	10881 10929	9447 9458 9468 9506 9514			9378 9413		2445	/445 10032 10064 10069	11156 11205	10403 10425 10452	12078 12125	10156 10163 10173 10176 10209 10218	10930 10945 10978 10988 10571 11571	9510 9519 ecct ercti arcti	10358	10971 10977 11009 11028 11036	10720 10729 10778	11241	10389	10412 10429 10457	10785			11006 11015 11073	10538 10588	11062 11085 11109 11116 1	10375 10400 10408 1		9581 9613 9620
PLC PL8 PLA 8P-8 8P-4 WP-C WP-8 WP-4	(aw) (aw) (aw) (aw) (aw) (aw) (aw)	10391 10408 10434 10440 11021	10061 10071 10086 10121	10404 10436 10444	11258 11265	10605 10619 10645	10430 10430 10438	10030 10039 10042 10073 10079	10426	10497 10521 10555	10490 10524 10543 10550	10404 10412	10189	10337 103415	10406 10415 10524	11423 11473	10356 10366 10415 10422	11049 11071		10339 10387 10393	10492	CCC01	10555 10604 10612		11494	11668 11722	11/63 11/78 1181/ 11/040 11/065	10026 10034 10043 10077 10085		7705	10881 10929 10929 10929 10929 10929	9447 9458 9468 9506 9514			9378 9413		2445	7391 7445 7445 7445 7445 70022 10030 10032 10069	11156 11205	10403 10425 10452	12078 12125	10156 10163 10173 10176 10209 10218	10930 10945 10978 10988 11510 11536 11571	9510 9519 ecci ercii arcii	10358	10971 10977 11009 11028 11036	10729 10778	11212 11220 11241	10379 10384 10389	10412 10429 10457	10765 10772 10785			11015 11073	10538 10588	11062 11085 11109 11116 1	10352 10375 10400 10408 1		9581 9613 9620
MITA MITA N.C. P.4 M.A BPA MAC VBA WA	(aw) (aw) (aw) (aw) (aw) (aw) (aw) (aw)	10382 10391 10408 10434 10440 10921 10921 10014 1021	10061 10071 10086 10121	10286 10389 10404 10436 10444	11160 11258 11265	10602 10605 10619 10645	10373 10381 10430 10438 10430 10438	10020 10030 10030 10042 10070	10419 10426	10490 10497 10521 10555	10483 10490 10524 10543 10550	10404 10412	10055 10182 10189	10327 10337	10415 10515 10517 10524	11337 11418 11423 11337 11473	10356 10366 10415 10422	10960 11041 11049 11071	10352	10326 10339 10387 10393	10484 10492	1000 ME 1000	10546 10555 10604 10612		11494	11566 11661 11668 11722	11004 11/05 11/78 1181/ 11004 11005	10026 10034 10043 10077 10085		7705	10802 10881 10929 1001 10162 10162 10167	9447 9458 9468 9506 9514			9358 9378 9413	1202	2445 FOCT	7445 / 391 10032 10030 10064 10069	11152 11156 11205	10394 10403 10425 10452	11983 11986 12078 12125	10156 10163 10173 10176 10209 10218	10814 10930 10945 10978 10988 11428 11512 11510 11526 11521	17011 00011 01011 01011 01011 01011	10350 10358	10879 10971 10977 11009 11028 11036	10610 10720 10729 10778	19211 02211 21211 182111	10379 10384 10389	10403 10412 10429 10457	10637 10645 10765 10772 10785	1680		10906 11006 11015 11073	10530 10538 10588	11056 11062 11085 11109 11116 1	900 950 957 902 957 9029 9027 9029 9027 9027 9027 9027 902		9570 9581 9613 9620
PAURIE PAURIE PA MATT-A PLC PL-8 PL-4 BP-8 BP-4 VB-C VB-8 VB-4	(aw) (aw) (aw) (aw) (aw) (aw) (aw) (aw)	10382 10391 10408 10434 10440 10440 10440	9896 10061 10071 10086 10121	10211 10286 10389 10404 10436 10444	11105 11160 11258 11265	10487 10602 10605 10619 10645	10430 10430 10438	0210 10010 10001 10001 10000 10000 0000 0000 00000 00000 00000 00000 0000	10251 10419 10426	10348 10490 10497 10521 10555	10490 10524 10543 10550	10260 10404 10412	10021 10055 10182 10189	10187 10327 10337 10337	10406 10415 10524	11313 11337 11418 11423 11473 11473	10204 10356 10366 10415 10422	11041 11049 11071	10200 10352	10194 10326 10339 10387 10393	10338 10484 10492	CCC01	10403 10546 10555 10604 10612	11655	11395 11494	11527 11566 11661 11668 11722	11/63 11/78 1181/ 11/040 11/065	9880 10026 10034 10043 10077 10085	10836	7620 7705	10881 10929	9276 11001 11001 1110 1110 1110 1110 1110	11687	1773 6988	9213 9358 9378 9413		2445 FOCT	7319 7391 7391 7391 740 740 740 740 7013 10030 10032 10064 10069	11053 11152 11156 11205	10276 10394 10403 10425 10452	11964 11983 11986 12078 12078	10003 10156 10163 10173 10176 10209 10218	10930 10945 10978 10988 10571 11571	1700 11440 1101 1011 1001 1001 1001 1001	10202 10350 10358	10816 10879 10971 10977 11009 11028 11036	10610 10720 10729 10778	0023 11087 11128 11133 11212 11220	10225 10379 10384 10389	10264 10403 10412 10429 10457	10765 10772 10785		11577	10847 10906 11006 11015 11073	10385 10530 10538 10588	10930 11056 11062 11085 11109 11116 1	900 950 950 950 902 902 902 902 902 902 902 902 902 90	11878	9581 9613 9620
PAURIE PAURIE PA MATT-A PLC PL-8 PL-4 BP-8 BP-4 VB-C VB-8 VB-4	(aw) (aw) (aw) (aw) (aw) (aw) (aw) (aw)	2349 10246 10382 10391 10408 10434 10440 2351 10862 10921 11014 11021	2094 9896 10061 10071 10086 10121	2470 10211 10286 10389 10404 10436 10444	2417 11105 11160 11258 11265	2100 10487 10602 10605 10619 10645	2306 10243 10373 10381 10430 10438 10430 10438	234/ 10210 10350 10356 10579 10079 20142 10073 10079	2336 10251 10419 10426	2371 10348 10490 10497 10521 10555	2392 10335 10483 10490 10524 10543 10550	2302 10260 10404 10412	2102 10021 10055 10182 10189	2344 10187 10327 10337 2567 10246 10187	2307 10249 10396 10406 10415 2368 10370 10515 10517 10524	2318 11313 11337 11418 11423 11423 11473	2323 10204 10356 10326 10415 10422	2212 10933 10960 11041 11049 11071	2324 10200 10352	2370 10194 10326 10339 10387 10393	2366 10338 10484 10492	2156 11820 2324 2400	2387 10403 10546 10555 10604 10612	2440 11655	2274 11395 11494	1878 11527 11566 11661 11668 11722	2328 1104U 11083 11/03 11/18 1181/ 3241 10054 11004 11000 11005	2258 9880 10026 10034 10077 10085	2094 10836	1824 7620 7705	2011 1076/ 10802 10881 10929 2005 11002 12051 13154 13152 13157 13257	2010 9276 1200 1210 1210 1210 1210 1220 1220 122	2329 11687	1773 6988	1949 9213 9358 9378 9413	2043	2325 11793 1011 7210 7201	1511 / 519 / 440 2118 9887 10013 10022 10030 10064 10069	2038 11053 11152 11156 11205	2110 10276 10394 10403 10425 10452	2246 11964 11983 11986 12078 12125	2066 10003 10156 10163 10173 10176 10209 10218	2286 10750 10814 10930 10945 10978 10988 2470 11200 11478 11512 11519 11535 11571	2069 9378 114460 11242 11245 11250 11271 2069 9378 9510 9519	2335 10202 10350 10358	2464 10816 10879 10971 10977 11009 11028 11036	2347 10556 10610 10720 10729 10778	2407 11067 11108 1113 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010	2325 10225 10379 10384 10389	2333 10264 10403 10412 10429 10457	2286 10580 10637 10645 10765 10772 10785	2366	2349 11577	2457 10847 10906 11006 11015 11073	2382 10385 10530 10538 10588	2304 10930 11056 11062 11085 11109 11116 1	2411 944/ 9500 95/0 95/0 952/ 9619 962/ 2457 10206 10341 10352 10375 10400 10408 1	2269 11878	2089 9442 9570 9581 9613 9620
PAURIE PAURIE PA MATT-A PLC PL-8 PL-4 BP-8 BP-4 VB-C VB-8 VB-4	(aw) (aw) (aw) (aw) (aw) (aw) (aw) (aw)	2349 10246 10382 10391 10408 10434 10440 2351 10862 10921 11014 11021	2094 9896 10061 10071 10086 10121	2470 10211 10286 10389 10404 10436 10444	-102.93332 2417 11105 11160 11258 11265	-104.04547 2100 10487 10602 10605 10619 10645	-102.90447 2306 10243 10373 10381 10430 10438 10438 10438 10438 10438	-102.4549 2311 9801 0020 10338 10370 100340 10378 -10378 10079 10079 10079	-102.92299 2336 10251 10419 10426	-102.89895 2371 10348 10490 10497 10521 10555	-102.89879 2392 10335 10483 10490 10524 10543 10550	-102.91412 2302 10260 10404 10412	-103.34689 2102 10021 10055 10189	-102.91924 2344 10187 10327 10337 10337 10337 10337	-102.932/3 230/ 10249 10396 10406 10415 -102.91006 2368 10370 10515 10517 10524	-102,94231 2318 11313 11337 11418 11423 11423 11473	-102.93298 2323 10204 10356 10415 10422	-102.94201 2212 10933 10960 11041 11049 11071	2324 10200 10352	2370 10194 10326 10339 10387 10393	2366 10338 10484 10492	2156 11820 2324 2400	-102.8577 2387 10403 10546 10555 10604 10612	-103.72758 2440 11655	2274 11395 11494	1878 11527 11566 11661 11668 11722	2328 1104U 11083 11/03 11/18 1181/ 3241 10054 11004 11000 11005	2258 9880 10026 10034 10077 10085	2094 10836	1824 7620 7705	2011 1076/ 10802 10881 10929 2005 11002 12051 13154 13152 13157 13257	2010 9276 1200 1210 1210 1210 1210 1220 1220 122	2329 11687	1773 6988	1949 9213 9358 9378 9413	2043	2325 11793 1011 7210 7201	1511 / 519 / 440 2118 9887 10013 10022 10030 10064 10069	2038 11053 11152 11156 11205	2110 10276 10394 10403 10425 10452	2246 11964 11983 11986 12078 12125	2066 10003 10156 10163 10173 10176 10209 10218	-103.11181 2286 10750 10814 10930 10945 10978 10988 -102.0254 2470 11300 11428 11519 11516 11526 11571	-103.1451 2069 9378 1144.0 1131.1451 2109.724 1137	2335 10202 10350 10358	2464 10816 10879 10971 10977 11009 11028 11036	2347 10556 10610 10720 10729 10778	2407 11067 11108 1113 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010 11010	2325 10225 10379 10384 10389	2333 10264 10403 10412 10429 10457	2286 10580 10637 10645 10765 10772 10785	2366	2349 11577	2457 10847 10906 11006 11015 11073	2382 10385 10530 10538 10588	2304 10930 11056 11062 11085 11109 11116 1	2411 944/ 9500 95/0 95/0 952/ 9619 962/ 2457 10206 10341 10352 10375 10400 10408 1	2269 11878	2089 9442 9570 9581 9613 9620
SHRACC SURVACC IS PANGIE LUTTIOR LONGTIONE IS PANGIE LUTTIOR LONGTIONE IS PANGIE IS MAY AND	(am) (am) (am) (am) (am) (am) (am) (am)	48.6858 -102.90993 2349 10246 10382 10391 10408 10434 10440 444141 -102.91497 2351 10862 10921 11014 11021	48.7765 -103.38533 2094 9896 10061 10071 10086 10121	48.7168 -102.71121 2470 10211 10286 10444	48.3184 -102.93332 2417 11105 11160 11268 11265	48.5218 -104.04547 2100 10487 10602 10605 10605 10619 10645	48.6784 -102.90447 2306 10243 10373 10371 10381 10430 10438 48.602 40.00145 10430 10436 10430 10438	48.035 -102.51435 2.347 10210 1030 1030 1030 10039 10079 48.7475 -103.46849 2111 9891 10079 10070 10070 10070 10079 10079	48.6832 -102.92299 2336 10251 10419 10426	48.6716 -102.89895 2371 10348 10490 10497 10521 10555	48.7089 -102.89879 2392 10335 10483 10490 10524 10543 10550	48.6718 -102.91412 2302 10260 10404 10412	48.7391 -103.34689 2102 10021 10055 10182 10189	48.7012 -102.91924 2344 10187 10327 10337 10337	48.6879 -102.932/3 2307 10249 10406 10415 48.687 -103 91006 2368 10370 10515 10517 10524	46.067 -102.94231 2318 11313 11337 11418 11423 11423 11473	48.7024 -102.93298 2323 10204 10356 10356 10415 10422	48.2243 -102.94201 2212 10933 10960 11041 11049 11071	48.7111 -103.02863 2324 10200 10352	48.7179 -102.93173 2370 10194 10326 10339 10387 10393	48.6662 -102.90423 2366 10338 10484 10492	4/.84b5 -1U5./UB15 2156 1182U 40.777 40.4416 3154 4000	48.7011 -102.8577 2387 10403 10546 10555 10604 10612	47,404 -103,72758 2440 11655	48.0278 -102.78931 2274 11395 11494	48.1593 -102.95385 1878 11527 11566 11661 11668 11722	48.28U5 -1U3.83/45 2.328 1104U 11083 11/63 11/13 1181/ A8 2074 -102 08078 - 2241 10654 11004 11005	48.8194 -103.50465 2258 9880 10026 10034 10043 10077 10085	48.2021 -103.012 2094 10836	48.6934 -101.76392 1824 7620 7705	48.2086 -103.0189 2011 10767 10802 10802 10829 AB 0108 -100.72070 2005 11002 12061 13154 13152 13157 13157 13157	48.907 -103.33666 2010 9276 14001 14104 14104 14107 14107 14220	47.426 -103.61522 2329 11687	48.9211 -101.78357 1773 6988	48.8889 -103.18837 1949 9213 9413 9358 9378 9413	47.6395 -104.01795 2043	47.7517 -103.88881 2325 11793 40.0000 001 0011 7310 0011 7310 7440	48.7536 -101.7/1036 18.11 / 519 / 446 48.7491 -103.47147 2118 9887 10013 10022 10030 10032 10069	48.221 -103.08928 2038 11053 11152 11156 11205	47.8784 -102.03138 2110 10276 10394 10403 10425 10452	48.0024 -103.61042 2246 11964 11983 11986 12078 12078	48.7439 -103.36894 2066 10003 10156 10163 10173 10176 10209 10218	48.62 -103.11181 2286 10750 10814 10930 10945 10988 A8.4152 -103.0254 2470 11300 11428 11512 11519 11536 11521	48.8657 -103.1451 2069 9378 14440 14440 14512 11529 11571 48.8657 -103.1451 2069 9378 9510 9519	48.6945 -102.92359 2335 10202 10350 10358	48.5003 -102.96848 2464 10816 10879 10971 10977 11009 11028 11036	48.6746 -103.27288 2347 10556 10610 10720 10729 10778	48.4951 -101.15344 - 1358 0623 48.2665 -102 95131 - 2427 11087 11128 11133 - 11212 11220 - 11241	48.6936 -102.93106 2325 10225 10379 10389 10389	48.6833 -102.91611 2333 10264 10403 10412 10429 10457	48.6532 -103.25197 2286 10580 10637 10645 10765 10772 10785	47.3884 -102.64939 2366	47.617 -103.93898 2349 11577	48.4727 -102.93086 2457 10847 10906 11006 11015 11073	48.6575 -102.91023 2382 10385 10530 10538 10588	48.4359 -102.82825 2304 10930 11056 11062 11085 11109 11116 1 2000 2000 2000 2000 2000 2000 2000 20	40.0419 -102.00104 2.111 944/ 9500 9500 9570 9567 9619 9627 48.76 -102.93203 2457 10206 10408 1	47.4461 -102.72327 2269 11878	48.846 -102.88811 2089 9442 9570 9581 9613 9620
PAURIE PAURIE PA MATT-A PLC PL-8 PL-4 BP-8 BP-4 VB-C VB-8 VB-4	(am) (am) (am) (am) (am) (am) (am) (am)	12905 48.6858 -102.90993 2349 10246 10382 10382 10391 10408 10434 10440 12917 48.4141 -102.91497 2351 10862 10921 11014 11021	12918 48.7765 -103.38533 2094 9896 10021 10061 10071 10086 10121	12933 48.7168 -102.71121 2470 10211 10286 10389 10404 10436 10444	12971 48.3184 -102.93332 2417 11105 11160 11258 11265	48.5218 -104.04547 2100 10487 10602 10605 10605 10619 10645	-102.90447 2306 10243 10373 10381 10430 10438 10438 10438 10438 10438	48.035 -102.51435 2.347 10210 1030 1030 1030 10039 10079 48.7475 -103.46849 2111 9891 10079 10070 10070 10070 10079 10079	48.6832 -102.92299 2336 10251 10419 10426	48.6716 -102.89895 2371 10348 10490 10497 10521 10555	-102.89879 2392 10335 10483 10490 10524 10543 10550	48.6718 -102.91412 2302 10260 10404 10412	48.7391 -103.34689 2102 10021 10055 10182 10189	48.7012 -102.91924 2344 10187 10327 10337 46.6970 401 60123 10127 40146 4046	-102.932/3 230/ 10249 10396 10406 10415 -102.91006 2368 10370 10515 10517 10524	46.067 -102.94231 2318 11313 11337 11418 11423 11423 11473	13434 48.7024 -102.93298 2323 10204 10356 10415 10422	13463 48.2243 -102.94201 2212 10933 10960 11041 11049 11071	48.7111 -103.02863 2324 10200 10352	48.7179 -102.93173 2370 10194 10326 10339 10387 10393	48.6662 -102.90423 2366 10338 10484 10492	2156 11820 2324 2400	48.7011 -102.8577 2387 10403 10546 10555 10604 10612	13599 47,404 -103.72758 2440 11655	2274 11395 11494	48.1593 -102.95385 1878 11527 11566 11661 11668 11722	2328 1104U 11083 11/03 11/18 1181/ 3241 10054 11004 11000 11005	48.8194 -103.50465 2258 9880 10026 10034 10043 10077 10085	48.2021 -103.012 2094 10836	48.6934 -101.76392 1824 7620 7705	2011 1076/ 10802 10881 10929 2005 11002 12051 13154 13152 13157 13257	48.907 -103.33666 2010 9276 14001 14104 14104 14107 14107 14220	47.426 -103.61522 2329 11687	1773 6988	48.8889 -103.18837 1949 9213 9413 9358 9378 9413	47.6395 -104.01795 2043	2325 11793 1011 7210 7201	48.7536 -101.7/1036 18.11 / 519 / 446 48.7491 -103.47147 2118 9887 10013 10022 10030 10032 10069	48.221 -103.08928 2038 11053 11152 11156 11205	2110 10276 10394 10403 10425 10452	48.0024 -103.61042 2246 11964 11983 11986 12078 12078	48.7439 -103.36894 2066 10003 10156 10163 10173 10176 10209 10218	-103.11181 2286 10750 10814 10930 10945 10978 10988 -102.0254 2470 11300 11428 11519 11516 11526 11571	48,8657 -103.1451 2069 9378 11946 11942 11949 11949 11941 11941 48,8657 -103.1451 2069 9378	14917 48.6945 -102.92359 2335 10202 10358	48.5003 -102.96848 2464 10816 10879 10971 10977 11009 11028 11036	2347 10556 10610 10720 10729 10778	48.4951 -101.15344 - 1358 0623 48.2665 -102 95131 - 2427 11087 11128 11133 - 11212 11220 - 11241	15001 48.6936 -102.93106 2325 10225 10379 10389 10389	15007 48.6833 -102.91611 2333 10264 10403 10412 10429 10457	2286 10580 10637 10645 10765 10772 10785	47.3884 -102.64939 2366	47.617 -103.93898 2349 11577	15038 48.4727 -102.93086 2457 10847 10906 11006 11015 11073	15044 48.6575 -102.91023 2382 10385 10530 10538 10588	2304 10930 11056 11062 11085 11109 11116 1	40.0419 -102.00104 2.111 944/ 9500 9500 9570 9567 9619 9627 48.76 -102.93203 2457 10206 10408 1	47.4461 -102.72327 2269 11878	2089 9442 9570 9581 9613 9620
SHRACC SURVACC IS PANGIE LUTTIOR LONGTIONE IS PANGIE LUTTIOR LONGTIONE IS PANGIE IS MAY AND	(am) (am) (am) (am) (am) (am) (am) (am)	12905 48.6858 -102.90993 2349 10246 10382 10382 10391 10408 10434 10440 12917 48.4141 -102.91497 2351 10862 10921 11014 11021	/EST JACOB 12918 48.7765 -103.38533 2094 9896 10061 10071 10086 10121	12933 48.7168 -102.71121 2470 10211 10286 10389 10404 10436 10444	12971 48.3184 -102.93332 2417 11105 11160 11258 11265	12973 48.5218 -104.04547 2100 10487 10602 10605 10619 10645	13065 48.6784 -102.90447 2306 10243 10373 10373 10381 10430 10438 10430 10438 1330 10438	- 13126 48.031 - 102.011 - 2347 1V210 - 2124	13135 48.6832 -102.92299 2336 10251 10419 10426	. 13147 48.6716 -102.89895 2371 10348 10490 10497 10521 10555	13167 48.7089 -102.89879 2392 10335 10483 10490 10524 10543 10550	13275 48.6718 -102.91412 2302 10260 10404 10412	13290 48.7391 -103.34689 2102 10021 10055 10189	13318 48.7012 -102.91924 2344 10187 10327 10327 10337	13324 48.08/9 -102.932/3 230/ 10249 10396 10406 10415 13418 48.6565 -102.91006 2368 10370 10515 10517 10524	T 13429 48.087 -102.94231 2318 11313 11337 11418 11423 11473 11473	13434 48.7024 -102.93298 2323 10204 10356 10415 10422	13463 48.2243 -102.94201 2212 10933 10960 11041 11049 11071	13480 48.7111 -103.02863 2324 10200 10352	13507 48.7179 -102.93173 2370 10194 10326 10339 10387 10393	13522 48.6662 -102.90423 2366 10338 10484 10492	13536 4/.8415 - 103./0815 - 2156 - 11820 	13583 48.7011 -102.8577 2387 10403 10546 10555 10604 10612	EEK FEDER 13599 47.404 -103.72758 2440 11655	13647 48.0278 -102.78931 2274 11395 11494	48.1593 -102.95385 1878 11527 11566 11661 11668 11722	136/5 48.28U5 -1U3.83/45 2328 1154U 11583 11/53 11/53 11/18 1181/ 13687 48.2014 -1/12 08078 3341 1/054 11004 11004 11005	13713 48.8194 -103.50465 2258 9880 10026 10034 10043 10077 10085	13746 48.2021 -103.012 2094 10836	13875 48.6934 -101.76392 1824 7620 7705	13893 48.2086 -103.0189 2011 10767 10802 10881 10929 44052 40.0108 -107.7010 -2005 11002 12020 12154 12152 12152 12152 12150 12230	14049 48.907 -103.33666 2010 9276 2201 2447 9458 9447 9458 9506 9514	14200 47.4426 -103.61522 2329 11687	14429 48.9211 -101.78357 1773 6988	1443 48.8889 -103.18837 1949 9213 9413	14486 47.6395 -104.01795 2043	14692 47.7517 -103.88881 2325 11793 4475 40.6556 401.07020 4041 7340	14/25 48.7908 -10/2/1/38 18.11 /319 /495 / 7391 /391 /391 /392 10054 10059 /446 /446 /446	14806 48.221 -103.08928 2038 11053 11156 11205	T 34- 14815 47.8784 -102.03138 2110 10276 10394 10403 10425 10452	14820 48.0024 -103.61042 2246 11964 11983 11986 12078 12125	14823 48.7439 -103.36894 2066 10003 10156 10158 10173 10176 10209 10218	14864 48.62 -103.11181 2286 10750 10814 10930 10945 10978 10988 4. 14864 48.4162 -103.0264 3420 11300 11428 11513 11510 11526 11521	4. 14000 48.8657 -103.7451 2069 9378 11440 11451 9510 11401 11401 11401 11401	14917 48.6945 -102.92359 2335 10202 10358	14923 48.5003 -102.96848 2464 10816 10879 10971 10977 11009 11028 11036	1 14925 48.6746 -103.27288 2347 10556 10610 10720 10729 10778	1 149/0 48.4961 -102.12544 1538 8623 1682 1138 1133 11212 11220 11241 11241 1241	15001 48.6936 -102.93106 2325 10225 10379 10389 10389	15007 48.6833 -102.91611 2333 10264 10403 10412 10429 10457	15022 48.6532 -103.25197 2286 10580 10645 10765 10772 10785	15025 47.3884 -102.64939 2366	15030 47.617 -103.93898 2349 11577	15038 48.4727 -102.93086 2457 10847 10906 11006 11015 11073	15044 48.6575 -102.91023 2382 10385 10530 10538 10588	15089 48.4359 -102.82825 2304 10930 11056 11062 11085 11109 11116 1	1502 48.04.13 -102.05104 2111 344/ 9500 95/0 95/0 95/2 95/2 95/2 95/2 102.05 10400 10408 1 15128 48.76 -102.93203 2457 10206	3 15130 47.4461 -102.72327 2269 11878	48.846 -102.88811 2089 9442 9570 9581 9613 9620
WELL SURVECT SUBJACT NO PAUNUE NO LITTURE LONGTICUE ELEVITON PA MATT-3 MATT-4 PLC PL-8 PL-4 BP-4 NB-C VB-9 NB-4	(am) (am) (am) (am) (am) (am) (am) (am)	12905 48.6858 -102.90993 2349 10246 10382 10382 10391 10408 10434 10440 12917 48.4141 -102.91497 2351 10862 10921 11014 11021	/EST JACOB 12918 48.7765 -103.38533 2094 9896 10061 10071 10086 10121	12933 48.7168 -102.71121 2470 10211 10286 10389 10404 10436 10444	12971 48.3184 -102.93332 2417 11105 11160 11258 11265	12973 48.5218 -104.04547 2100 10487 10602 10605 10619 10645	13065 48.6784 -102.90447 2306 10243 10373 10373 10381 10430 10438 10430 10438 1330 10438	- 13126 48.031 - 102.011 - 2347 1V210 - 2124	13135 48.6832 -102.92299 2336 10251 10419 10426	. 13147 48.6716 -102.89895 2371 10348 10490 10497 10521 10555	13167 48.7089 -102.89879 2392 10335 10483 10490 10524 10543 10550	13275 48.6718 -102.91412 2302 10260 10404 10412	13290 48.7391 -103.34689 2102 10021 10055 10189	13318 48.7012 -102.91924 2344 10187 10327 10327 10337	13324 48.08/9 -102.932/3 230/ 10249 10396 10406 10415 13418 48.6565 -102.91006 2368 10370 10515 10517 10524	T 13429 48.087 -102.94231 2318 11313 11337 11418 11423 11473 11473	13434 48.7024 -102.93298 2323 10204 10356 10415 10422	13463 48.2243 -102.94201 2212 10933 10960 11041 11049 11071	13480 48.7111 -103.02863 2324 10200 10352	13507 48.7179 -102.93173 2370 10194 10326 10339 10387 10393	13522 48.6662 -102.90423 2366 10338 10484 10492	13536 4/.8415 - 103./0815 - 2156 - 11820 	13583 48.7011 -102.8577 2387 10403 10546 10555 10604 10612	EEK FEDER 13599 47.404 -103.72758 2440 11655	13647 48.0278 -102.78931 2274 11395 11494	13667 48.1593 -102.95385 1878 11527 11566 11661 11668 11722	136/5 48.28U5 -1U3.83/45 2328 1154U 11583 11/53 11/53 11/18 1181/ 13687 48.2014 -1/12 08078 3341 1/054 11004 11004 11005	13713 48.8194 -103.50465 2258 9880 10026 10034 10043 10077 10085	13746 48.2021 -103.012 2094 10836	13875 48.6934 -101.76392 1824 7620 7705	34-11 13893 48.2086 -103.0189 2011 10767 10802 10881 10929 1403£ 48.0086 40.703.010 2005 41603 13054 13154 13152 13153 13153	14049 48.907 -103.33666 2010 9276 2201 2447 9458 9447 9458 9506 9514	14200 47.4426 -103.61522 2329 11687	14429 48.9211 -101.78357 1773 6988	1443 48.8889 -103.18837 1949 9213 9413	14486 47.6395 -104.01795 2043	14692 47.7517 -103.88881 2325 11793 4475 40.6556 401.07020 4041 7340	14/25 48.7908 -10/2/1/38 18.11 /319 /495 / 7391 /391 /391 /392 10054 10059 /446 /446 /446	14806 48.221 -103.08928 2038 11053 11156 11205	T 34- 14815 47.8784 -102.03138 2110 10276 10394 10403 10425 10452	14820 48.0024 -103.61042 2246 11964 11983 11986 12078 12125	14823 48.7439 -103.36894 2066 10003 10156 10158 10173 10176 10209 10218	14864 48.62 -103.11181 2286 10750 10814 10930 10945 10978 10988 4. 14864 48.4162 -103.0264 3420 11300 11428 11513 11510 11526 11521	4. 14000 48.8657 -103.7451 2069 9378 11440 11451 9510 11401 11401 11401 11401	14917 48.6945 -102.92359 2335 10202 10358	14923 48.5003 -102.96848 2464 10816 10879 10971 10977 11009 11028 11036	1 14925 48.6746 -103.27288 2347 10556 10610 10720 10729 10778	1 149/0 48.4961 -102.12544 1538 8623 1682 1138 1133 11212 11220 11241 11241 1241	15001 48.6936 -102.93106 2325 10225 10379 10389 10389	15007 48.6833 -102.91611 2333 10264 10403 10412 10429 10457	15022 48.6532 -103.25197 2286 10580 10645 10765 10772 10785	15025 47.3884 -102.64939 2366	15030 47.617 -103.93898 2349 11577	15038 48.4727 -102.93086 2457 10847 10906 11006 11015 11073	15044 48.6575 -102.91023 2382 10385 10530 10538 10588	15089 48.4359 -102.82825 2304 10930 11056 11062 11085 11109 11116 1	1502 48.04.13 -102.05104 2111 344/ 9500 95/0 95/0 95/2 95/2 95/2 95/2 102.05 10400 10408 1 15128 48.76 -102.93203 2457 10206	3 15130 47.4461 -102.72327 2269 11878	15137 48.846 -102.88811 2069 9442 9520
SHRACC SURVACC IS PANGIE LUTTIOR LONGTIONE IS PANGIE LUTTIOR LONGTIONE IS PANGIE IS MAY AND	(aw) (aw) (aw) (aw) (aw) (aw) (aw) (aw)	STONEVIEW-STONEWALL 12906 48.6858 -102.9093 2349 10246 10382 10391 10408 10434 10440 REHAK 15WD 12917 48.4141 -102.91497 2351 10862 10921 11014 11021	BERCO-MARKWEST JACOB 12918 48.7765 -103.38533 2094 9896 10021 10061 10071 10086 10121	WESTERNESS 1-4 12933 48.7168 -102.71121 2470 10211 10286 10389 10404 10436 10444	BEAVER LODGE-DEVONIA 12971 48.3184 -102.93332 2417 11105 11160 11258 11265	M. LANGBERG 1-7 12973 48.5218 -104.04547 2100 10487 10602 10602 10605 10619 10645	20401 JV-P OLSON 13 13065 48.6784 -102.90447 2306 10243 10373 10373 10381 10430 10438 5754 10550 10438 10430 10438	STUNEVIEW-STUNEWALL 12101 48.035 -102.91435 2347 10216 10390 10390 10396 10376 10379 10079 10079 10079 10079	20401 JV-P SSU 1114 13135 48.6832 -102.92299 2336 10251 10419 10426	STONEVIEW-STONEWALL 13147 48.6716 -102.89895 2371 10348 10490 10490 10497 10521 10555	SKARPHOLD 5 13167 48.7089 -102.89879 2392 10335 10483 10490 10524 10543 10550	STONEVIEW-STONEWALL 13275 48.6718 -102.91412 2302 10260 10412	GOLDAL 1-25 13290 48.7391 -103.34689 2102 10021 10055 10182 10189	STONEVIEW-STONEWALL 13318 48.7012 -102.91924 2344 10187 10337 10337 10337 10337 10450 10445	HACKENBERG 19 13324 48:68/9 -102:932/3 230/ 10249 10396 10406 10415 STONEVJEW-STONEWALI 13418 48:6595 -102.91006 23:68 10370 10515 10573 10524	G.L.THOMPSON 7 13429 48.087 -102.94231 2318 11313 11337 11418 11423 11423 11473	STONEVIEW-STONEWALL 13434 48.7024 -102.93298 2323 10204 10356 10366 10415 10422	VERSON 1-30 13463 48.2243 -102.94201 2212 10933 10960 11041 11049 11071	ANKER 1 13480 48.7111 -103.02863 2324 10200 10352	A.B.ERICSON 3- 13507 48.7179 -102.93173 2370 10194 10326 10339 10339 10387 10393	STONEVIEW-STONEWALL 13522 48.6662 -102.90423 2366 10338 10484 10492	CHURCH 1-ZX 13596 47,46815 2159 11820 CAMADANNETZYY 13772 0373745 13370315 2159 11820 CAMADANNETZYYY 13772 0373745 137374 037374	UNIT DAVID 2014 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	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JACOBSON 1443 48.8889 -103.18837 1949 9213 9358 9378 9413	FEDERAL 1-14 14486 47.6395 -104.01795 2043	FEDERAL 9-5 14692 47.7517 -103.8881 2325 11793 caader i arceant 14795 ao reeg for rotros 1011 7310 7310 7310	EMMRL-LARSON 1 14/2 45/358 -101.9/038 1811 /319 /440 PLUMER-LUNDQUIST 25 14775 48,7491 -103.47147 2118 9887 10013 10013 10022 10030 10032 10064 10069	TIOGA SOUTH 1 14806 48.221 -103.08928 2038 11053 11152 11156 11205	VECTA-MORDQUIST 34- 14815 47.8784 -102.03138 2110 10276 10394 10403 10425 10452	UNDVIG 32-9 14820 48.0024 -103.61042 2246 11964 11983 11986 12078 12125	BENTSON 26-1 14823 48.7439 -103.36894 2066 10003 10156 10163 10173 10176 10209 10218	HANSEN 5D-3-1 14864 48.62 -103.11181 2286 10750 10814 10930 10945 10978 10988 IAMEGOME PAVE 4. 14664 48.4186 -103.0554 3.470 11300 114.28 11512 11516 11524	LUNESUME DOVE 4- 14634-40.41.20 -1.03.24.34 24/0 11.350 1.142.6 1.121.2 1.1230 1.127.1 RINDEL 15-9 1.4900 48.8657 -1.03.1451 2.069 9378 9510 9519 9519	5TONEVIEW-STONEWALL 14917 48.6945 -102.92359 2335 10202 10350 10350 10358	NDCA 4 14923 48.5003 -102.96848 2464 10816 10879 10971 10977 11009 11028 11036	BURTMAN 19-1 14925 48.6746 -103.27288 2347 10556 10610 10720 10729 10778	CAULUN POLLIS I 14970 46:4961 -102.15944 1538 0623 BISU G-406 14084 49.2665 -103.96131 2437 11087 11138 11133 11210 11220 11241	STONEVIEW-STONEWALL 15001 48.6936 -102.93106 2325 10225 10379 10389 10389	STONEVIEW-STONEWALL 15007 48.6833 -102.91611 2333 10264 10403 10412 10429 10457	ROSTEN 29-1 15022 48.6532 -103.25197 2286 10580 10637 10645 10765 10772 10785	REISS-10 1 15025 47.3884 -102.64939 2366	FEDERAL 3-28HR 15030 47.617 -103.93898 2349 11577	LALIM 41-34 15038 48.4727 -102.93086 2457 10847 10906 11006 11015 11073	STONEVIEW-STONEWALL 15044 48,6575 -102.51023 2382 10385 10530 10538 10538 10588	UNSTAD 10-9 15089 48389 -102.828.5 2304 10930 11056 11052 1108 1109 11116 1 	UWWENUL IV-LI 13039 48.0419 -102.002104 2.111 944/ 9500 9370 936/ 9519 952/ GILBERTSON 6-19 15128 48.75 -102.93203 2457 10206 10341 10352 10353 10400 10408 1	DAVIS-PDCTUHY 3 15130 47.4461 -102.72327 2269 11878	HOLTE 6-21 15137 48.846 -102.88811 2089 9442 9570 9581 9613 9620
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	-20	H9	10	EAK FEE 1	DGE-SILURI		C 1 331	2-T CC30	TE 14-32	14-9H	-12	RAL 6-25	5-1		5-18X		1	STATE 1	EDERAL 1	-33D	AD 6-32	-10-161-98	-13	01-11		NELSON 3	STATE 32-	н	STIANSON	K 1-01 SW	1-3H	. 10-3	1-2-M22	H 5-9		<b>WN 2</b>		N 1	AOORE	5A-MADIS	ORTH DAK		S F11-	RNMENT	ET AL 1	SVIG 1	IAKMON	ERS 1	1	OLSON		EK I DRTH DAKI	TAD 1	<b>FRAND</b>	1-1		ND BANK	SAUSKER	e
WELL NAME	RURNS 3A-20	STATE 1-36H	BLDU H-315	WILLIAMS PEAK FEE 1	BEAVER LODGE-SILURIA	SSU 4303H	35U 1314H	CONTUCKS AA-30	FANCY BUTTE 14-32	PEDERSON 14-9H	NIELSEN 14-12	SAETZ FEDERAL 6-25	HANISCH 26-1	MORK 24-8	GAJEWSKI 5-18X	FOSS 12-11	V CHADIN 32-21	V. CHAFIN 32-21 ARNEGARD STATE 1	STINGRAY FEDERAL 1-	HIGGINS 34-33D	A. GRIMESTAD 6-32	GOLDAL 16-10-161-98	LINDVIG 11-13	DRAWBOND 11-10	CURL 23-14	20401 JV-P NELSON 3	MRACHECK STATE 32-1	OLSON 9-11H	EINAR CHRISTIANSON	SHELL CREEK 1-01 SW	TITTERUDE 1-3H	E-M EMMEL 10-3	REFUELS 12-14H	E-M FLYING H 5-9	VIALL 30-1	ALFRED BROWN 2	BLOU 12	BLOU 13 L.T.HANSON 1	DALLAS D. MOORE	NORTH TIOGA-MADISON	STATE OF NORTH DAKOT	GAGNUM 1 IIIASTARK 1	GRADY HEIRS F11-	SHELL GOVERNMENT	THOMPSON ET AL 1	N. A. KNUDSVIG 1	CLIFFORD MARMON EKREHAGEN ESTATE	JACK R. ROGERS 1	VORWERK 1	MILTON W. OLSON	BND - OYLOE 1	NELLIE MILLEK 1 STATE OF NORTH DAKOT	NILS TROGSTAD	H. D. LILLESTRAND	1-HENRY 1-1	ROOKE 1	ABKA STEEN 1 FEDERAL LAND BANK	WALTER R. SAUSKER	IRENE 1-13
W																																																											
UWI/API	330530254900	330230045500	331050151600	330530256100	331050151900	330230046200	330230046300	330230040000	330530266900	330230048000	330230048100	330530268400	330230048300	330530271300	330530272000	331050750075000	330530275700	330530276000	330530276400	331050161300	330530277800	330230050400	330530278300	330230051000	3305302/9400	331050163600	330530280800	330530282600	330750003700	330610066000	330230052900	330750139700	331010047500	330750139800	331050169100	330530305800	331050178700 221050179400	330090032100	330230002400	330130018900	330530044200	000140060005	330530054600	330530054700	330090096100	330250002400	330090097900	330090098000	330610018100	330530056600	331050067600	330250003100	331050068200	330090101000	330090101400	331050068700	330530057700	330090104400	330090104500
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s PL/BP NET SS THICKNESS	11	0	0	0	0	0 0	0 1	0	ŝ	0	20	0	19	0 1	1 0	14	15	41	16	er o	15	18	32	18	12	• ;	41 C	2 0	0	16	28	0 1	• •	16	0	0 1	1 18	ç 0	0	29	= =	, m	23	16	78	27	12	15 21	9 08	4	30	9 11	17	0	10 11	11	29
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EST MAX SAMMA RAY (API)	36	30	0	0	200	120	0 02	0	94		128	170	105	0		155		145	100	01 01	285	15		15	155	44	8 6	3 0	72	91	26	0 2	0			200	150	2		01				14		96	94	25	101	110	01 2	1 1	11	34	123	55	118
WB MAX GAMMA EST GROSS RAY THICKNESS (API) (FEET)	6	2	0	0	9	00 0			9	00	7	80	5	0 0	5 10	9	9	4		⊃ «	2	0	80	0	ŝ	en d	'nc		4	3	ŝ	0 1	n 0	9	0	2	5 0	. 4	0	0 1	0 0		0	0 1	9 0	60	11	0 0	0 00	12	0 0		. 0	1 5	, 9	.4	80
WB MAX GAMMA RAY (API)	6	120	0	0	200	120		•	170		136	201	160	•		175		174	128	9/T	200	95		75	230	172	c/ 101	0	150	122	67	• ;	2 0	100	0	•	121		0	10	197	30	68	119	COT	169	76	97	145	101	8 5	200	121	135	159	137	125
V WB GROSS O THICKNESS (FEET)	6	9	0	0		2	5 0	, 0	28	80	6		CI (	0 1	1 2	11	14	19	54	9 ¥	14	16	15	19	20		1 2	10	9	12	13	0	10		0	0	DI 82	20	0	0	5 1	4	~	9 5	9 12	12	9	00 C	, 22	14	ξ, ι	° []	1	18	1 1	1 51	24
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PRAIRIE FM THICKNESS (FEET)	260	106	31	129	192	268	376	40	433	151	274	157	469	101	372	227	380	447	351	401	246	424		490	535	359	9/7	89	334	436	306	90	16	301	20	241	435	91	187	320	302 519	430	291	363	305	387	213	374	653	236	297	323 266	359	279	274	384	342
WINNIPEG F OSIS FM (MD)	11986	6473	6663	5955	11782	7958	11276	6263	11463	9386	10980	8810	10690	12064	8248	11140	10050	11943	9744	F0/01	11825	11620		10712	9212	6592	12226	5523	6614	11270	9784	10740	6470	10037	7030	12487	10532	12434	7198	9950	10460	7445	3666	11532	10068	10672	10442	9864	10898	10122	9971	11663	12095	11195	9376 11830	12158	10797
EST-A (MD)	11917	6412			11713	7842			11293	9365			10451		8039	11111	9881	11827	9611	6734			8184	10470	8859	6299	11415		6350	11114	9681		0047	9934		12409	10184			0.000	10362			10405		10528	10403		10517						9052 11746	12070	10678
EST-C EST-B (MD) (MD)												8772								6730																	10181							10402	rohor		#### 10399			10063							
WB-A ES (MD) (N	11900	6404			11700	7827			11283	9350	10877	8760	10438	10409	8026	11099	9870	11811	9600	6720	11738	11491	8168	10453	8844	6286	10411	02121	6336	11104	9661		104/	9913			10/01	0404			10200	7132	9878	11402	9964	10518		11726	10504	10053	9852	11572	11972	11080	9039 11736	12062	10666
WB-B (MD)						7818			11269				10433	10398	8019	11094	9862			6712	11733			-	8832		10401	19939		11097	9653	ļ	Tett/				10159				10193			10461	10+01	10512	10384		10489	10044	9843		11965		11730		
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8P-8 (MD) (MD)											10838					11063		11762					81	10406							9621			38			10118			97			9841	20401	9924	10478	10354	11688	10450		9811 98	11538			88		10611
PL-A B	11846						11000		11205		10826		10373	10348	OLCOT	11039	9805	11733	9530	10224	11686	11417	8104	10388	8780		12059	00077		11028	9096	0000	000/	9864			10036	10004		9783	10291	7070		11339	9912	10453	10333	9630	10431		9799	11525	11911		8973 11688	12002	10601
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MNT-A PL-C (MD) (MD)	11762						10008		11098							10927	9696	11601				11301					11063	00077		10895											10025			11231	OTCOT	10327		11590	10299		00111	11435	11804	10950	11572	11886	
FM MNT-B (MD) (MD)	11726	6367	6632	5826	11590	7690	10950	6223	11030	9235	10706	8653	10221	101953	7876	10913	9670	11496	9393	10303	11579	11196	8010	10222	8677	6233	11214	5455	6280	10834	9478	10650	0TE/	9736	7010	12246	1041/ 9966	12343	7011	9630	10158 9993	7015	9704	11169	9763	10285	10229	11559 9490	10245	9886	9674	11397	11736	10916	8866 11556	11774	10455
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SURFACE SURFACE KB			366	705	346	579	2// 2//	196	969						2594	031									358	583			574				83	387	171													292	367	914	364	843		595	156	384	967
E LONGITU	48.3051 -103.83347	48.7253 -101.32053	48.3696 -101.10866	48.8047 -101.12705	47.5718 -102.56346	48.3179 -101.46579	48.30101- 0105.84 70270 101- 0107 84	48.6379 -101.12196	48.5007 -102.80069	47.9616 -101.69752	48.4975 -104.00688	48.0789 -101.54688	48.7331 -102.93122	47.6118 -103.53659 48 7177 -107 93373	48.3252 -101.53594	3 -102.19031				48.05// -103.0341/ 48.5584 -101	9 -103.96306		48.9937 -102.35715	48.7376 -102.93213	48.8055 -102.34058	48.7428 -101.29683	125/3.201- 291.874 312005 501- 2075 94	48.903 -100.99096	48.7288 -101.29674	48.2602 -102.36653	48.8241 -104.02104		48.8058 -101.38883	48.8598 -103.59887	48.2527 -101.15177	47.6521 -102.81405	48.6356 -103.03341 48.8055 -102 89804	47.533 -102.89919	48.8029 -101.64177	48.8277 -103.79052	48.6537 -103.91983 48.4218 -102.25716	48.805 -101.66223	48.7373 -103.99873	48.45 -103.05011	48.8056 -103.78862	48.2816 -102.21538	47.8857 -102.00242	48.3159 -103.90292 48.8567 -103 13824	48.6715 -102.64367	48.0716 -101.98914	48.7366 -104.00364	s -102.367/4 8 -103.76843		5 -102.87695	48.9396 -103.06156 48.2465 -103.12199	48.1878 -102.82984	48.6676 -103.41967
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	TAD 1	ADAMS	SON 1-B	3 1-A-	ESTATE OF HAIRY ROBE	USCH 1	REAVED I ONGE-ORNOVIC	N ET AL	CKSON	ISEN 1	NS 1	NSON 1-	1	BURLINGTON NORTHERN A R FRICSON 1-	LAL P	1-34	SON 1	44X-26	1-23	-	22-32	8	-33	EIRS 1	8		5 21.6	. 36-5		L 1		A 1	-2		1	1	SIAIE OF NORIH DAKUT PRIFRE-STATE 1	N-BROWN	22X-1	AUM 1	33-14	21-2	GEORGE C. ANDERSON	WILLIAMS-DELANEY	1	2-1	DES 24-	1 43-16	WESTERN INVESTMENT C		UGEN 25	4	1	8-1	SVANGSTU 24-18 WALTER H. GRONDALE	9-1	1-24
WELLNAME	PAUL HARSTAD 1	GEORGE C. ADAMS	VERNON OLSON 1-B	C. M. HUBER 1-A-	STATE OF I	RICHARD MUSCH 1	REAVER LONGE-ORD	E. VAN HORN ET AL	ALBERT ERICKSON	JEROME JENSEN 1	AGNES BURNS 1	MYRTLE HANSON 1-	HOLTE-BND 1	BURLINGTON NORT A R FRICSON 1-	M. O. LEE ET AL	WAHNER 1-34	L. C. ANDERSON	MORROW	MATHEWS 1-23	VAINE ELALIA BROOKS 1	AAFEDT 2:		WILSON 2-33	SUNFLOT HEIRS	EWING 3-3	RICE A 1	HUVE 42-5 WULLETED 21-6	ROSENDAHL 36-5	KIRBY A-1	HARSTAD ET AL	SKABO 1	GUSTAFSON A 1	GREEK 41-2	OLSEN 1	GUY ALMY 1	DEEP CREEK 1	PRIFERF-STATF 1	HAWKINSON-BROWN	OSTERBERG 22X-1	ORVILLE RAAUM 1	NELSON I HALVERSON 33-14	OSTERBERG 21-2	EORGE C. /	WILLIAMS-DELANEY	JOHNSON 1	KVAMME	ROBERT ANDES	BARKIE 1 RINDFI 43	VESTERN IN	MAE OLSON	HAROLD HAUGEN	FEDJE 1-14	1 NOSNHOL	SILURIAN 8-1	SVANGSTU 24-18 WALTER H. GRONDJ	MARMON 9-1	FEDERAL 1-24
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UWI/API	331050069000	330090105400	331010011600	330090105500	330250003800	331010012400	331050069600	330090107000	330610018600	331010014400	331050069700	331010014800	330130072200	33053005005	331010000500	330610018800	330610007200	330610019000	330230012700	3300270022000	331050073900	330610019800	330130074800	330130074900	330130075500	330090122000	331050025600	330090123000	330090124800	330610020200	330230015000	330250011500 220750075200	330090128900	330230015200	331010001000	330250012400	330130080100	330250013000	330750076300	330230015700	330610021300	330750076600	330230016100	331050078000	330230016300	330610021600	330610021800	330230016700	330130080600	330610022000	330230017000	331050080000	331050080100	330530091000	330230017100 331050080400	331050080500	33023001

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PRAIRIE FM THICKNESS	(FEET)	570	210	341	266	368	411	529	181	385	183	459	324	297	204	384	64	322	497	399	211	182	368	294	320	1/4	263	347	454	398	213	273	343	260	308	544	221	301	253	227	305	352	321	334	238	325	292	465	186	335	60	126	378	136	62
	(010)	11670	11880	10104	12056	11423	11900	10594	12744	11030	11248	8164	11556	9585	11846	9414	5734	12590	8516	12064	11455	10946	11840	11482	11246	10788	11438	10930	7031	11295	11993	10667	12638	11176	10756	11204	12446	11702	11967	112512	10500	9676	9797 10934	10247	11928	11481	11410	10720	11820	9702	11305	12602	11381	9770	6913
-	(INI)		11802	9983			11829		12687		11742	7856	2007	9473				12505			11362				11156	10700	11336	10823			11929		12553	76771	10668	10915	12383	11606			10406		10934	10144			11240	10489				12596	11263		
	(aw) (a			9980						10877	11738																					10608																							
	(MU) (MU)	HOLDT	11791	9971	11992	11303	11821	10282		10871	11728	7834	11444	9460	11781			12498	8176	11945	22511	10936	11719	11379	11144	10683	11321	10812	6682	11156	11914	10597	12544	78771	10653	10904	11001	11595	11893	12488	10388	9521	9672 10920	10133	11858	11370	9900	10477	11751	9574			11249		
	(OM)	0/001					11814	10276		10862	11721	7820	11436		11778			12490	8176	11934	C200	10928	11713	11375	11133	10674	100T	10806	6673	11150		10588	12537	9/771	10645	10896	2016			12484			9667 10915	10124	11848	11362	11218	10470		9568			11238		
WB-C	(CIM)				11980			10268										12483	8176		000.4		11705		11126			10798				_				10889		11581	11878					10118			11210			9564			11229		
	(IMD) (	0hcOT		4 9934			HCROT									9202					100	10896				-	4		6647			10559		12243	10612		12352	066TT			10350		3 9638 10887	10084			9862 11192			9530			11198		
PL-A BP-B	(aw)			9895 9924	934	11240	11771	10213		10804	11673	12/11	11378		11728	187		12438	8117	11883	00	10875	11558	11327	11081	10629 10641	LOOT 670	10756	6618	11100		10532	12475	97771	10596	10835	12331	11534	11832	12432	10331		9618 9633 10863	10071	11797	11303	9851 11165	10411		9518			11187		
	(UM)	0000		6			11764 11			10798 10	II I		, 11373 11			9177 9		12431 12		11879 11	0007		11649 11			01 26501 10673 10		10750 10		11093 11			12470 12	7	10591 10	10828 10	1027			2429 12	0321 10		9609 9				9844 9 1158 11			9506 9			11181 11		
PL-C		77601													1					11871							4								1		•				1		-		-								12305		
	(aw) (a	DCONT		9783		11135	11680			10695	11585	COOTT	11281	9303				12331		11762		10764	11548	11233	10980			10641		10958		10415	12366	61121		10715		11451	11744	12330			9528	9975		11205	11040						11071		
	(UM) (UM)	11613	11670	9763	11790	11055	11664	10065	12563	10645	11565	P1C1	11232	9288	11642	9030	2670	12268	8019	11665	11222 0775	10764	11472	11188	10926	10505	11175	10583	6577	10612	11780	10394	12295	10916	10448	10660	12225	11401	11714	12285	10195	9324	9476 10753	9913	11690	11156	9714 10971	10255	11634	9367	11215	12476	11003	9634	6851
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SURFACE SURFACE KB LATITUDE LONGITUDE ELEVATION		4101	5218	1579	3463	5749	5215	5298	3205	3859	7842 seec	141	5204	1857	104	203	591	994	3766	8008	828	1426	3388	7318	565	115.7	1309	5232	3757	1789 065	003	3482	2413	163	458	7026	1168	205	1138	7944 2071	1971	9454	8789 8592	1166	1709	3728	9796 1204	5302	5805	1015	5756	9206	5761 15aa	8712	3882
E SURFA € LONGIT	40 CO1 000 CO1 00	42.022 -103.06137 47.4434 -103.06137	47,6758 -102.45218	48.1947 -102.01579	48.1584 -103.58463	48.3657 -102.85749	46.2439 -102.36215 47.933 -102.76215	48.7874 -102.95298	102.9205	5 -102.88859	102.47842	00000/101-10		7 -101.84857		1 -103.2203		9 -103.29994	8 -101.93766	102.78008	4/2/2/201- 12/2/28 10/20 201- 3030 44		9 -103.18388	48.4255 -103.77318		40.74U3 -104.00152 48.5339 -104.00152	47.7121 -102.31309	48.6679 -103.26232	48.8991 -101.59757	48.6133 -103.20789 47.6652 -102.066		48.0211 -102.18482	48.2538 -103.22413	4/./951 -102.6/163 48.2376 -102.94201	48.5919 -103.91458	48.4177 -102.47026	47.7993 -103.33911	48.131 -103./4122 48.3369 -103.12205	48.1708 -103.81138	48.1076 -103.47944 48.1500 -103 00071	48.6424 -103.90851	48.9395 -103.49454	48.8499 -103.78789 47 85 -102 13542	48.7843 -103.74166	48.2648 -103.81709	48.3618 -102.99728	48.7331 -103.99796 48.5339 -102.81204	48.7444 -102.95302	47.5644 -102.55805	48.9255 -103.84015	47.3537 -102.45756	47.615 -103.19706	48.5374 -103.06761 47 9406 -103 40599	47.6301 -101.78712	9 -100.8882
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WELL NAME	- INVERSE	T NIDENIALI		OYNES 1-B5	1	JOYCE 1-2	OLIVE WELLS 1-6	ZIMMERMAN 1	BANG 1	CARLSON 8-36	GRACE 1-20 GRANDALE 1-0	DEWING 12-15	ERICKSON STATE 1	G 15-24	NORDELL 1-2	VAALER 1-24	FRED AND SIGNA WRIGH	GJORVEN 14-21	GOLDEN 44X-34	ORTLOFF 13-	YOUNG BEAK 1	TRIBAL 1-1	FLATEN 23-2X	BENDIXSON 1-17	SMITH 33-2	TRIRAI 4-1	SOLOMON BIRD BEAR	LEONARD ROSTEN 1	GATES 1	OLAF SEVRE 1	MORELAND 1	PARSHALL S.D.	SOLBERG STATE 1	BEAK DEN 1 KROGEN 1-19D	FISCHER 34-18	KUSTER 14-17	JOHN FELLAND 1	WITTROCK 22-14	ALFSON 1-9-4C	TOFTE 1-1R	GERALD FISCHER 1	BAKKE 1	GERALD RAAUM 1-2 SOLOMONSON.STATE	RIVELAND 1-12	JORGENSON 1-9	MOE 2-1	LADD PETROLEUM STATE RICF 14-3	KJELSHUS 2	BURBANK BIA 23-8	WEHRMAN 1-19	WERNER 1-30	HILMAN C. BERG	GRIMSRUD 1 HVSTAD 11-31	METHENY 1-20A	WUNDERLICH 1
MELL																																																							
UWI/API	23105000700	330530094700	330250014700	330610023100	331050081000	331050081500	330530099500	330230017400	330250015700	331050082000	330610023800	330750079800	331050083300	331010023500	331050083500	330230017700 220520108500	330490000700	331050084500	330750080900	330610024600	0060100020055	330550002400	331050084900	331050085200	331050085300	331050085800	330250000500	330230018100	330750083400	331050087500	330250017700	330610025800	331050088600 220E20121E00	331050089400	331050090100	330610026100	330530127800	331050090700	331050090800	331050091000	330230018700	330230018800	330230018900 330610026400	330230019100	331050092100	331050092900	330610026600	330230019300	330250023200	330230019400 330530135600	330250024500	330530136400	331050094300 330530136600	330550003600	330490012700
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Tops Data Table

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WB/EST GROSS V THICKNESS	(FEET)	0	4 0	32	28	32	26	25	28 23	9	10	24	0 5	35	34	d r	13	22	94	17	18	31	39	18	9 GE	29	, 1	30	۹ 10	40	62	25	37 26	00	3 10	36	20	30	80	4 2	27	19	11 2	38	0	36	26	24 0	28
EST MAX W GAMMA ( RAY TH		0	0 0	54	72	1	36 0	44	11 15	10	8 9	81	0	101	57	80	09	124	40	39	15	100	62	14	0 02	84	9 8	70	<b>D</b> 80	20	14	35	30 82	17	0 0	60	18	\$ 8	17	0 20	49	15	14	39 132	0	120	20	143	240
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WB MAX GAMMA EST RAY THIC		0	76	100	183	74	9 0	65	110	178	170	142	0	80	70	0	142	200	0	50	5 2	174	200	106	145	150	80	134	200	119	150	108	122	104	182 59	22	24	0	34	0 55	145	109	70	128	0	11	57	395 15	540
WB WB GROSS GAI THICKNESS R		0	4 C	14	13 8	13	14	15	8 8	9	0 e	01	0 ;	3 1	27	d o	2	# =	1 0	11 1	18	18	28	18	0 19	12	, 1	16	٥ 01	# 1	or 6	Ħ	5 6	00	10	14	m ç	0 17	00	04	12	14	Ξ'	23	0	2	° 12	13	14
MX MA WBG Y THICH	9) (FE	0	0 0	60	20	25	12 0	16	15	15	0 0	0	0 5	31	47 75	( O	0	37 15	9 0	0 0	20	18 25	15	20	20	64	0 119	20	27	13	5 2	80	32 86	44	0 0	66	79		19	0 29	51	15	20	83	0	27	114	0	60
BP MAX DSS GAMMA ESS RAY	r) (AP	0	0 0	9	2 0	1	0 0	0	0 0	0	0 0	0	0 4	5 6	9	n 0	0	<b>б</b> с	0	0 0	0	0 0	5	0 0	0 m	5 0		2	o \$	0 0	0 0	5	4 in	ŝ	0 0	5	4 0		0	0 m	9	0	0 0	14 0	0	4	5 6	0 4	2
LX AA BP GROSS THICKNESS		0		18	88 02	75	6 <u>6</u> 0	60	80	27	38	0	0 5	199	88	2 O	0	40	; 0	0 1	69	22	178	85	145	52	120	06 0	0 120	18	22	0	8 8	120	35	2	52		50	0 5	56	87	55 55	8 2	0	22	0 6	0	10
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A PL GROSS THICKNESS	(FEET)			0					m ~	0	0 g		• ;	t 0	0 9	2 0	0	vo ~	ę 0					0 0																									6
MNT MAX GAMMA PI SS RAY TH	(API)	0			0 0	4 60	0 0 0 0	2 60	2 IZ		0 %	4 8	0		0		0	4 135 a 68		0 0	4	7 104	500					6 140	3 73											0 0		4	4 76	4 0 4 0				0 0	0
MNT GROSS THICKNE	(FEET)			-	- 2					,				-	- '			_ //	-	_ *		2	-	_ •	-	_ `	-							-		-	_ `		-		0				-		_		2
PRAIRIE FM THICKNESS	(FEET)	74	137	326	515	304	185	393	374	213	344	233	144	320	317	225	193	243	171	224	398	490 498	430	230	328	274	317	388	319	416	196	342	34b 322	327	268 186	365	363	252	347	217 247	305	307	379	203	32	361	387 374	350	
WINNIPEG P	(UIV)	7984	12042	10222	8795	10547	11996	12022	11554	11796	9853 12335	12106	11614	10543	10161	12555	11295	11635	12315	10190	11611	10164	11970	11860	9702	10610	9717	11705	11/86	10091	11691	9555	9322 9932	9590	12465 12470	9413	9534	9618 12394	9320	12336 12411	9471	12414	11743	11126	11962	9315	9254 9272	10420	
WI EST-A O				10115	8450	10450	11794	11915	12604		12266	12034	02001	10436	10055	12497	11230	11564	12251	10056		11067	11857		9586	10527	9612	11587		9866	nonot	9410	9452 9822	9485		9277	9392	12316	9195	12266	9367	12337	0.001	8986		9181	9119	6769	8888
E5T-8	(UM)					10444								10433	10052		11228													9866			9448				1080	12310					0.011	11060					
WB-A EST-C			11994	10105	8436	10431	11779		11426 #### 12598	11725	9710 12254	12024		10422	10043	10/1	11219	11938		1110049	11488	0867	11843	11796	9564	10513	9594	11576	10700	9845	11626	9394	9430 9799	9462	12384 12460	9266	385		9185	12348	349	12326	1618 or o	8974		9166	9110	3755	8876
W8-8 W			-	10096 10	8428 8		11774 1		12590 12		9704 1			10413 10	10035 10			11540 1:		110042 10		11054 9852 6		11788 1	9560				11/75 10694 10	9840			3425		12377 1		9375	C/ #5	9180	12335 12		~	11611 1	1 8964 8			9100		8866
WB-C V				10089					12580					10406	10026					11088		11044 : 9848		11783	9555					9831			9419			9250		468	~					~		9150	3095		
BP.A	6												y	~ ~								-																21	9169				11605	8958			9059	246	8840
ŵ	(UN)			10054	8398	10392							0001	10378	19991	1600T		11916				1 0820			9522	10475	9553	11528	10658	9800		9355	9391	9418		9213	9342	25	9135 916	12305	9310		11605	8939 8951		9114	6	1	60
8-48								-					1000					11909				0689	11800	_		1								9418			9342	21	9135		9310			8930 8939		2 9114			
PL-A	(DM) (DM)			10045	8375	10376	e 11733	11841			12202	200	10501	10362	9982	9/90T		11880 11909		4 11026		10983 9797 9820	11770 11800	11741	9510	10462 1	9543	11505	10640	9775			93/0 9748		(9 12326 04 12409	9201	9323 9342	2			9310	12267	11559	8910 8930 8939		9092 9114	9044	10237	8811
PL-8	(GM) (GM) (GM)			10045		10376	11726 11733		11355 11361 12528 12532		9648 9654 12202		10500	10362		9/90T		11909		AC011 M1011		0689	11800	11741		1				9775	11576 11580						9323 9342	2	9135		9310	12262 12267	11555 11559	8930 8939		9092 9114		10237	
PL-C PL-B PL-A	(QW) (QW) (QW) (QW)			10045	8367 8375	10376			11355 12528		9648	11870	0000 00000 COPOS	10355 10362	9977 9982	9/90T		11880 11909	CO417	11014		10977 10983 9797 9820	11762 11770 11800	11741	9510	10462 1	9543	11505	10640	9775	11576		93/0 9748			9201	9323 9342	12156	9114 9135		9310	12262 12267	11559	00011 1000 8900 8910 8930 8939		9092 9114	9044	10237	8811
MNT-8 MNT-A PL-C PL-8 PL-A	(GM) (GM) (GM) (GM) (GM)	0	6 0	10036 10045	8367 8375 10046 11040	10285 10370 10376	11726	11725 11836	11245 11355	11670	12114 9648	11870	23404	10355 10362	9977 9982	0/00T 6000T TOCOT		11795 11880 11909 11304 11483 11488	CONTY ACCTY	10886 11014	11286 11290 11415	10858 10977 10983 333 9688 9694 9797 9797 9820	11641 11762 11770 11800		9504 9510	10457 10462 1	9536 9543	11381 11496 11505	10537 10632 10640	9775 9775	11576	9344	9340 9748	9398	12319	9189 9201	9319 9323 9342	12156	9114 9135	12283	9302 9310	12178 12262 12267	11435 11543 11555 11559	10909 10901 19501 8930 8939 8900 8910 8930 8939			9039 9044	75201 92201	8811 8811
PRANRIE FM MNT-8 MNT-4 PL-C PL-8 PL-A	(aw) (aw) (aw) (aw) (aw) (aw)		9 11876 55 8730	10036 10045	8280 8367 8375 10006 10046 11031 11040	10243 10285 10370 10376	11620 11726 11865	11629 11725 11836	11180 11245 11355 12364 12528	11583 11583	9509 9513 12107 12114 9648	11873 11870	11470	10223 1046/ 10355 10362	9844 9977 9982	12330 12330 12001 12001 1201	11102	11785 11795 11880 11909 11336 11304 11483 11488	12144	9966 10886 11014	11213 11286 11290 11415	10800 10858 10977 10983	11540 11641 11762 11770 11800	11630	9374 9504 9510	10336 10457 10462 1	9400 9536 9543	11317 11381 11496 11505	11060 10495 10537 10632 10640	9675 9775 9775	11495 30/0 39/0 11576	9213 9344	9226 9370 9610 9740 9748	9263 9398	12197 12319 12284 12404	9048 9189 9201	9171 9319 9323 9342	925/ 12142 12156	8973 9114 9135	12119 12164 12283	9166 9302 9310	12107 12178 12262 12267	11364 11435 11543 11555 11559	108/3 10909 10909 10900 8910 8939 8780 8930 8930	11930	8954	8867 8898 9039 9044	6672 10070 10237	8689 8811 8811
PRANRIE FM MNT-8 MNT-4 PL-C PL-8 PL-A	(aw) (aw) (aw) (aw) (aw) (aw)		2179 11876 2055 8730	10036 10045	8367 8375 10046 11040	10243 10285 10370 10376	11726	11629 11725 11836	11245 11355	11583 11583	12114 9648	11873 11870	23404	2001 10461 10467 10362 10362 10362	9844 9977 9982	0/00T 6000T TOCOT	11102	11795 11880 11909 11304 11483 11488	12144	10886 11014	11213 11286 11290 11415	10858 10977 10983 333 9688 9694 9797 9797 9820	11540 11641 11762 11770 11800		9374 9504 9510	10336 10457 10462 1	9536 9543	11317 11381 11496 11505	10537 10632 10640	9775 9775	11495 30/0 39/0 11576	9213 9344	9340 9748	9263 9398	12319	9048 9189 9201	9171 9319 9323 9342	12156	8973 9114 9135	12283	9166 9302 9310	12107 12178 12262 12267	11364 11435 11543 11555 11559	10909 10901 19501 8930 8939 8939	11930	8954	8867 8898 9039 9044	75201 92201	8689 8811 8811
PRANRIE FM MNT-8 MNT-4 PL-C PL-8 PL-A	(aw) (aw) (aw) (aw) (aw) (aw)	2121	2179 2055	2117 9896 10036 10045	1950 8280 8367 8375 2164 10806 10846 11031 11040	2167 10243 10285 10370 10376	2289 11620 11726 2113 11865	2249 11629 11725 11836	2420 11180 11245 11355 2308 12364 1228	1976 11583 11670	2255 9509 9648 2338 12107 12114 1	2211 11873 11870	2270 11470 2004 10464 10467	2108 10223 1046/ 10355 10362	2131 9844 9977 9982	2220 12330 10001 10001 12001 12001 2220 2220	2198 11102	2436 11785 11795 11880 11909 1021 11336 11304 11482 11488	2421 12144 11274 11403	2104 9966 2283 10826 10886 11014	2363 11213 11286 11290 11415	2266 10800 10858 10977 10983	2449 11540 11641 11762 11770 11800	2241 11630 2224 11510	2260 9374 9504 9510	2073 10336 10457 10462 1	2193 9400 9536 9543	2324 11317 11381 11496 11505	2123 11660 2248 10495 10537 10632 10640	2290 9675 9775 9775	11576 30443 30700 9970 11892 11495 31576	2185 9213 9344	2079 9226 2338 9610 9740 9748	2204 9263 9398	2208 12197 12319 2275 12284 12404	1983 9048 9189 9201	2044 9171 9319 9323 9342	212/ 926/ 2384 12142 12156	1980 8973 9114 9135	2393 12119 2165 12164 12283	2141 9166 9302 9310	2407 12107 12178 12262 12267	2277 11364 11435 11543 11555 11559	2134 108/3 10909 10909 2134 10800 1978 8780 8920 8920 8930 8939	2439 11930	1992 8954	1935 888/ 1938 8898 9044	1609 6672 2142 10070 10237	1944 8689 8811 8811
PRANRIE FM MNT-8 MNT-4 PL-C PL-8 PL-A	(aw) (aw) (aw) (aw) (aw) (aw)	2121	2179 2055	-103.4498 2117 9896 10036 10045 1	1950 8280 8367 8375 2164 10806 10846 11031 11040	2167 10243 10285 10370 10376	2289 11620 11726 2113 11865	2249 11629 11725 11836	2420 11180 11245 11355 2308 12364 1228	1976 11583 11670	2255 9509 9648 2338 12107 12114 1	2211 11873 11870	2270 11470 2004 10464 10467	-103.5066 2108 10223 10497 10355 10362	2131 9844 9977 9982	2220 12330 10001 10001 12001 12001 2220 2220	2198 11102	2436 11785 11795 11880 11909 1021 11336 11304 11482 11488	2421 12144 11274 11403	-103.37993 2104 9966 -102.33656 2283 10826 10886 11014	-103.1373 2363 11213 11286 11290 11415	2266 10800 10858 10977 10983 2355 9666 9688 9604 9797 9820	-102.57595 2449 11540 11641 11762 11770 11800	-103.95505 2241 11630	-102.49090 2334 11510 -103.79637 2260 9374 9510	2073 10336 10457 10462 1	2193 9400 9536 9543	2324 11317 11381 11496 11505	2123 11660 2248 10495 10537 10632 10640	2290 9675 9775 9775	11576 30443 30700 9970 11892 11495 31576	2185 9213 9344	2079 9226 2338 9610 9740 9748	2204 9263 9398	-103.46152 2208 12197 12319 -103.39687 2275 12284 12404	-103.3962 1983 9048 9189 9201	-103.3943 2044 9171 9319 9323 9342	-103.40/23 212/ 926/ -102.81926 2384 12142 12156	-103.41282 1980 8973 9114 9135	-102.69786 2393 12119 -103.13892 2165 12164 12283	-103.97143 2141 9166 9310 9310	-103.204 2407 12107 12178 12262 12267	-103.19767 2277 11364 11435 11543 11555 11559	-102.52766 1978 8780 10909 10991 8910 8930 8939 -102.53766 1978 8780 8930 8910 8930 8939	-103.74354 2439 11930	-103.43492 1992 8954	1935 888/ 1938 8898 9044	1609 6672 2142 10070 10237	1944 8689 8811 8811
PRANRIE FM MNT-8 MNT-4 PL-C PL-8 PL-A	(aw) (aw) (aw) (aw) (aw) (aw)	47.8135 -101.17774 2121	2179 2055	48.7458 -103.4498 2117 9896 10036 10045 1	8280 8367 8375 10006 10046 11031 11040	48.6604 -103.85535 2167 10243 10285 10370 10376	11620 11726 11865	48.2826 -102.76577 2249 11629 11725 11836	11180 11245 11355 12364 12528	48.0729 -103.89807 1976 11583 11670	48.9138 -103.48908 2255 9509 9648 47.7052 -102.70947 2338 12107 12114 1	47.712 -102.59684 2211 11873 11870	47.4834 -102.49439 2270 11470	47.9939 -102.12 2001 10491 10491 10497 10359 10352 48.6829 -103.5066 2108 10223 10352 10352 10352	48.7875 -103.50599 2131 9844 9977 9982	40.0114 -103.07/64 2119 10921 10961 10009 10076 . 47.7484 -103.19959 2220 12330	47.5578 -102.26182 2198 11102	47.8846 -102.88052 2436 11785 11795 11880 11909 48.3651 -103.50034 1031 11336 11304 11482 11488	40.001 -102.79259 2421 12144 1.00	48.791 -103.37993 2104 9966 48.7367 -103 33656 2383 10826 10886 11014	48.5487 -103.1373 2363 11213 11286 11290 11415	48.365 -102.45838 2266 10800 10858 10977 10983 3 48.365 -107.07346 2355 9666 9688 9604 9797 9820	48.2887 -102.57595 2449 11540 11641 11762 11770 11800	48.1527 -103.95505 2241 11630 474926 -107.46666 2324 11510	4/4920 -10240090 2394 11210 48.9403 -103.79637 2260 9374 9510	48.5525 -104.00695 2073 10336 10457 10457 10462 1	48.8833 -103.86379 2193 9400 9536 9543	48.2023 -102.46905 2324 11317 11381 11496 11505	4/9535 -105/95809 2123 11060 48.6277 -103.78452 2248 10495 10537 10632 10640	48.824 -103.04538 2290 9675 9775 9775 9775	40.44.04 -102.2430 2237 9043 9070 9970 48.0196 -103.85805 1892 11495 11495 11576	48.9361 -103.96536 2185 9213 9344	48.9343 -103.53431 2079 9226 9370 48.889 -103.65361 2338 9610 9748 9748	48.9328 -103.84377 2204 9263 9398	47.9435 -103.46152 2208 12197 12319 47.9024 -103.39687 2275 12284 12404	48.965 -103.3962 1983 9048 9189 9201	48.9433 -103.3943 2044 9171 9319 9323 9342	48.936 -103.40/23 212/ 926/ 47.751 -102.81926 2384 12142 12156	48.9831 -103.41282 1980 8973 9114 9135	47.6511 -102.69786 2393 12119 47.9369 -103.13892 2165 12164 12283	48.9404 -103.97143 2141 9166 9302 9310	48.3043 -103.204 2407 12107 12178 12262 12267	48,4795 -103.19767 2277 11364 11435 11543 11555 11559	48.2295 -102.92925 2134 108/3 10909 10991 11000 48.873 -102.53766 1978 8780 8939 8939	47.6157 -103.74354 2439 11930	48.9886 -103.43492 1992 8954	48.9614 -103.2311b 1935 8867 48.9831 -103.28075 1938 8898 9039 9044	48.6069 -101.34766 1609 6672 48.7293 -103.35736 2142 10070	48.8959 -102.52588 1944 8689 8811 8811
MNT-8 MNT-A PL-C PL-8 PL-A	(aw) (aw) (aw) (aw) (aw) (aw)	8807 47.8135 -101.17774 2121	8812 47.8573 -103.72477 2179 8870 48.4177 -101.8236 2055	8888 48.7458 -103.4498 2117 9896 10036 10045 1	8893 48.8671 -102.25877 1950 8280 8367 8375 8809 48.3451 -107.02981 2144 10006 10046 11031 11040	48.6604 -103.85535 2167 10243 10285 10370 10376	8914 48.2507 -103.89863 2289 11620 11726 8915 47.5346 -103.09339 2113 11865	8936 48.2826 -102.76577 2249 11629 11725 11836	89/9 48.4939 -103.0/268 2420 11180 11245 11355 8998 48.1093 -103.35257 2308 12364 12528	9003 48.0729 -103.89807 1976 11583 11670	9020 48.9138 -103.48908 2255 9509 9648 9037 477052 -10270947 2338 12107 12114 1	47.712 -102.59684 2211 11873 11870	2270 11470 2004 10464 10467	47.9939 -102.12 2001 10491 10491 10497 10359 10352 48.6829 -103.5066 2108 10223 10352 10352 10352	48.7875 -103.50599 2131 9844 9977 9982	2220 12330 10001 10001 12001 12001 2220 2220	9191 47.5578 -102.26182 2198 11102	9192 47.8846 -102.88052 2436 11785 11795 11880 11909 0264 48.5651 -103.50024 1021 11236 11204 11482 11488	9269 47.5112 -102.79259 2421 12144	-103.37993 2104 9966 -102.33656 2283 10826 10886 11014	48.5487 -103.1373 2363 11213 11286 11290 11415	2266 10800 10858 10977 10983 2355 9666 9688 9604 9797 9820	48.2887 -102.57595 2449 11540 11641 11762 11770 11800	-103.95505 2241 11630	4/45/0 -102.40090 2334 11310 48.9403 -103.79637 2260 9374 9510	48.5525 -104.00695 2073 10336 10457 10457 10462 1	2193 9400 9536 9543	9458 48.2023 -102.46905 2324 11317 11381 11496 11505	9464 4/.9455 -105.95809 2123 11060 9465 48.6277 -103.78452 2248 10495 10537 10632 10640	9472 48.824 -103.04538 2290 9675 9775 9775 9775	94/0 40.44.00 - 102.214.95 2.22/ 904.9 90/0 99/0 9518 48.0196 -103.85805 1892 11495 11495 11576 7	9528 48.9361 -103.96536 2185 9213 9344	2079 9226 2338 9610 9740 9748	9608 48.9328 -103.84377 2204 9263 9398	-103.46152 2208 12197 12319 -103.39687 2275 12284 12404	9622 48.965 -103.3962 1983 9048 9189 9201	9628 48.9433 -103.3943 2044 9171 9319 9323 9342	9661 48.936 -103.407.23 2127 9267 9676 47.751 -102.81926 2384 12142 12156	9677 48.9831 -103.41282 1980 8973 9134 9135	-102.69786 2393 12119 -103.13892 2165 12164 12283	9761 48,9404 -103.97143 2141 9166 9302 9310	9775 48.3043 -103.204 2407 12107 12178 12262 12267	9800 48.4795 -103.19767 2277 11364 11435 11543 11555 11559	9645 48.2295 -102.9295 2134 108/3 10909 10991 11000 99001 48.873 -102.53766 1978 8780 8980 8910 8930 8939	47.6157 -103.74354 2439 11930	9907 48.9886 -103.43492 1992 8954	P 9913 48.9614 -103.23116 1935 8867 9918 48.9831 -103.28075 1938 8898 9044 9	99191 48.6069 -101.34766 1609 6672 9942 48.7393 -103.34756 2142 10070 10237	48.8959 -102.52588 1944 8689 8811 8811
WELL SUPACE SUBACE IN PAURE NO LITTUDE CONTINCE IN NOT-8 MIT-4 PLC PL-8 PLA	(aw) (aw) (aw) (aw) (aw) (aw)	8807 47.8135 -101.17774 2121	H-IC 8812 47.8573 -103.72477 2179 8870 48.4177 -101.8236 2055	8888 48.7458 -103.4498 2117 9896 10036 10045 1	8893 48.8671 -102.25877 1950 8280 8367 8375 8809 48.3451 -107.02981 2144 10006 10046 11031 11040	8901 48.6604 -103.85535 2167 10243 10285 10370 10376	8914 48.2507 -103.89863 2289 11620 11726 8915 47.5346 -103.09339 2113 11865	8936 48.2826 -102.76577 2249 11629 11725 11836	22 89/9 48.4939 -103.0/268 2420 11180 11245 11355 8998 48.1093 -103.35257 2308 12364 12228	9003 48.0729 -103.89807 1976 11583 11670	9020 48.9138 -103.48908 2255 9509 9648 9037 477052 -10270947 2338 12107 12114 1	9040 47.712 -102.59684 2211 11873 11870	9044 47.4834 -102.49439 2270 11470 0065 47.0000 407.15200 0004 40.451 40453	9051 47.9596 -103.5066 2108 10223 1046/ 10355 10352 10362	9083 48.7875 -103.50599 2131 9844 9977 9982	9100 45.0114 -103.07.04 2119 10321 10301 10009 10070 9180 47.7484 -103.19959 2220 12330	9191 47.5578 -102.26182 2198 11102	9192 47.8846 -102.88052 2436 11785 11795 11880 11909 0264 48.5651 -103.50024 1021 11236 11204 11482 11488	7-95 9269 475112 -102.79259 2421 12144	9274 48.791 -103.37993 2104 9966 9778 48.7347 -107.33666 2383 10826 11014	9296 48.5487 -103.1373 2363 11213 11286 11290 11415	9326 48.365 -102.45838 2266 10800 10858 10977 10983 : 9346 48.3995 -107.07346 2355 5666 9588 8594 9797 9820	000 000 11762 11762 11760 11540 11641 11762 11770 11800	9395 48.1527 -103.95505 2241 11630 0307 474305 4107.46666 2324 11610	9397 47.4920 -102.40090 2354 1.1340 9398 48.9403 -103.79637 2260 9374 9510	9412 48.5255 -104.00695 2073 10336 10457 10462 1	т 9446 48.8833 -103.86379 2193 9400 9536 9543	9458 48.2023 -102.46905 2324 11317 11381 11496 11505	1 9464 47.9355 -103.93809 2.123 11560 9465 48.6277 -103.78452 2248 10495 10537 10632 10640	9472 48.824 -103.04538 2290 9675 9775 9775 9775	94/0 40.44.00 - 102.214.95 2.22/ 904.9 90/0 99/0 9518 48.0196 -103.85805 1892 11495 11495 11576 7	9528 48.9361 -103.96536 2185 9213 9344	9568 48.9543 -103.53431 -2079 9226	I 3 9608 48.9328 -103.84377 2204 9263 9398	9619 47.9435 -103.46152 2208 12197 12319 9620 47.9024 -103.39687 2275 12284 12404	9622 48.965 -103.3962 1983 9048 9189 9201	9628 48.9433 -103.3943 2044 9171 9319 9323 9342	9661 48.936 -103.407.23 2127 9267 9676 47.751 -102.81926 2384 12142 12156	9677 48.9831 -103.41282 1980 8973 9134 9135	9710 47.6511 -102.69786 2393 12119 9717 47.9369 -103.13892 2165 12164 12283	9761 48,9404 -103.97143 2141 9166 9302 9310	3 9775 48.3043 -103.204 2407 12107 12178 12262 12267	9800 48.4795 -103.19767 2277 11364 11435 11543 11555 11559	20-2 9845 48.2295 -102.92925 2134 10873 10909 10919 10991 10000 1 99001 48.873 -102.53766 1978 8780 8939	9901 47.6157 -103.74354 2439 11930	9907 48.9886 -103.43492 1992 8954	P 9913 48.9614 -103.23116 1935 8867 9918 48.9831 -103.28075 1938 8898 9044 9	99191 48.6069 -101.34766 1609 6672 9942 48.7393 -103.34756 2142 10070 10232	99190 48.8959 -102.52588 1944 8689 88811 8811
WELL SUPACE SUBACE IS PAURE NO LITTUDE CONTINCE IS PAURE NO LITTUDE CONTINCE ELEVITOR FA MATE PLC PL8 PLA	(aw) (aw) (aw) (aw) (aw) (aw)	8807 47.8135 -101.17774 2121	H-IC 8812 47.8573 -103.72477 2179 8870 48.4177 -101.8236 2055	8888 48.7458 -103.4498 2117 9896 10036 10045 1	8893 48.8671 -102.25877 1950 8280 8367 8375 8809 48.3451 -107.02981 2144 10006 10046 11031 11040	8901 48.6604 -103.85535 2167 10243 10285 10370 10376	8914 48.2507 -103.89863 2289 11620 11726 8915 47.5346 -103.09339 2113 11865	8936 48.2826 -102.76577 2249 11629 11725 11836	22 89/9 48.4939 -103.0/268 2420 11180 11245 11355 8998 48.1093 -103.35257 2308 12364 12228	9003 48.0729 -103.89807 1976 11583 11670	9020 48.9138 -103.48908 2255 9509 9648 9037 477052 -10270947 2338 12107 12114 1	9040 47.712 -102.59684 2211 11873 11870	9044 47.4834 -102.49439 2270 11470 0065 47.0000 407.15200 0004 40.451 40453	9051 47.9596 -103.5066 2108 10223 1046/ 10355 10352 10362	9083 48.7875 -103.50599 2131 9844 9977 9982	9100 45.0114 -103.07.64 2119 10321 10301 10009 10070 9180 47.7484 -103.19959 2220 12330	9191 47.5578 -102.26182 2198 11102	9192 47.8846 -102.88052 2436 11785 11795 11880 11909 0264 48.5651 -103.50024 1021 11236 11204 11482 11488	7-95 9269 475112 -102.79259 2421 12144	9274 48.791 -103.37993 2104 9966 9778 48.7347 -107.33454 2383 10826 11014	9296 48.5487 -103.1373 2363 11213 11286 11290 11415	9326 48.365 -102.45838 2266 10800 10858 10977 10983 : 9346 48.3995 -107.07346 2355 5666 9588 8594 9797 9820	000 000 11762 11762 11760 11540 11641 11762 11770 11800	9395 48.1527 -103.95505 2241 11630 0307 474395 4107.46666 3324 11610	9397 47.4920 -102.40090 2354 1.1340 9398 48.9403 -103.79637 2260 9374 9510	9412 48.5255 -104.00695 2073 10336 10457 10462 1	т 9446 48.8833 -103.86379 2193 9400 9536 9543	9458 48.2023 -102.46905 2324 11317 11381 11496 11505	1 9464 47.9355 -103.93809 2.123 11560 9465 48.6277 -103.78452 2248 10495 10537 10632 10640	9472 48.824 -103.04538 2290 9675 9775 9775 9775	94/0 40.44.00 - 102.214.95 2.22/ 904.9 90/0 99/0 9518 48.0196 -103.85805 1892 11495 11495 11576 7	9528 48.9361 -103.96536 2185 9213 9344	9568 48.9543 -103.53431 -2079 9226	I 3 9608 48.9328 -103.84377 2204 9263 9398	9619 47.9435 -103.46152 2208 12197 12319 9620 47.9024 -103.39687 2275 12284 12404	9622 48.965 -103.3962 1983 9048 9189 9201	9628 48.9433 -103.3943 2044 9171 9319 9323 9342	9661 48.936 -103.407.23 2127 9267 9676 47.751 -102.81926 2384 12142 12156	9677 48.9831 -103.41282 1980 8973 9134 9135	9710 47.6511 -102.69786 2393 12119 9717 47.9369 -103.13892 2165 12164 12283	9761 48,9404 -103.97143 2141 9166 9302 9310	3 9775 48.3043 -103.204 2407 12107 12178 12262 12267	9800 48.4795 -103.19767 2277 11364 11435 11543 11555 11559	20-2 9845 48.2295 -102.92925 2134 10873 10909 10919 10991 10000 1 99001 48.873 -102.53766 1978 8780 8939	9901 47.6157 -103.74354 2439 11930	9907 48.9886 -103.43492 1992 8954	P 9913 48.9614 -103.23116 1935 8867 9918 48.9831 -103.28075 1938 8898 9044 9	99191 48.6069 -101.34766 1609 6672 9942 48.7393 -103.34756 2142 10070 10232	99190 48.8959 -102.52588 1944 8689 8811 8811
PRANRIE FM MNT-8 MNT-4 PL-C PL-8 PL-A	(aw) (aw) (aw) (aw) (aw)	HAUF 1-16 8807 47.8135 -101.17774 2121	47.8573 -103.72477 2179 48.4177 -101.8236 2055	GORDON HALL 1 8888 48.7458 -103.4498 2117 9896 10036 10045 1	48.8671 -102.25877 1950 8280 8367 8375 48.2461 -102 02981 2194 10006 10046 11021 11040	STORSETH 1 8901 48.6604 -103.85535 2167 10243 10285 10370 10376	48.2507 -103.89863 2289 11620 11726 47.5346 -103.09339 2113 11865	THOMPSON 4-1 8936 48.2826 -102.76577 2249 11629 11725 11836	89/9 48.4939 -103.0/268 2420 11180 11245 11355 8998 48.1093 -103.35257 2308 12364 12528	IRWIN 1 9003 48.0729 -103.89807 1976 11583 11670	48.9138 -103.48908 2255 9509 9648 47.7052 -102.70947 2338 12107 12114 1	HARMON 1 9040 47.712 -102.59684 2211 11873 11870	A 9044 47.4834 -102.49439 2270 11470	LEBERIO 1-35 9053 47,3298 -102,372 2001 10461 10467 10201 10552 10362 10201 10467 17-1 9061 48,6829 -103,5066 2108 10223 10323 10352 10362 10362	9083 48.7875 -103.50599 2131 9844 9977 9982	CETERIST 1-11 9100 40-0114 -103-37/04 2119 10321 10321 10301 10009 10079	C. A. DANKS 1-15 9191 47.5578 -102.26182 2198 11102	47.8846 -102.88052 2436 11785 11795 11880 11909 48.3651 -103.50034 1031 11336 11304 11482 11488	DAMILE 1 7.2504 40-3031 102.79259 1.221 1.230 1.1394 1.1403 COGC/ALAQ 33-147-95 9269 47.5112 -102.79259 2.421 1.2144	48.791 -103.37993 2104 9966 48.7367 -103 33656 2383 10826 10886 11014	SMITH 24-31 9296 48.5487 -103.1373 2363 11213 11286 11290 11415	48.365 -102.45838 2266 10800 10858 10977 10983 3 48.365 -107.07346 2355 9666 9688 9604 9797 9820	ROSS 36-32 9373 48.2887 -102.57595 2449 11540 11641 11762 11770 11800	48.1527 -103.95505 2241 11630 474926 -107.46666 2324 11510	UUUNN 1	9412 48.5525 -104.00695 2073 10336 10457 10462 1	ПАОЧОНИО I 9446 48.8833 -103.86379 2193 9400 9536 9543 REISTAD 1-IR 9446 48.8833 -103.86379 2193 9400 9536 9543	STROBECK 1-35 9458 48.2023 -102.46905 2324 11317 11381 11496 11505	9464 4/.9455 -105.95809 2123 11060 9465 48.6277 -103.78452 2248 10495 10537 10632 10640	472 48.824 -103.04538 2290 9675 9775 9775	TALEVONSUN 1-10 9410 40:4104 -102.21453 2227 9649 9970 9970 CLARENCE JOHNSRUD 9518 48.0196 -103.85805 1892 11495 11576 7	CONOCO MOORE 20 9528 48.9361 -103.95336 2185 9213 9344	48.9343 -103.53431 2079 9226 9510 9370 9370 48.889 -103.65361 2338 9610 9748 9748	LAVERNE HAUGEN 3 9608 48.9328 -103.84377 2204 9263 9398	47.9435 -103.46152 2208 12197 12319 47.9024 -103.39687 2275 12284 12404	ARNOLD HAGEN STATE 9622 48.965 -103.3962 1983 9048 9201	9628 48.9433 -103.3943 2044 9171 9319 9323 9342	G. C. MAUGLMNU Z 996.1 48.936 -1.U3.40/23 212/ 92.67 LYLE HENDERSON TRUST 9676 47.751 -1.02.81926 2384 12142 12156	CANDAK-HANSON 33 9677 48.9831 -103.41282 1980 8973 9135	9710 47.6511 -102.69786 2393 12119 9717 47.9369 -103.13892 2165 12164 12283	CONOCO MOORE 18 9761 48.9404 -103.97143 2141 9166 9302 9310	GORDON E. TANK 3 9775 48.3043 -103.204 2407 12107 12178 12262 12267	9800 48.4795 -103.19767 2277 11364 11435 11543 11555 11559	E. ANDERSON 20-2 9845 48.2295 -102.92242 2134 10873 10909 10991 11000 TXL STORAGE 1 99001 48.873 -102.53766 1978 8780 8930 8910 8930 8930	USA 31-25-155 9901 47,6157 -103,74354 2439 11930	9907 48.9886 -103.43492 1992 8954	GIN HAN PAKTINENSHIP 9913 48.9014 -103.2311b 1935 8867 P. A. LANDSTROM 9918 48.9831 -103.28075 1938 8898 9039 9044 9	48.6069 -101.34766 1609 6672 48.7293 -103.35736 2142 10070	EBY-1 99190 48.8959 -102.52588 1944 8689 8811 8811 8811