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An Assessment of In-Place Gas in Tight and Near-Tight Reservoirs, Wind River Indian Reservation, Wyoming

by

Ronald C. Johnson, Robert A. Crovelli, Thomas M. Finn, and Bradley G. Lowell

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ABSTRACT

A basin-centered, low-permeability gas accumulation occurs in rocks of Late Cretaceous and early Tertiary age in the Wind River Basin of central Wyoming. A significant portion of this accumulation occurs within the boundaries of the Wind River Indian Reservation. The central part of the accumulation is overpressured while the marginal or transition zone appears to be normally pressured to underpressured. The overpressured part of the accumulation occurs in rocks with thermal maturities as measured using vitrinite reflectance (Rm) of about 1.1% or greater, while the marginal transition zone occurs in rocks with a thermal maturity of about Rm 0.73 to 1.1%. Pressure gradients of more than 0.73 psi/ft were measured in the central core of the overpressured part, where present-day formation temperatures exceed about 300°F.

A volumetric approach was used to estimate in-place gas resources in each stratigraphic unit within the highly overpressured (present-day temperatures > 300°F), moderately overpressured (Rm>1.1%), and underpressured (Rm 0.73-1.1%) parts of the accumulation for a total of 17 plays. Each play was divided into as many as 92 subplay areas based on variations in sandstone thickness and depth. Mean estimates were made of the hydrocarbon-volume attribute for each subplay to calculate the mean estimate of in-place gas for each play. Estimates were also made of the ranges for the volume attribute at the 95th and 5th fractile levels, in order to calculate the estimated range of gas in each subplay using probability theory. The subplays were aggregated assuming perfect positive correlation to calculate the estimated range of gas in each play. Finally, all of the plays were aggregated assuming perfect positive correlation to assess total in-place gas in all of the plays.

A total of 316 tcf of mean in-place gas is estimated for the 17 plays that occur within the boundaries of the Reservation. This is about 31% of the total of 995 tcf of gas mean in-place gas estimated by Johnson and others (1996b, Table 67) for the 22 plays in the entire Wind River Basin. Using probability theory, there is a 95% chance that there is at least 187 tcf of gas in-place in the basin centered gas accumulation in the Wind River Indian Reservation and a 5% chance that there is at least 496 tcf of gas in place. It cannot be overemphasized that this gas is a dispersed, low-grade resource, and that only the most economic parts, or sweet spots, of this resource will probably ever be produced. Although recoverable gas was not estimated for the low-permeability gas accumulation in the Wind River Indian Reservation, an estimate of in-place gas at various depths was

calculated. About 58% of the gas in-place occurs at depths of greater than 14,000 ft and only about 10% of the gas occurs at depths of 10,000 ft or less.

INTRODUCTION

Since 1977, the U.S. Department of Energy (DOE) has supported the U.S. Geological Survey in its comprehensive tight-gas sand research in Rocky Mountain basins including the Uinta Basin of Utah and Colorado, the Piceance Basin of Colorado, the Greater Green River Basin of Wyoming, Colorado, and Utah, the Wind River Basin of Wyoming ,and most recently the Bighorn Basin of Wyoming and Montana. Much pioneering work, which help to define these "unconventional" hydrocarbon deposits, was conducted under this project, and much of the subsequent commercial development of these resources can be attributed to Department of Energy funding for this research. This study presents an assessment of in-place gas in tight reservoirs in the Wind River Indian Reservation. The spreadsheets presented here are also available in digital form in part B of this report (Open-File Report 98-XXXB).

The Wind River Indian Reservation in the central part of Wyoming includes about the western one-third of the Wind River Basin (Figure 1). The Wind River Basin is one of several Rocky Mountain basins that contain significant resources of gas in very low-permeability (tight) sandstone reservoirs of Cretaceous and Tertiary age (Figure 2). Johnson and others (1996b) estimated that the Wind River Basin contained a mean estimate of 995 trillion cubic feet (tcf) of gas in place in tight to nearly tight reservoirs. They did not, however, subdivide the basin into Reservation and non-Reservation areas, and there was no estimate how much of this in-place gas occurred within the Reservation boundaries. In this report, an estimate is made of in-place gas that occurs in tight to near-tight reservoirs within the Reservation boundaries. In addition, the play maps used by Johnson and others (1996b) have been digitized. In their study, Johnson and others (1996b) used a hand-held planimeter to determine the sizes of the nearly 1,600 subplay areas used in their volumetric calculation of in-place gas. In this report the areas of these subplay areas was determined using a GIS system. The geologic framework needed for this assessment was described in a geologic summary report by Johnson and others (1996a), and many of the maps in this assessment rely on information from the summary report. Thermal maturity information used in the assessment is from Nuccio and others (1996). This report is similar to the report of Johnson and others (1996b) but has been modified to address the tight gas resources of only that part of the Wind River Basin that occurs within the boundaries of the Wind River Indian Reservation.

Tight gas reservoirs have an in-situ permeability to gas of 0.1 (md) or less (Spencer, 1987) and cover vast areas of the structurally deeper parts of Rocky Mountain basins. These accumulations differ from conventional hydrocarbon accumulations in that they (1) cut across stratigraphic units, (2) commonly are structurally down dip from more permeable water-filled reservoirs, (3) have no obvious structural and stratigraphic trapping mechanisms, and (4) are almost always either overpressured or underpressured. The abnormal pressures of these reservoirs indicate that water in hydrodynamic equilibrium with outcrop is not the pressuring agent. Instead, hydrocarbons within the tight reservoirs are thought to pressure these rocks (Spencer, 1987).

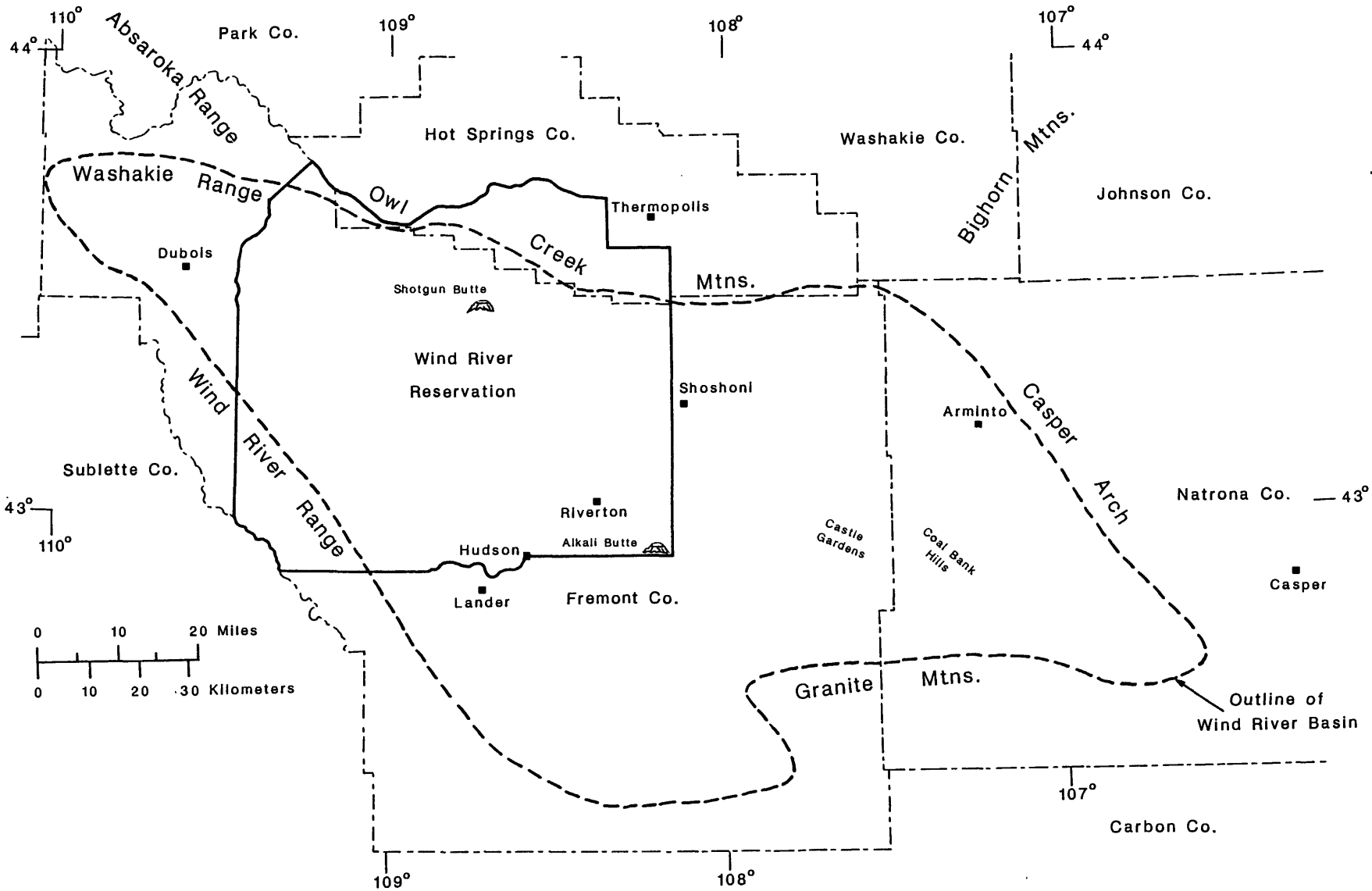


Figure 1: Index map showing approximate outline of Wind River Basin (dashed line) and surrounding uplifts. Location of Wind River Indian Reservation is also shown.

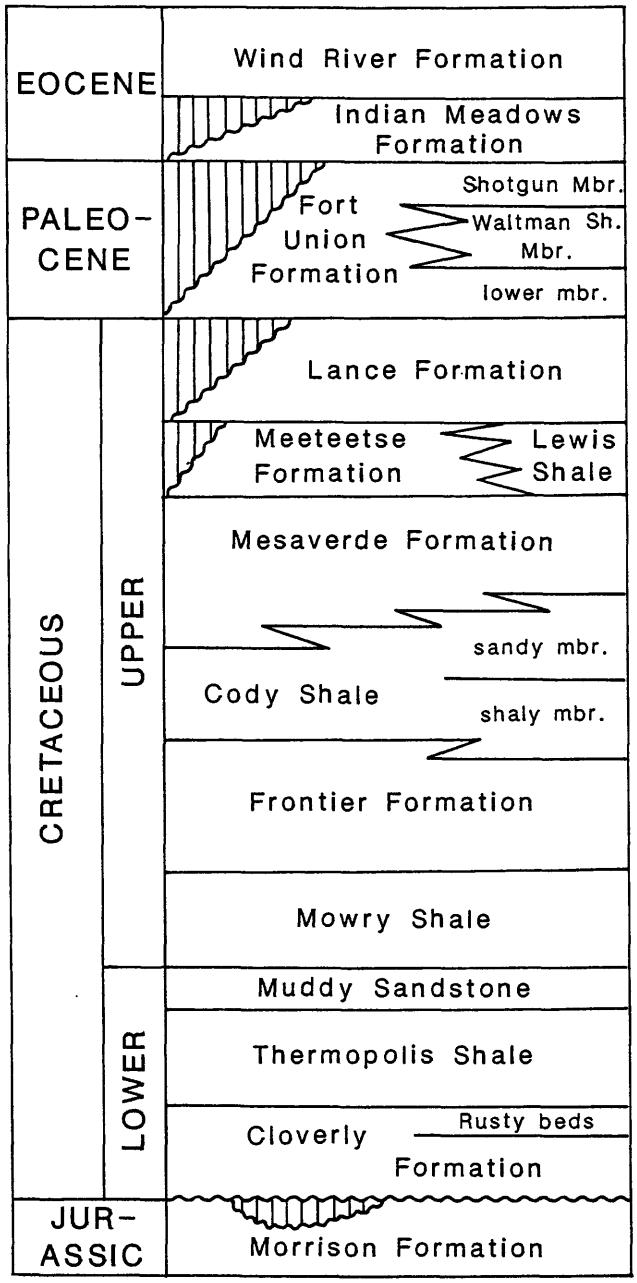


Figure 2: Generalized stratigraphic chart of Cretaceous and Lower Tertiary rocks, Wind River Basin, Wyoming.

Masters (1979) was one of the first to study these unique deposits, which occur downdip from more permeable, water-wet rocks. Masters proposed that gas generated in the deep, thermally mature areas of sedimentary basins with low-permeability rocks, is inhibited from migrating upwards and out of the basin by a capillary seal. Masters pointed out that low-permeability rocks (1 md), with 40% water saturation, are only three-tenths as permeable to gas as they are to water, and at 65% water saturation, the rock is almost completely impervious to the flow of gas. The concepts for the development of basin-centered gas accumulations in the Rocky Mountains has been further refined by a number of workers such as Jiao and others (1993), Meissner (1980; 1981; 1984), Mcpeek (1981), Law and others (1979), Law and Dickenson (1985), MacGowan and others (1993), Spencer and Law (1981), Spencer (1985), and Yin and Surdam (1993). In general, these models suggest that overpressuring, which is commonly encountered in these basin-centered accumulations, is the result of volumetric increases during hydrocarbon generation by the coals, nonmarine carbonaceous shales and marine shales that are interbedded with the sandstone reservoir rocks, and that migration distances from source rock to reservoir rock are not great. According to these models, much of the water that originally filled the pore spaces is driven out of these basin-centered hydrocarbon accumulations as hydrocarbons are generated. The capillary seal is activated as gas replaces water in the pore space, and hence the basin-centered gas accumulations seal themselves as they form. Some workers believe that these seals are so efficient that they may be able to maintain abnormally high pressures for tens of millions of years (MacGowan and others, 1993). An overpressured accumulation can evolve into one that is underpressured if a basin undergoes significant cooling.

Detailed geologic studies, critical to characterizing the complex nature of this resource, were conducted prior to this assessment This basic geologic information is largely published elsewhere, and these reports are referred to throughout the following discussion. Estimates of seven volume attributes are required in order to calculate in-place volumes of gas: 1) area of gas play or closure; 2) thickness of reservoir rock; 3) percent porosity; 4) percent trap fill; 5) hydrocarbon saturation; 6) pressure; and 7) temperature. In addition, the compressibility of gas or Z factor varies between gasses with different compositions, and hence an estimate of gas composition was also required for the volumetric equation. An explanation of how these volume attributes were estimated is given in the following discussion.

ACKNOWLEDGMENTS

We would like to thank the U.S. Department of Energy (DOE) who has supported the U.S. Geological Survey in its comprehensive tight-gas sand research in Rocky Mountain Basins. We would also like to thank oil and gas producers including Chevron, Louisana Land and Energy, Tom Brown Inc. and Barrett Resources who graciously provided drillhole information critical to our study. The reviewers Mitch Henry and Ted Dyman offered many helpful comments which improved this report significantly.

SUMMARY OF GEOLOGIC HISTORY

The Wind River Basin is an extensive structural depression surrounded by broad belts of faulted and folded Paleozoic and Mesozoic rocks that occupy the flanks of the adjacent mountain ranges and anticlinal uplifts, including the Wind River Range on the west, the Washakie Range and Owl Creek and southern Bighorn Mountains on the north, the Casper arch on the east, and the Granite Mountains on the south (Figure 1). Along the south and west margins of the basin the sedimentary strata dip 10°-20° basinward, whereas along the north and east margins the dips are commonly vertical to overturned. The basin floor is thus markedly asymmetric; the structurally deepest parts are close to the Owl Creek and Bighorn Mountains on the north and the Casper arch on the east. The basin interior is covered by nearly flat-lying lower Eocene rocks, which mask the structural features of the older rocks except along the mountain flanks and adjacent basin margins.

The basin formed during the Laramide orogeny in latest Cretaceous, Paleocene, and early Eocene time as the Rocky Mountain foreland basin, an extensive area of downwarping extending from the arctic to the Gulf of Mexico, was gradually partitioned into much smaller Laramide basins by rising Laramide uplifts. Epicontinental seas transgressed and regressed central Wyoming many times. The final major episode of marine deposition in central Wyoming is represented by the Cody Shale and the basal sandstone member of the overlying Mesaverde Formation that accumulated during the eastward regression of the Late Cretaceous shoreline. Nonmarine conditions prevailed during the deposition of the remainder of the Mesaverde as well as the overlying Meeteetse Formation, except for limited transgressions westward into the eastern part of the basin area as evidenced by the presence of tongues of the marine Lewis Shale within the Meeteetse stratigraphic interval (Figure 2). The sedimentary environment during the nonmarine period was largely characterized by floodplains, lagoons, and coastal swamps.

Major Laramide deformation began in latest Cretaceous time (beginning of Lance deposition) with pronounced downwarping of the basin trough and broad doming of parts of the marginal areas. The intensity of movement increased through the Paleocene, and culminated in earliest Eocene time as high mountains were uplifted. Clastic debris, stripped from the flanks of the rising mountain arches, was shed basinward from all sides, and a complete record of orogenic events is now preserved in the many thousands of feet of nonmarine sedimentary rocks in the Lance, Fort Union, Indian Meadows, and Wind River Formations that accumulated in the areas of greatest subsidence.

Basin subsidence and mountain uplift had virtually ended by the close of early Eocene time. Renewed folding and faulting of existing structural features took place after deposition of the Eocene Wind River Formation, but with few exceptions these movements were of minor consequence and did not significantly modify the structural patterns that had already been established.

Extensive sedimentation resulted in deposition of thick basin-fill sediments in middle and late Tertiary times. These younger rocks, which were subsequently eroded from the area of the Wind River Basin, were estimated by Keefer (1970, p. D29) to be as much as 3,000 feet thick. Keefer's estimate was made by projecting across the Wind River Basin erosional remnants of pediment surfaces preserved along the flanks of

Beaver Rim Divide to the south and the Absaroka Range to the northwest. Based on lithologies preserved in these remnants, this missing section was predominantly volcanoclastic, in sharp contrast to the predominantly non-volcanic, locally derived clastic material of the lower Eocene and older parts of the basin fill. By Pliocene time apparently only the highest mountain ridges projected above the sedimentary plain. Then, perhaps in middle or late Pliocene time, the entire region was uplifted several thousand feet, and a long period of degradation began which still continues. Re-excavation has now progressed to the point where only the lower Eocene and older rocks still remain in the central part of the basin. It should be emphasized, however, that the total thickness of basin-fill sediments that had accumulated by late Tertiary time (those remaining and those subsequently eroded away) should be taken into account in studies of the thermal maturity and burial histories of potential petroleum source rocks within the basin.

After the onset of the Laramide orogeny, the sedimentary history of the Wind River Basin is directly linked to the history of uplift on each of the surrounding uplifts. Flores and other (1994), in their paleogeographic reconstructions of Wyoming, show that the present-day Wind River Basin developed gradually during Paleocene time as each of the uplifts that define the basin became successively active. According to Flores and others (1994) the Wind River Range and Sweetwater Arch south of the Wind River Basin were actively rising by early Paleocene time. The Washakie Mountains northwest of the basin and the Granite Mountains south of the basin became active in middle Paleocene time, while the Owl Creek Mountains north of the basin and Casper Arch northeast of the basin did not become active until late Paleocene time.

Multiple unconformities in the Upper Cretaceous and lower Tertiary section adjacent to the Wind River Range record several periods of uplift and/or base level lowering in the adjacent basin. The oldest unconformity along the flank of the Wind River Range occurs between the Meeteetse Formation and Lance Formation. In the western part of the basin, this unconformity progressively truncates through the Meeteetse Formation through a lateral distance of from about 1 1/2 to 6 miles (Johnson and others, 1996a, fig 6). A second unconformity occurs between the Lance and the overlying Fort Union Formation. The Lance appears to be completely truncated in outcrop along the flanks of the Wind River Range but is present in the subsurface a short distance basinward (Keefer and Johnson, 1993, Figure 3, Plates 2, 4 and 5).

Flores and others (1994) suggest that two major river systems developed in the area of the Wind River Basin during the early Paleocene, one flowing eastward near the trough of the basin, and a second flowing northeastward to eastward along the south flank of the basin. The first is represented in outcrop by conglomeratic, braided and meandering stream deposits in the Shotgun Butte area in the northwest part of the basin (Flores and Keighin, 1993). The second is represented by a 15 mile wide paleovalley incised into Upper Cretaceous rocks along the flank of the Wind River Range near the town of Hudson (Flores and others, 1993). This paleovalley appears to have trended generally northeastward to eastward into the Castle Garden area adjacent to the Granite Mountains. In late Paleocene time much of the basin was flooded by an extensive permanent lake, Lake Waltman, in which was deposited 3,000 feet or more of dark-colored, very fine-grained lacustrine sediments which now comprise the Waltman Shale

Member of the Fort Union Formation (Figure 2). The basin may have evolved into a closed basin at this time as a result of uplift on the Owl Creek Mountains and Casper Arch (Flores and others, 1994). The lake was largely filled in prior to the end of the Paleocene.

DEFINING THE LIMITS OF BASIN-CENTERED HYDROCARBON ACCUMULATIONS

In order to estimate in-place resources in a basin-centered gas accumulation, the limits or boundaries of the accumulation must first be defined. These limits can be fairly well defined in heavily drilled areas using mud-log gas shows, results from drillstem and perforation tests, and geophysical well log analysis. Basin-centered gas accumulations are characterized by nearly continuous shows in mud logs (Masters, 1979; 1984), and mud logs are typically more reliable than geophysical logs in helping to define gas productive intervals (Dunleavy and Gilbertson, 1986; Reinecke and others, 1991). Drillstem tests are useful in defining basin-centered gas accumulations in that they can detect zones of overpressuring and underpressuring. A change in sonic log response is commonly used to define overpressured conditions in unconsolidated fine-grained sediments in areas such as the Gulf Coast. Surdam and others (1994) demonstrated that sonic logs are also useful in delineating overpressured shale sequences in basin-centered gas accumulations in Rocky Mountain basins.

Although all Rocky Mountain basin-centered gas accumulations share many characteristics in common, each basin is unique in many ways. Because of these unique characteristics a "rule of thumb" developed to help define the limits of a basin-centered gas accumulation in one basin may not work well in another. A good understanding of the basic geologic framework of a particular basin can be very helpful. The Cretaceous and lower Tertiary basin-centered gas accumulation in the Wind River Basin is sparsely drilled when compared to other Rocky Mountain basins such as the Piceance Basin, San Juan Basin and Greater Green River Basin. Many gas fields are single well fields (Figure 3) that have never been connected to a pipeline and produced. Most geologic formations in the Upper Cretaceous through lower Tertiary interval in the Wind River Basin have produced gas somewhere in the basin, however, much of this production is from relatively shallow reservoirs which clearly have conventional permeabilities.

The sparse drillhole information makes defining the limits of the basin-centered accumulation in the Wind River Basin a challenge. Only a few permeability measurements from cores have been published, and none of these measurements were made under in-situ pressure conditions. Available drillstem tests in the basin are too sparse to define the limits of the basin-centered accumulation throughout the basin. In spite of the sparse data, many units in the basin, including the Upper Cretaceous Mesaverde, Meeteetse, and Lance Formations, and the Paleocene Fort Union Formation, were designated as tight in the 1980s and early 1990s when a tax credit was given for gas produced from tight formations. The most compelling evidence for a widespread basin-centered hydrocarbon accumulation in the Wind River Basin is the high mudweights universally used while drilling deep tests in the basin. These high mudweights indicate that moderately overpressured to highly overpressured conditions are pervasive

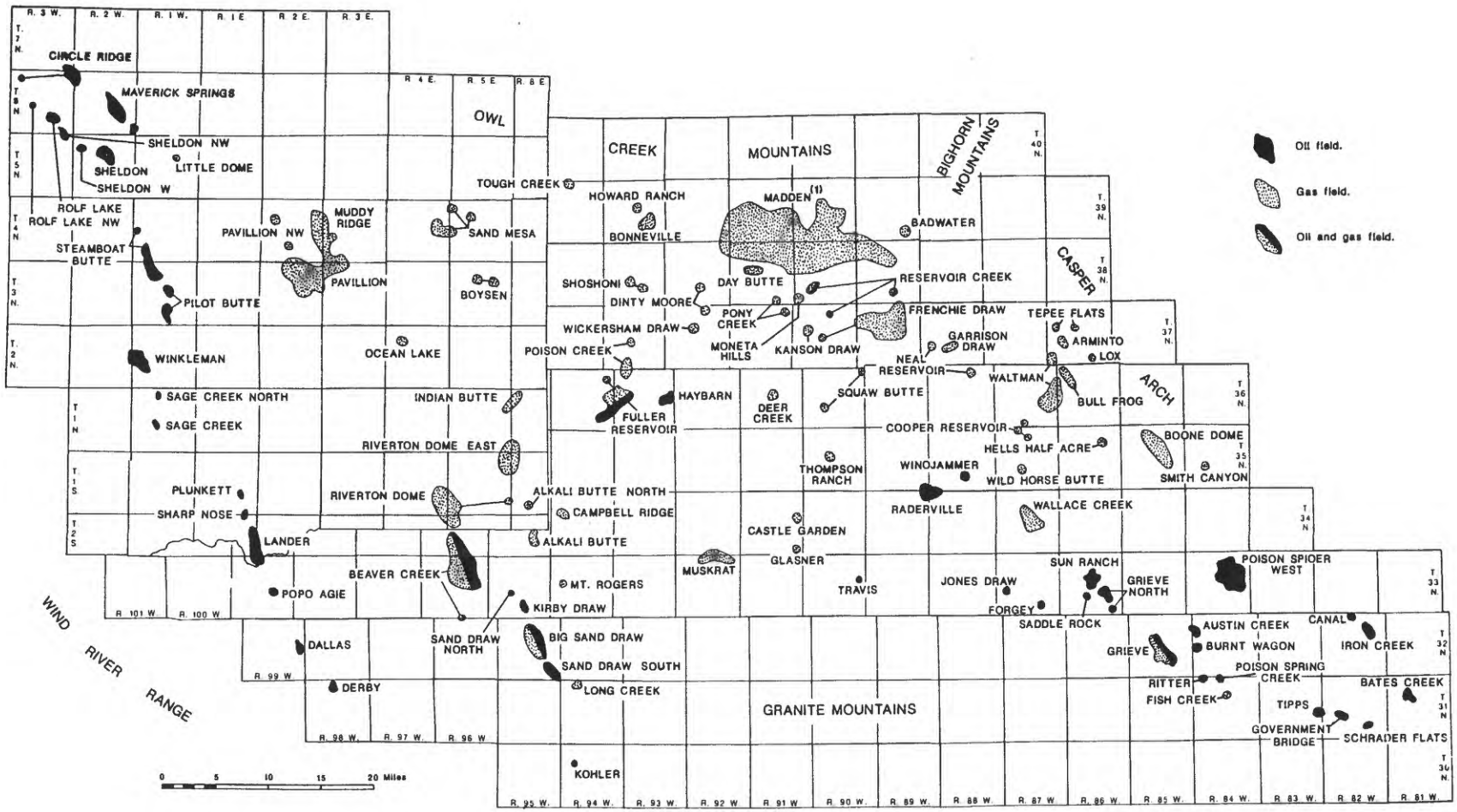


Figure 3: Map showing locations of oil and gas fields in the Wind River Basin that produce gas from Upper Cretaceous and Lower Tertiary rocks. Many smaller fields are shut in. Modified from De Bruin and Hostetler (1991).

throughout the deep central part of the basin. Three different methods in this study were used to try to define the limits of the basin-centered accumulation: 1) hydrocarbon shows and mudweights from mud logs; 2) thermal maturity variations; and 3) present-day formation temperature variations. The onset of sustained gas shows on mud logs has generally been more reliable than geophysical logs in defining the top of basin-centered gas accumulations (Dunleavy and Gilbertson, 1986, p. 111-113; Reinecke and others, 1991, p. 218).

Using gas shows from mudlogs to define the limits of the basin-centered gas accumulation

Mudlogs are not widely distributed and are not routinely made available to the public. Most of the mudlogs used in this study were obtained by contacting oil and gas producers directly. The Waltman Shale Member of the Fort Union Formation covers much of the central part of the basin (Figures 2 and 4) and is a key stratigraphic marker in this discussion. The Waltman extends into the easternmost part of the Wind River Indian Reservation (Figure 4). In the area where the Waltman is present in the basin, significant gas shows occur throughout the sandstones, shales, and coals of the underlying lower unnamed member of the Fort Union Formation. This interval is gas productive in many areas throughout the basin (Figure 4). In contrast very few gas shows occur in the largely fluvial and deltaic Eocene and Paleocene interval above the Waltman. Hydrocarbon production from the Waltman Shale and the interval above is confined to a few small oil and gas fields. These results are consistent with the Waltman Shale acting as a regional seal inhibiting the vertical migration of gas throughout the central part of the basin.

Recent work on the chemical and isotopic compositions of gases in the Wind River Basin by Johnson and Rice (1993), Johnson and others (1994a; 1994b), Johnson and others (1996c) supports the concept that the Waltman Shale is acting as a regional seal. At Fuller Reservoir field in the west-central part of the basin (Figure 3), nonassociated gases from below the Waltman Shale are distinctively heavier isotopically than the small amounts of associated gas produced with heavy waxy oil from deltaic sandstones within the Waltman. The heavy gases probably were generated by the carbonaceous shales and coal beds in the lower member or migrated vertically from more mature Upper Cretaceous age source rocks below. Vertical migration of gases is also apparent at Madden field in the north-central part of the basin (Figure 3). Gases change little isotopically through 12,000 ft of section beneath the Waltman Shale.

West of the pinchout of the Waltman Shale, at Pavillion and Muddy Ridge fields area on the Wind River Indian Reservation, (Figures 3 and 4), gas shows occur scattered throughout the Paleocene and Eocene interval, and large amounts of gas have been produced from the Eocene Wind River Formation at shallow depths of 2,000 ft or less. Gases produced from the Wind River Formation at Pavillion field are isotopically heavy and similar to gases produced in the field from much deeper, Paleocene and Upper Cretaceous horizons. Vertical migration of gas from these thermally mature source rocks was possible because there was no Waltman seal. Johnson and others (1994a; 1994b) cite other examples in other Rocky Mountain basins where gases in shallow thermally immature reservoirs were apparently sourced by deeper more mature source rocks. Shale seals are seldom mentioned in conjunction with basin-centered hydrocarbon

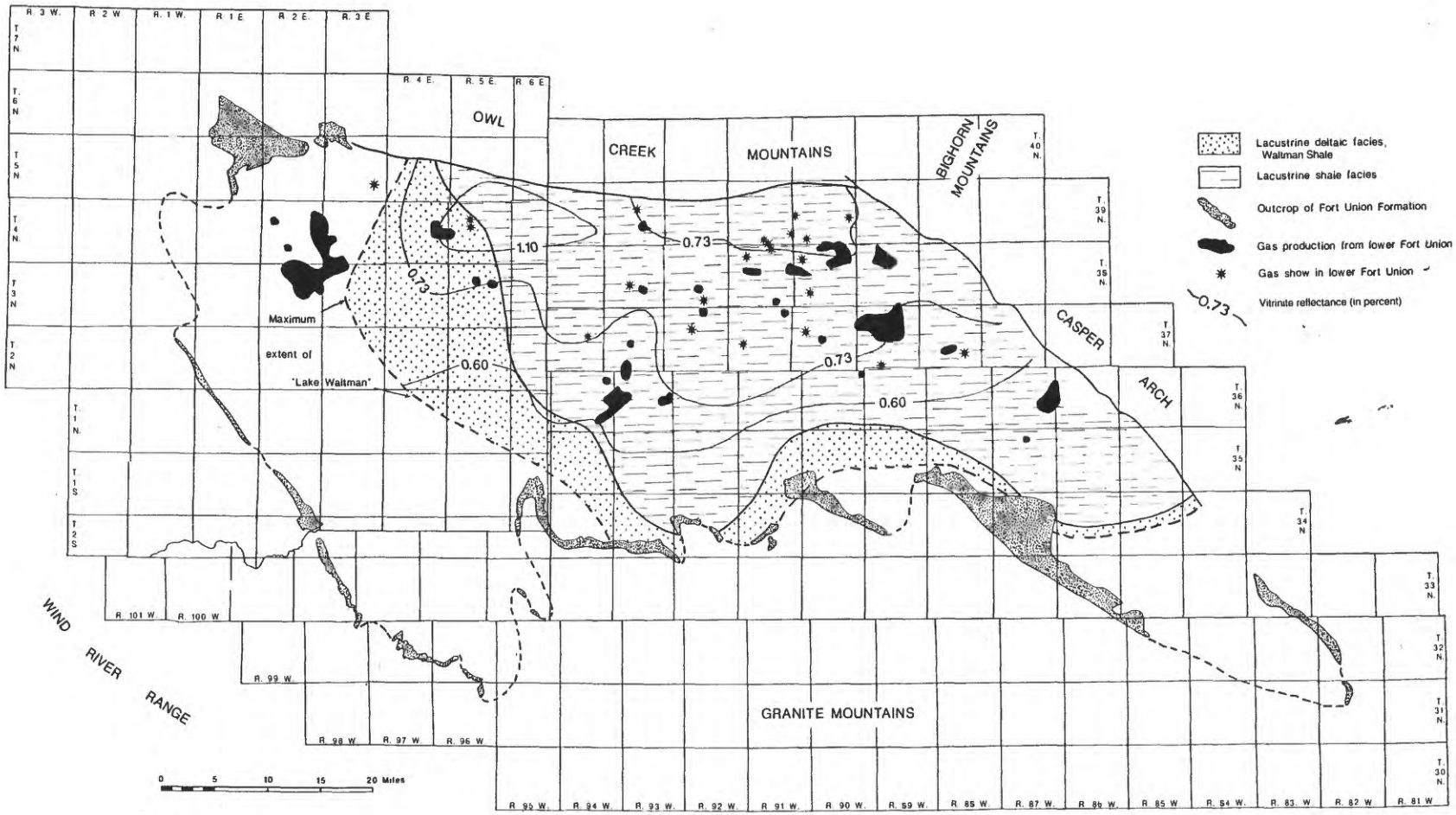


Figure 4: Map showing extent of the Waltman Shale Member of the Paleocene Fort Union Formation (lacustrine shale facies) and correlative deltaic rocks. Gas production and gas shows in the underlying lower unnamed member of the Fort Union are also shown. Vitrinite reflectance levels at the base of the Waltman are also shown (from Nuccio and others, 1996).

accumulations. However, Masters (1984, p. 10) stressed the importance of the Lower Cretaceous Joli Fou Shale as a regional seal inhibiting the vertical migration of hydrocarbons out of the basin-centered hydrocarbon accumulation in the Alberta Deep Basin. The presence of the regional Waltman seal in the Wind River Basin is probably responsible for extending the boundaries of the basin-centered gas accumulation into strata with thermal maturities lower than typically found in other basins. Nuccio and others (1996) show thermal maturities as low as a vitrinite reflectance (Rm) of 0.5 to 0.6 in the upper part of the lower unnamed member of the Fort Union Formation beneath the Waltman in the Wind River Basin.

Using mudweights to define limits of overpressuring in a basin-centered gas accumulation

Basin-centered gas accumulations are either abnormally underpressured or abnormally overpressured. Underpressured reservoirs are hard to detect using mudweights because drillers seldom drill using an underbalanced mud system; however, high mud weights used during drilling are generally an indication of overpressured conditions. Extremely tight formations, however, can be drilled using normal weight muds without dire consequences, and overpressuring is not detected until a permeable bed or a fracture is encountered. Hence, plotting the point at which mud weights are increased during drilling in a basin will generally define the minimum extent of an overpressured pocket. Mud logs for wells in the Wind River Basin were acquired from the U.S. Geological Survey log library and from oil and gas companies operating in the basin. Figure 5 shows the elevations at which mud weights of 10-lb per gallon, representing mild overpressuring, and 12-lb per gallon, representing moderate overpressuring, were first used while drilling. These elevations were derived by subtracting drilling depth from sea level. Clearly there is a need for more mud weight data in the basin but some general trends are apparent. Elevations where 10-lb mud was first used generally fall between -5,500 and -8,500 ft except on Madden field, located on Madden anticline in the northern part of the basin, where 10 lb mud was used at elevations of +290 to -1,935 ft. Overpressuring on Madden field begins in the lower member of the Fort Union Formation, just below the base of the Waltman Shale. In addition, 10 lb mud was not used in some wells along the north margin of the basin until elevations of from -11,000 to -12,395 ft.

Overpressuring at relatively shallow depths such as at Madden field has traditionally been attributed to 1) the inability of formation water to be expelled fast enough during subsidence and compaction (compaction disequilibrium); and 2) a long gas column. The first source of overpressuring usually occurs in young, rapidly subsiding basins such as the present-day Gulf Coast and would not be applicable here. The second requires a single long continuous gas column in contact with an underlying column of water, a situation that can occur on large closed structures such as Madden anticline. However, a long gas column seems unlikely at Madden Anticline. The lower member of the Fort Union is about 3,000 to 3,500 ft thick at Madden, yet every sandstone tested is capable of producing some gas. Recent completions are still encountering virgin reservoir pressures (Ron Baugh, personal communication, Sept.,

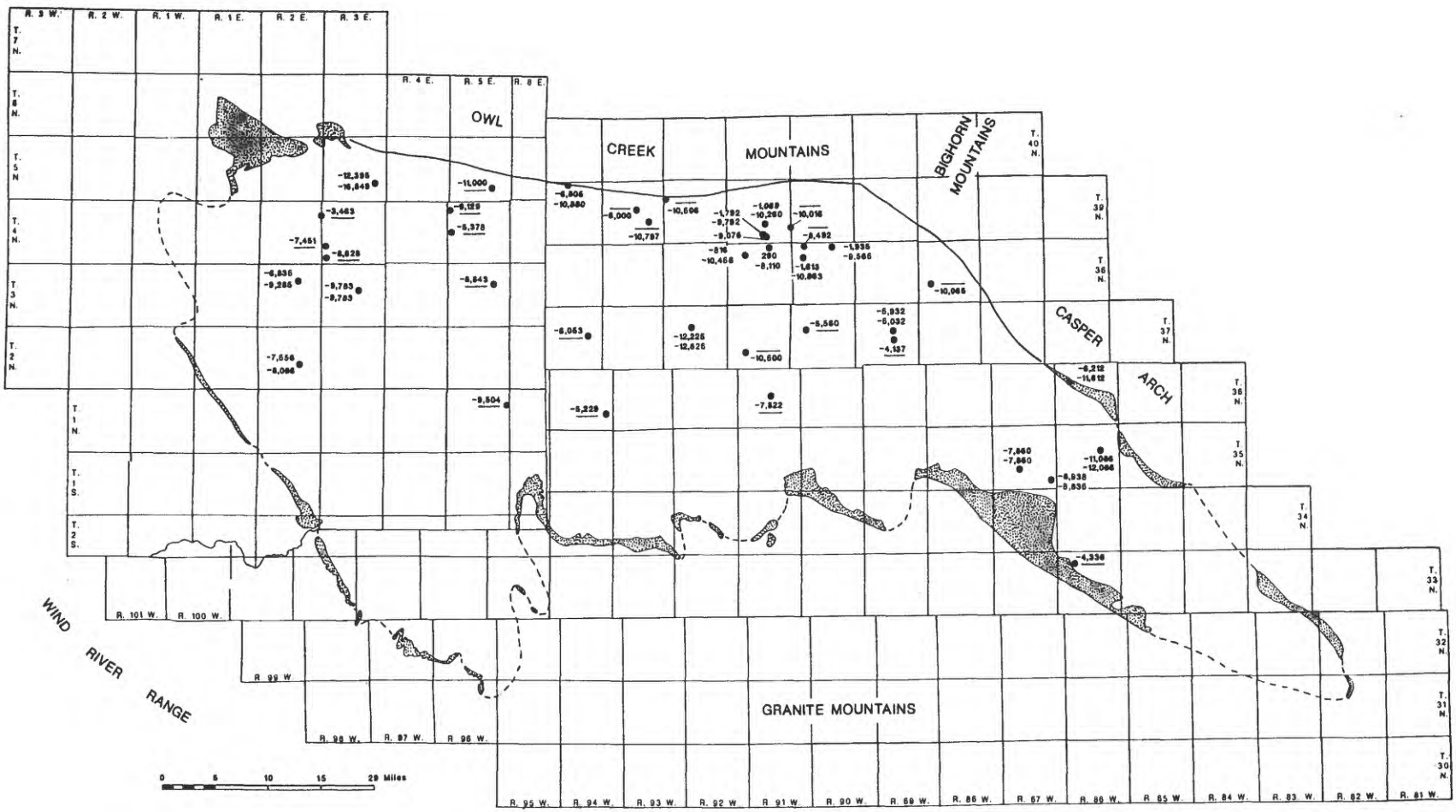


Figure 5: Map of the Wind River Basin showing elevations in feet at which 10 lb per gallon mud (upper number) and 12 lb per gallon mud (lower number) were first used during drilling. Queried where data is poor. Dashed line indicates that position where 10 lb or 12 lb mud was first used could not be determined.

1995). In addition, a single water column does not appear to underlie the anticline. According to Schmitt (1975) water has been recovered from as little as 200 ft below the crest of the anticline which has over 1,000 ft of closure at the lower Fort Union level (Johnson and others, 1996a, Plate 1). Trying to define potentially productive intervals in the lower member at Madden using geophysical logs has proven unreliable (Dunleavy and Gilbertson, 1986, p.111-112), another common characteristic of low-permeability reservoirs. Unfortunately there are no reliable permeability data available for the lower member of the Fort Union Formation at Madden (Brown and Shannon, 1989).

Twelve pound mud was first used generally between elevations of -10,000 and -12,700 ft (Figure 5) except on the Madden Anticline where 12 lb mud was used at somewhat higher elevations and along the north margin of the basin where 12 lb mud was used at somewhat lower elevations. Figures 6 and 7 are schematic north-south and east-west cross sections through the basin showing the approximate positions where 10 lb and 12 lb mud were used. The shallow depth for the onset of overpressuring on Madden Anticline is clearly anomalous when compared to the onset of overpressuring in the rest of the basin.

Using levels of thermal maturity to help define the basin-centered gas accumulation

Levels of thermal maturity define areas where potential source rocks have generated gas at some time in the past and are commonly used to help define the limits of a basin-centered gas accumulation. Masters (1984, p. 27, Fig. 25) in a study of the basin-centered gas accumulation in the Western Canada Sedimentary Basin or Western Canada Deep Basin, indicated that a vitrinite reflectance (Rm) of 1.0% corresponds approximately to the upper limit of the accumulation. In the Piceance Basin of western Colorado, Johnson and others (1987) used a vitrinite reflectance (Rm) of 1.1% to define upper the limits of the basin-centered gas accumulation, while an Rm of from 0.73 to 1.1% was used to define a transition zone containing both tight reservoirs and reservoirs with conventional permeabilities. In the Greater Green River Basin of Wyoming, Colorado, and Utah, Law and others (1989) used an Rm of 0.80% to define the top of overpressuring in the basin-centered gas accumulation.

The approximate elevations of the Rm 0.73% and Rm 1.1% levels in the Wind River Basin are shown on Figures 8 and 9 (from Johnson and others, 1996a; Nuccio and others, 1996). Much of the Rm data used to construct these diagrams are from Pawlewicz (1993), and Nuccio and others (1996). The elevations for these two Rm levels are highest in the central part of the basin and lowest in the western and eastern parts. The Rm 0.73% and Rm 1.1% are also plotted on the schematic north-south and east-west cross sections (Figures 6 and 7). The position of the Rm 1.1% thermal maturity level is approximately 1,000 to 2,000 ft above the 10 lb mud level throughout much of the basin except at Madden Anticline, where it dips below the 10 lb mud level, and in the western part of the basin where the 10 lb mud level and the position of the Rm 1.1% level are nearly the same. The elevation of the Rm 0.73% thermal maturity level varies from about 3,000 ft above the 10 lb mud level in the eastern and western parts of

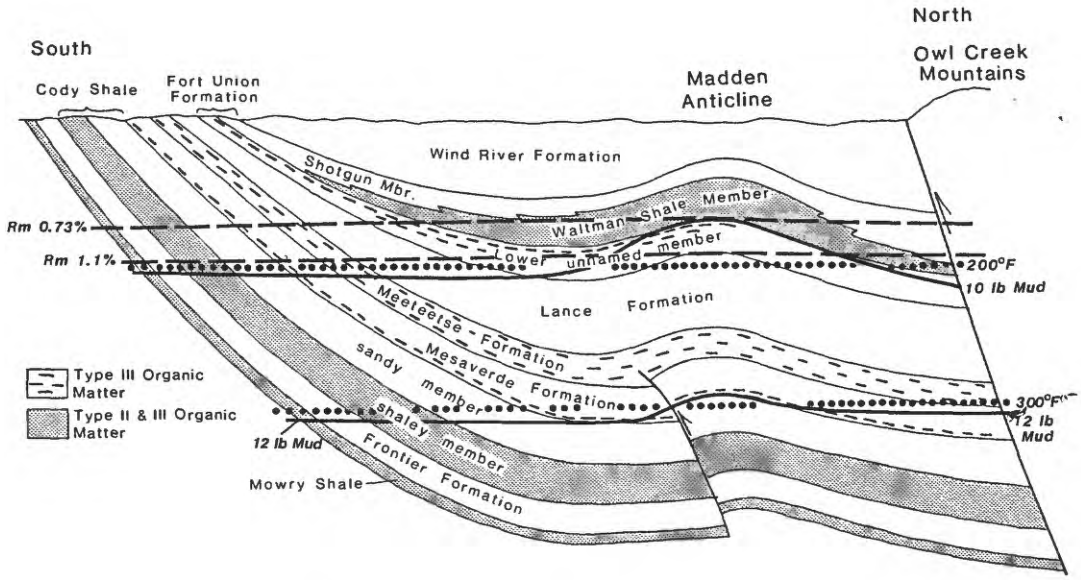


Figure 6: Schematic north-south cross section through the Wind River Basin, Wyoming showing Upper Cretaceous and Lower Tertiary stratigraphic units, organic-rich units which could be potential source rocks, approximate positions where 10 lb and 12 lb mud were first used during drilling, approximate positions of Rm 0.73% and Rm 1.1% vitrinite reflectance levels, and approximate positions of 200° F and 300° F present-day isotherms.

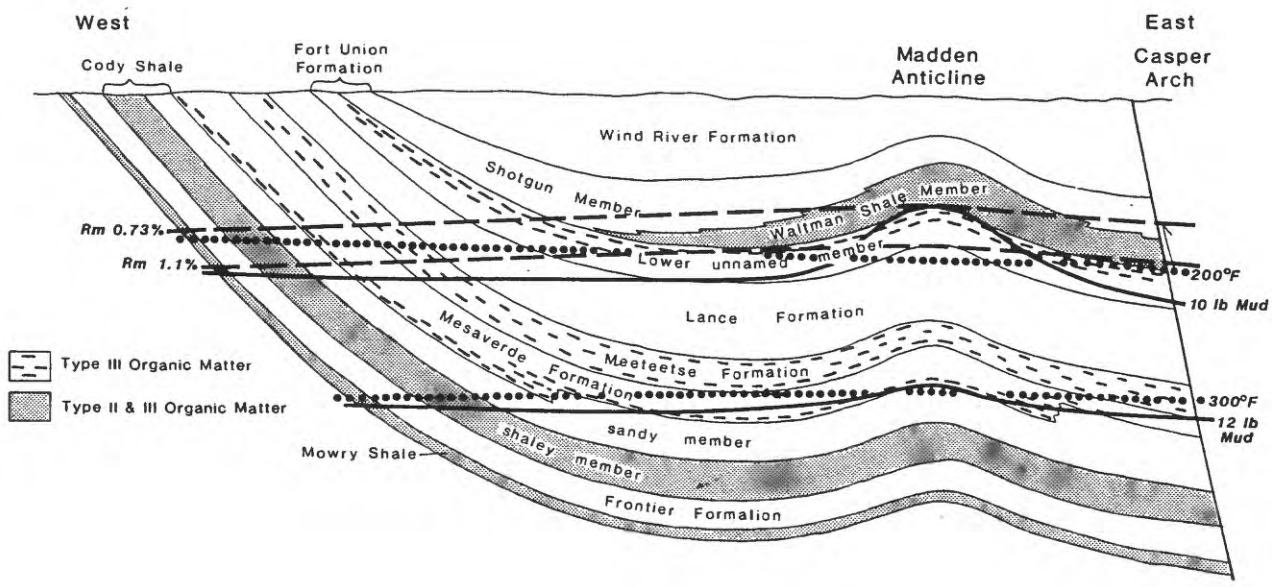


Figure 7: Schematic east-west cross section through the Wind River Basin, Wyoming showing Upper Cretaceous and Lower Tertiary stratigraphic units, organic-rich units which could be potential source rocks, approximate positions where 10 lb and 12 lb mud was first used during drilling, approximate positions of Rm. 0.73% and Rm 1.1% vitrinite reflectance levels, and approximate positions of 200° F and 300° F present-day isotherms.

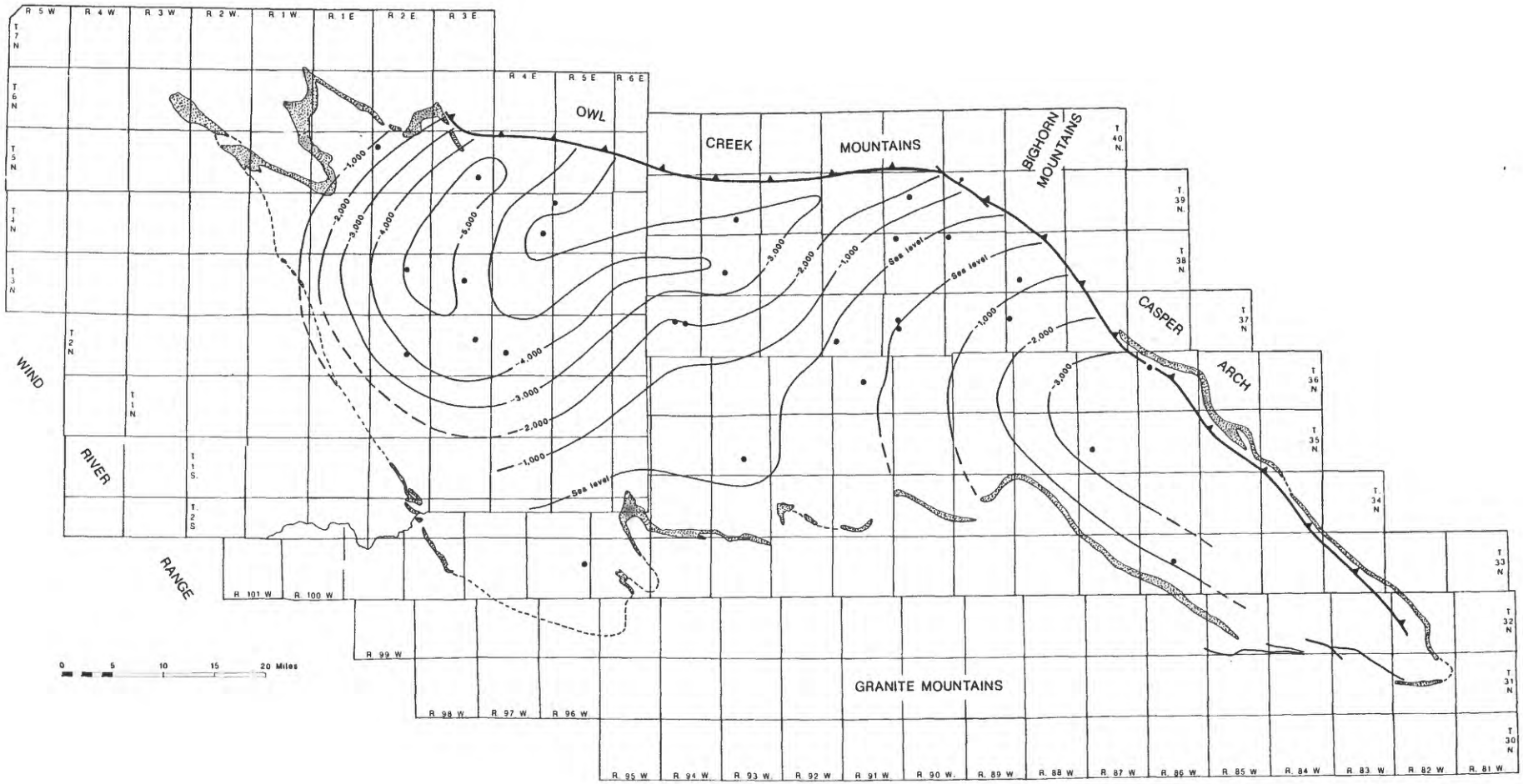


Figure 8: Map showing approximate elevation of the Rm 0.73% vitrinite reflectance level in the Wind River Basin. Contour interval: 1,000 ft. Data from Pawlewicz (1993) and Nuccio and others (1996).

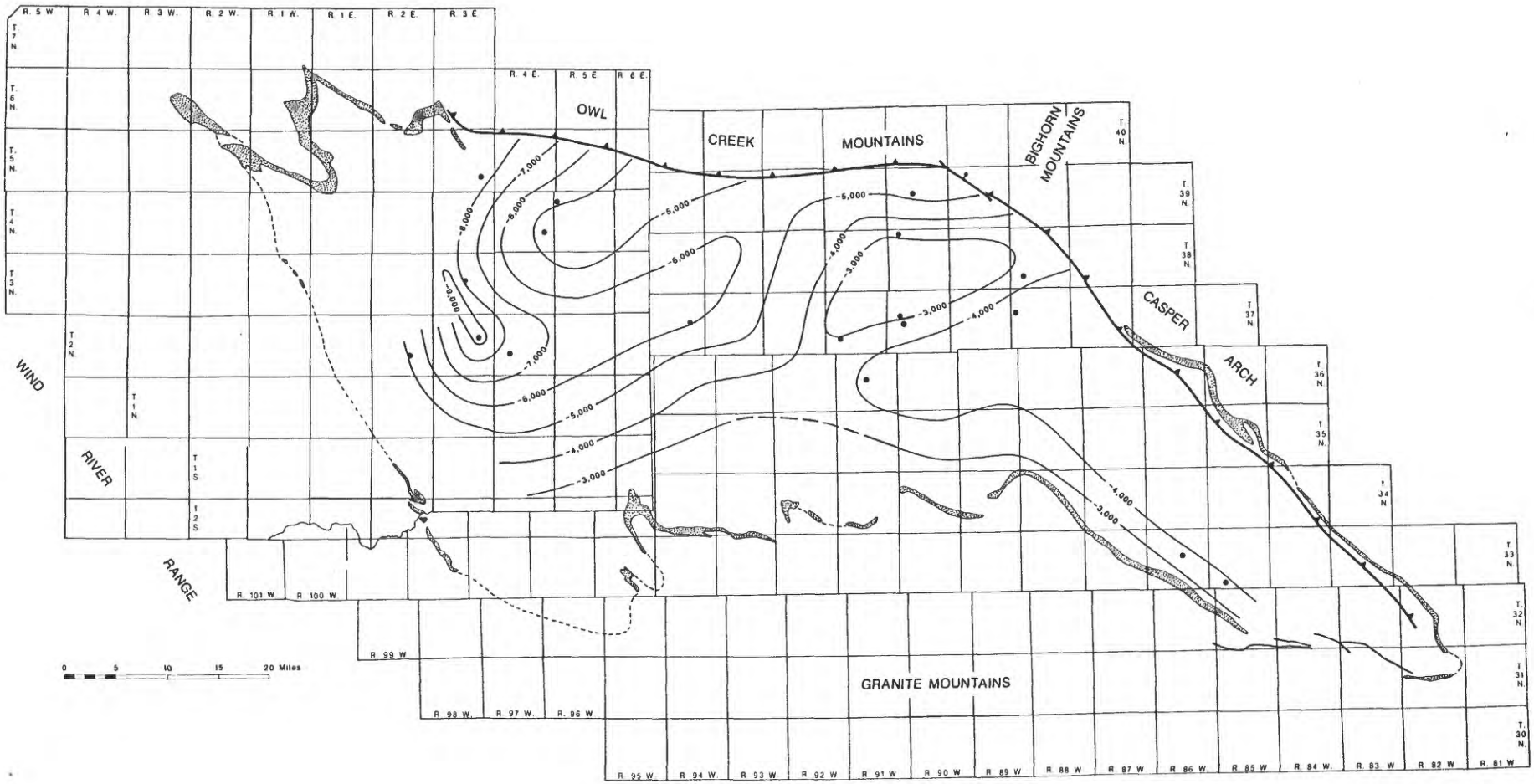


Figure 9: Map showing approximate elevation of the Rm 1.1% vitrinite reflectance level in the Wind River Basin. Contour interval: 1,000 ft. Data from Pawlewicz (1993) and Nuccio and others (1996).

the basin to about the same as the 10 lb mud level at Madden Anticline in the central part.

Using present-day formation temperatures to help define the basin-centered gas accumulation

The rate that gas is generated by source rocks is directly related to temperature. Spencer (1989) suggested that rates of gas generation need to exceed rates of gas loss in order to maintain abnormally high pressures in Rocky Mountain basin-centered gas accumulations, and that this balance generally occurs at present-day formation temperatures of about 200^0 F or greater. A corrected geothermal gradient map of the basin, recently constructed by Pawlewicz (1993), showed that present-day gradients vary irregularly across the basin from less than 1.2^0 F/100 ft to over 2.0^0 F/100 ft. Geothermal gradients are on average somewhat higher in the central part of the basin where elevations of the Rm 0.73 and Rm 1.1 thermal maturity levels are greatest (Figures 8 and 9) but there is considerable scatter.

The geothermal gradient map of Pawlewicz (1993) was used to determine the approximate positions of two isotherms, the 200^0 F and the 300^0 F on the two schematic cross sections (Figures 6 and 7). The isotherms are not greatly affected by present-day topographic variations because topographic relief in the basin is fairly subdued. On both cross sections, the 300^0 F isotherm fairly closely follows the 12 lb mud weight line. The 200^0 F isotherm closely follows the Rm 1.1% level on the north-south cross section in the central part of the basin. However, on the east-west cross section (Figure 7), the distance between the 200^0 isotherm and the Rm 1.1% level increases towards the east and west end of the basin. Because variations in present-day thermal gradients do not closely follow variations in thermal maturity throughout the basin, it is likely that thermal gradients in the basin have changed significantly since the presently observed thermal maturaties were established.

A comparison between variations in thermal maturity, present-day temperatures, and overpressuring as indicated by mud weights indicates that both the 200^0 F isotherm and the Rm 1.1% thermal maturity level fairly closely follow the limits of the overpressured pocket in the central part of the basin. However, toward the western margin of the basin, only the Rm 1.1% line fairly closely tracks the 10 lb mud line. This suggests that the position of the Rm 1.1% thermal maturity level in the basin may fairly closely correspond to the onset of overpressuring, and the top of the Rm 1.1% thermal maturity level is used here to define the limits of the overpressured basin-centered gas accumulation. The 300^0 isotherm is used to define the limits of the deep highly overpressured portion of the basin-centered accumulation. The transition zone, which includes low-permeability gas reservoirs, gas reservoirs with conventional permeabilities, and water-charged reservoirs is defined as occurring between the Rm 0.73 and Rm. 1.1 thermal maturity levels. The gas plays are defined somewhat differently in the Paleocene Fort Union Formation because of the presence of the Waltman seal. Two plays are defined in the lower unnamed member of the Fort Union, one where the Waltman seal is present and the other where the Waltman is absent.

Limitations on using variations in thermal maturity to define the basin-centered gas accumulation

Although thermal maturity variations have been used to help define the limits of basin-centered gas accumulations in several Rocky Mountain basins, there are many limitations to this approach. These limitations were summarized by Johnson and others (1987) and will be reviewed here. Variations in lithology and environments of deposition can affect the limits of a basin-centered gas accumulation. In the Alberta Deep Basin, coarse-and permeable conglomeratic intervals are water-wet farther into the basin than finer grained intervals (Masters, 1979). Environments of deposition can also have a major impact on the limits of the accumulation. Sandstones which are laterally persistent between outcrop and the basin-centered gas accumulation, tend to be water-wet farther into the basin than sandstones that do not persist to outcrop. In the Piceance Basin of western Colorado, the regionally persistent regressive marine Rollins and/or Trout Creek Sandstone appears to be water-wet even in the deepest part of the basin-centered gas accumulation (Johnson and others, 1987; Reinecke and others, 1991). In the Wind River Basin, marginal marine sandstones in the lower part of the Mesaverde Formation, and shelf sandstones in the upper part of the underlying Cody Shale are laterally persistent in a north-south direction and may be subject to recharge along the south margin of the basin and appear to be water-bearing further into the basin than adjacent fluvial intervals. These facies variations are discussed in more detail in the descriptions of the individual plays. They are addressed in the probabilistic models used in the assessment by varying the percentage of sandstones that are assumed to be water-bearing.

Availability of rich source rocks can also impact a basin-centered gas accumulation. Law (1984), in his discussion of overpressuring in the Green River Basin, noted that pressures are less in organically lean intervals than organically rich intervals. MacGowan and others (1993) cited the lack of source rocks as a major reason why the Pennsylvanian Minnelusa Formation in the Powder River Basin is normally pressured while the overlying Cretaceous section is overpressured. Rich source rocks occur throughout the Upper Cretaceous and lower Tertiary interval in the Wind River Basin. They include in ascending order: 1) the Upper Cretaceous Mowry Shale (Type II and III organic matter); 2) the shaley member of the Upper Cretaceous Cody Shale (Type II and III organic matter); 3) the lower part of the Upper Cretaceous Mesaverde Formation (Type III organic matter); 4) the Upper Cretaceous Meeteetse Formation (Type III organic matter); 5) the coaly interval in the upper part of the lower unnamed member of the Paleocene Fort Union Formation (Type III organic matter); and 6) the Waltman Shale Member of the Fort Union Formation (Type II and III organic matter). These organic-rich zones are shown on the schematic cross sections (Figures 6 and 7). Some coal and carbonaceous shale also occur in the Upper Cretaceous Lance Formation.

PROBABILISTIC METHODOLOGY FOR GAS RESOURCE ASSESSMENT
(For a detailed discussion see part B of this report)

Probabilistic methodology is developed for an assessment of the total in-place gas resources in the study area. The study area is subdivided into a set of geologic plays, and the plays are analyzed separately. Every play is partitioned geologically into parts, called subplays. Each subplay is assessed individually, and then all of the subplays of a play are aggregated to make an assessment of the overall play. Finally, all of the plays are aggregated for an assessment of the total in-place gas resources in the study area.

Each subplay is assessed individually using a reservoir engineering equation. The hydrocarbon-volume attributes (Table 1) are (1) area of subplay, (2) thickness of reservoir rock, (3) effective porosity, (4) trap fill, (5) hydrocarbon saturation, and (6) depth to reservoir. The hydrocarbon-volume attributes jointly determine the volume of the hydrocarbon accumulation within the subplay. The following reservoir engineering equation is used to calculate the in-place volume of gas in cubic feet:

$$\text{Gas in-place} = 1.5378 * 640 * A * H * P * F * S_h * P_e / (T * Z),$$

where

A = area of subplay (square miles)
H = reservoir thickness (feet)
P = effective porosity (percent)
F = trap fill (percent)
S_h = hydrocarbon saturation (percent)
P_e = original reservoir pressure (psi)
T = reservoir temperature (degrees Rankin)
Z = gas compressibility factor (no units)

The equation consists of a product of factors that are functions of the hydrocarbon-volume attributes. The geologic variables P_e, T, and Z are each taken to be linear functions of reservoir depth D (feet) in the form $a * D + b$.

To obtain a point estimate of the in-place gas of a subplay, point estimates are made of the six attributes A, H, P, F, S_h, and D which may vary from subplay to subplay within a play. The parameters a and b for each of the variables P_e, T, and Z (i.e., three pairs of a and b) are estimated for a play, and the one set of parameter values is used in all subplays of the play. The point estimate of the in-place gas of a subplay is taken to be a mean estimate.

To obtain an interval estimate of the in-place gas of a subplay, estimates are made of the ranges (range = F5–F95) of the six attributes A, H, P, F, S_h, and D. Like the parameters a and b, there is only one set of ranges for a play that is used in all subplays of the play. The attributes are treated as independent continuous random variables. The probabilistic methodology used to process the geologic data is an analytic method

derived from probability theory. The analytic methodology is developed by the application of the laws of expectation and variance. The methodology systematically tracks through the geologic model and computes all of the means and variances of the appropriate random variables. An estimate of the standard deviation of the in-place gas of a subplay is computed and varies from subplay to subplay. The log normal distribution is used as a probability model in order to generate probability fractiles for gas in-place.

All of the means, standard deviations, and fractiles of the subplays of a play are aggregated, assuming complete dependency or perfect positive correlation, to make an assessment of the play. Finally, all of the plays are aggregated, assuming complete dependency, by applying a separate methodology for an assessment of the total in-place gas resources in the study area. This probabilistic methodology for gas resource assessment lends itself as an ideal application for spreadsheet software.

DEFINITION OF GAS PLAYS IN THE WIND RIVER BASIN

The basin-centered gas accumulation in the Wind River Basin was divided by Johnson and others (1996b) into twenty-two plays. Of these twenty two, seventeen occur partially within the Reservation boundaries. On the spreadsheets, the file names consist of a "G", representing the GRASS spreadsheet, followed by the play code. First, Johnson and others (1996b) defined eight stratigraphic plays: 1) the Upper Cretaceous Frontier Formation; 2) the Upper Cretaceous Cody Shale; 3) the Fales Sandstone Member of the Mesaverde Formation; 4) the marginal marine sandstone interval of the Upper Cretaceous Mesaverde Formation; 5) the nonmarine interval of the Upper Cretaceous Mesaverde Formation; 6) the Upper Cretaceous Meeteetse Formation; 7) the Upper Cretaceous to possibly lower Paleocene Lance Formation; and 8) the lower unnamed member of the Paleocene Fort Union Formation (Figure 10). Then stratigraphic plays one through six were subdivided into three separate plays: 1) greater than 300^0 F present-day temperature, which represents the highly overpressured play; 2) Rm greater than 1.1%, which represents the moderately overpressured play; and 3) Rm from 0.73 to 1.1% which represents the marginal, transition zone of the basin-centered gas accumulation. The Fales Sandstone Member occurs only in the eastern part of the Wind River Basin east of the Reservation, and hence none of the three Fales plays occur within the Reservation boundaries. Stratigraphic play number seven, or the Lance Formation, does not appear to be over 300^0 F anywhere in the basin and hence was only subdivided into two plays, the moderately overpressured play and the transition zone play. The lower unnamed member of the Fort Union Formation was subdivided into two plays: 1) where the Waltman Shale Member is present; and 2) where the Waltman Shale Member is absent. Thermal maturates in the lower unnamed member vary from as low as about Rm 0.5% to greater than Rm 1.1% (Nuccio and others; 1996). Highly overpressured conditions do not appear to exist in the lower member anywhere in the basin. This is consistent with present-day temperatures which do not exceed 300^o F in the lower member.

Formation pressure and temperature estimates for each play required overburden estimates, and these estimates were made by converting structure contour maps into overburden maps. To do this an average surface elevation of 5,500 ft was assumed for

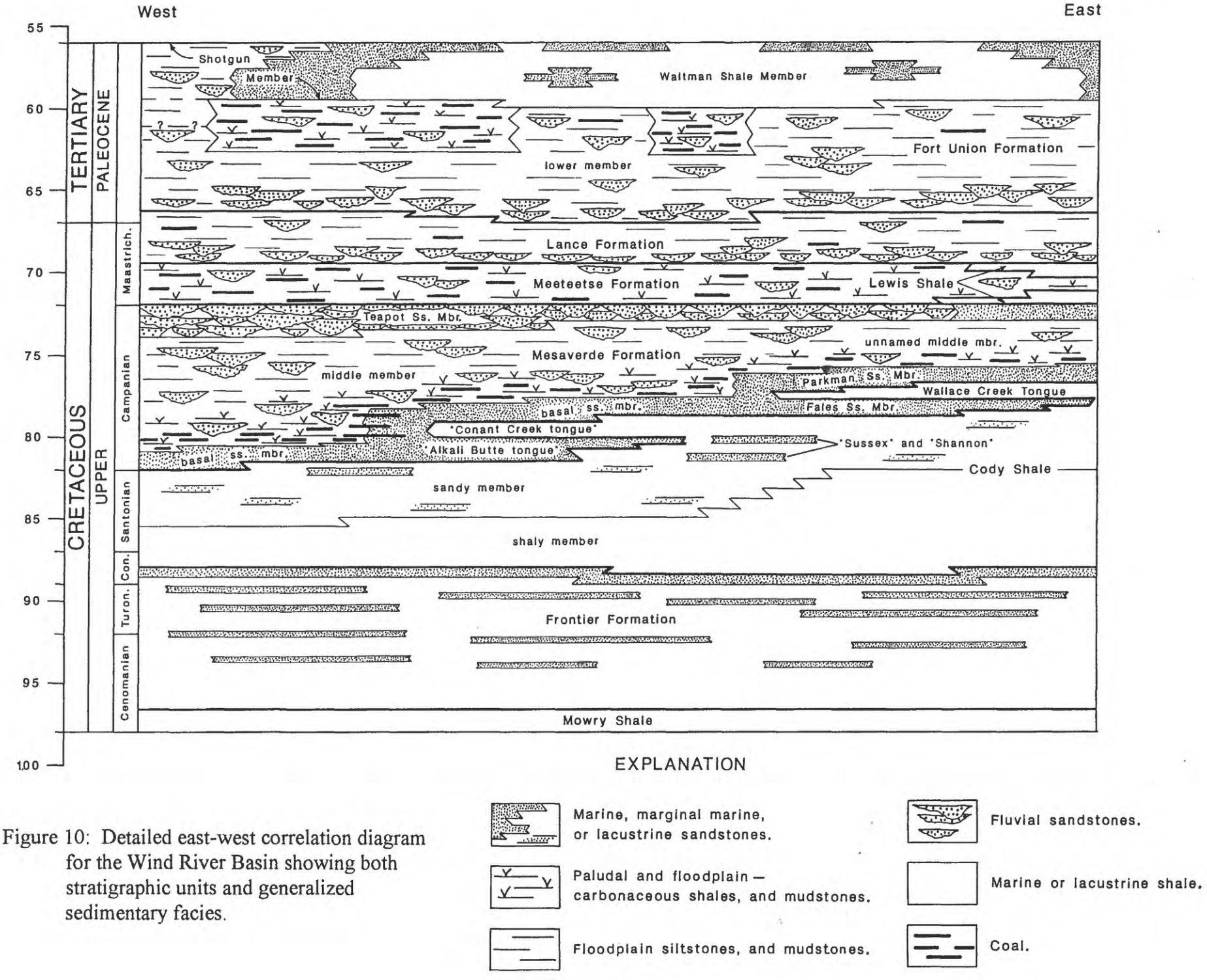


Figure 10: Detailed east-west correlation diagram for the Wind River Basin showing both stratigraphic units and generalized sedimentary facies.

the entire basin. Topographic relief in the Wind River Basin is not great, and this is within about 800 ft of true elevation throughout almost all of the basin. If a stratigraphic play was relatively thin, then a structure contour map on the top or base of the play was used. For the thicker stratigraphic plays, a structure contour map on the middle of the play was constructed. Three of the structure contour maps used, the top of the Frontier Formation, the top of the Cody Shale, and top of the Teapot Sandstone Member of the Mesaverde Formation, are from Johnson and others (1996a, Plate 1). Six new structure contour maps were constructed by Johnson and others (1996b) for their assessment of the entire Wind River Basin: 1) top of the marginal marine interval of the Mesaverde Formation (Figure 11); 2) middle of the nonmarine part of the Mesaverde Formation (Figure 12); 3) top of the Lance Formation (Figure 13); 4) middle of the Lance Formation (Figure 14); 5) base of the Lance Formation (Figure 15); and 6) middle of the lower unnamed member of the Fort Union Formation (Figure 16).

The boundaries of the highly overpressured plays, where a stratigraphic interval exceeds 300^0 F, were defined by Johnson and others (1996b) by overlaying the overburden maps on the thermal gradient map of Pawlewicz (1993). The boundaries of the areas where the stratigraphic intervals have an Rm of 0.73% or greater and an Rm. of 1.1% or greater were defined by overlaying the contour maps showing the elevations of the Rm 0.73% and Rm 1.1% in the basin from Johnson and others (1995) and Nuccio and others (1996) on the structure contour maps for the stratigraphic plays. Isopach maps of total sandstone in beds 10 ft thick or greater from Johnson and others (1996b) were plotted on the play maps for each stratigraphic unit.

The play map for each stratigraphic unit therefore includes three different types of information: 1) overburden contours generated from structure contour maps; 2) play boundaries defined by thermal maturity and present-day temperature; and 3) sandstone isopach lines. Each of the plays in each stratigraphic unit was subdivided by Johnson and others (1996b) into as many as 120 areas or subplays by the crosscutting overburden and sandstone thickness lines. The area of each subplay was measured by Johnson and others (1996b) in square miles using a planimeter. For this report, the areas of the subplays were determined by computer from the digitized play maps presented in this report. An estimate of mean in-place gas for each of these subplays was calculated using the formula presented earlier, and the mean in-place gas for a play was estimated by summing the gas in each of the subplays within the play. Each subplay is numbered and listed on the spreadsheets. Not all of the subplays defined by Johnson and others (1996b) occur within the Reservation boundaries, and hence some subplay numbers are skipped on the spreadsheets presented in this report. Complex geometric problems arose with the calculations of in-place gas for some of the plays, and these are discussed under the discussion of each play.

In order to estimate the in-place gas in each of the subplays within a play, overburden estimates and sandstone thickness estimates were made using the overburden and sandstone contours that define the area. For example, if a subplay is defined by the 7,000 and 8,000 ft overburden lines and the 100 and 200 ft sandstone thickness lines, then an average overburden of 7,500 ft and an average sandstone thickness of 150 ft was assumed for the area. If the subplay was closer to the 100 ft thickness line than it was to

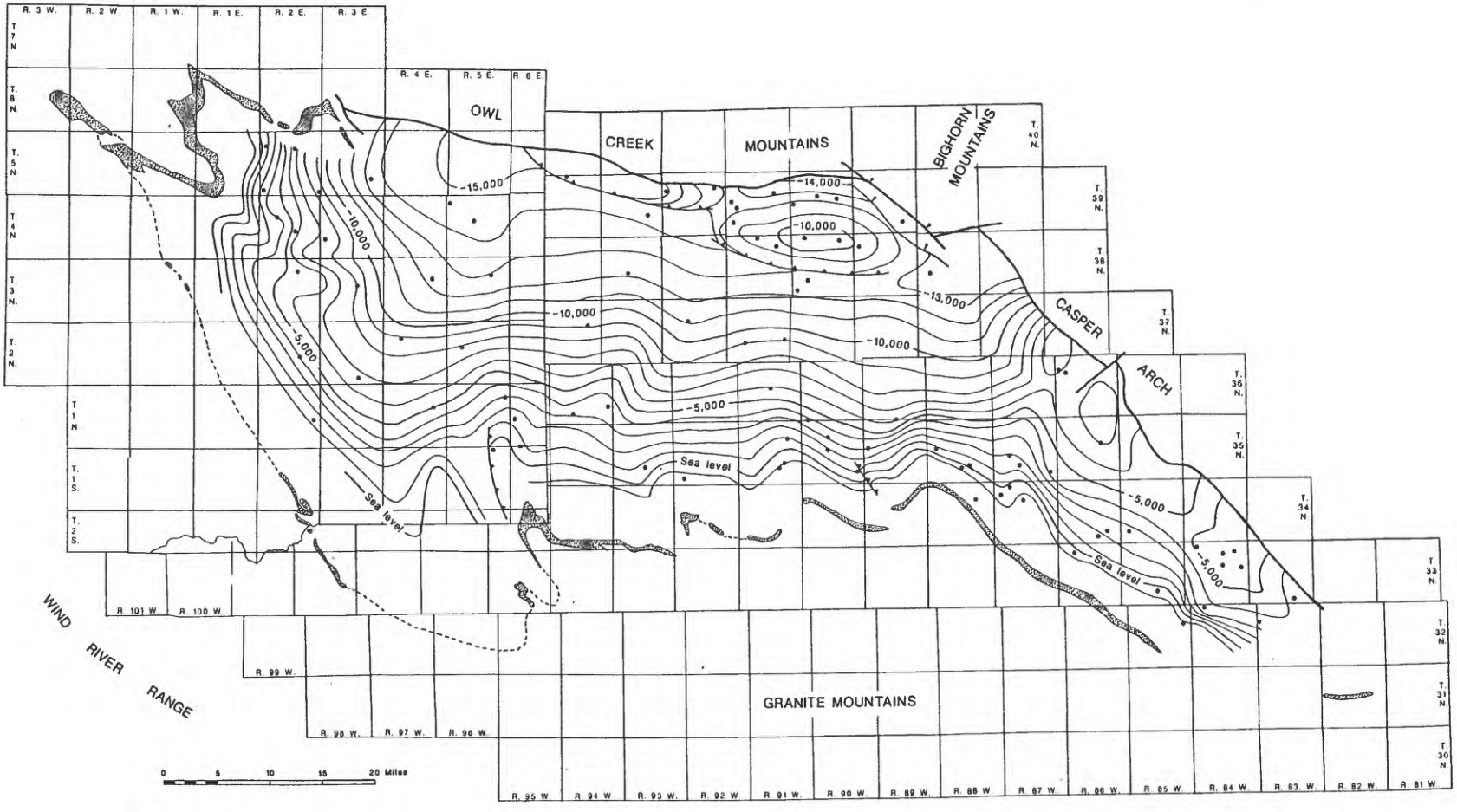


Figure 11: Structure contour map on the top of the marginal marine interval of the Upper Cretaceous Mesaverde Formation. Contour interval: 1,000 ft.

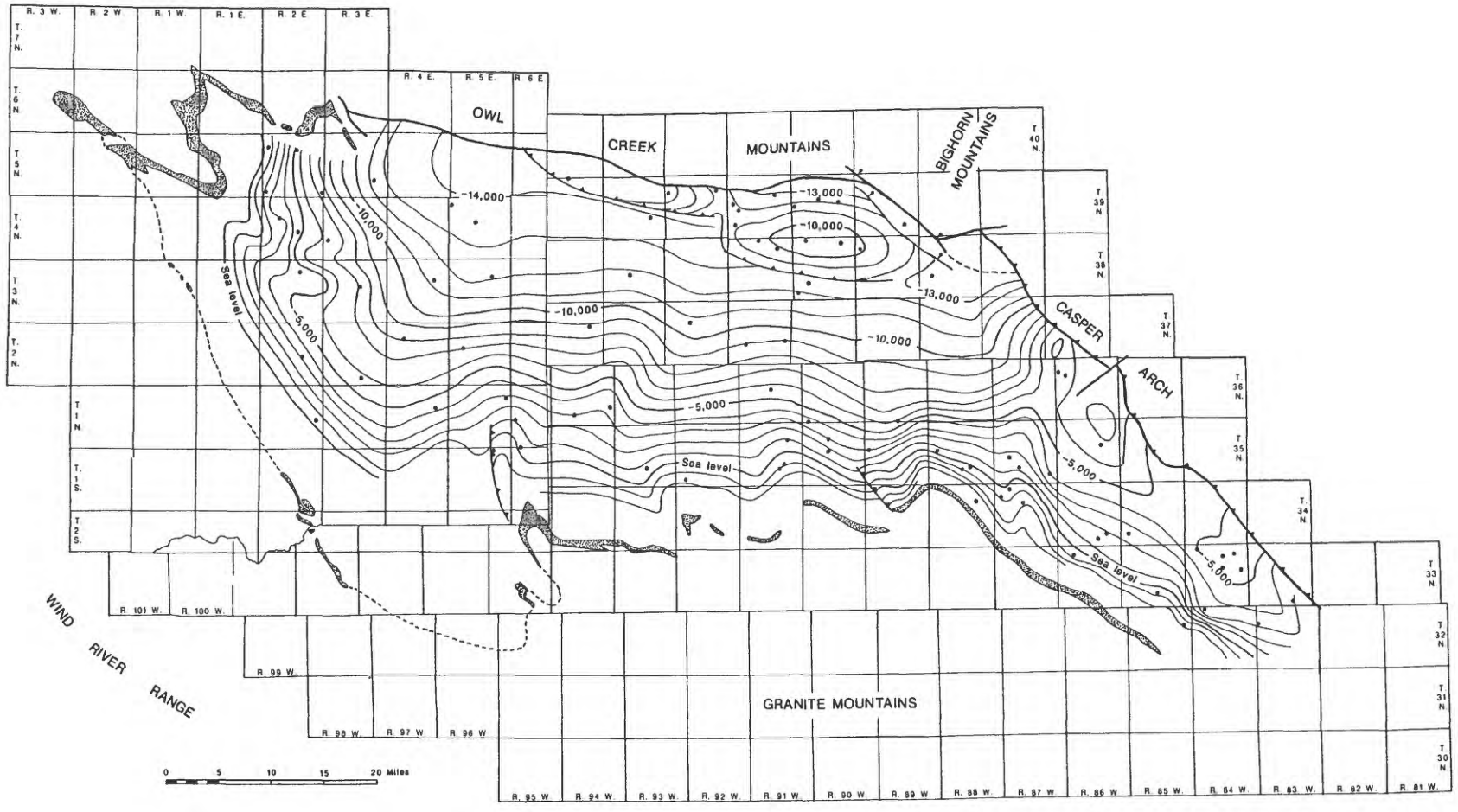


Figure 12: Structure contour map on the middle of the nonmarine interval of the Upper Cretaceous Mesaverde Formation. Contour interval: 1,000 ft. Shaded areas are present-day outcrops of Mesaverde Formation.

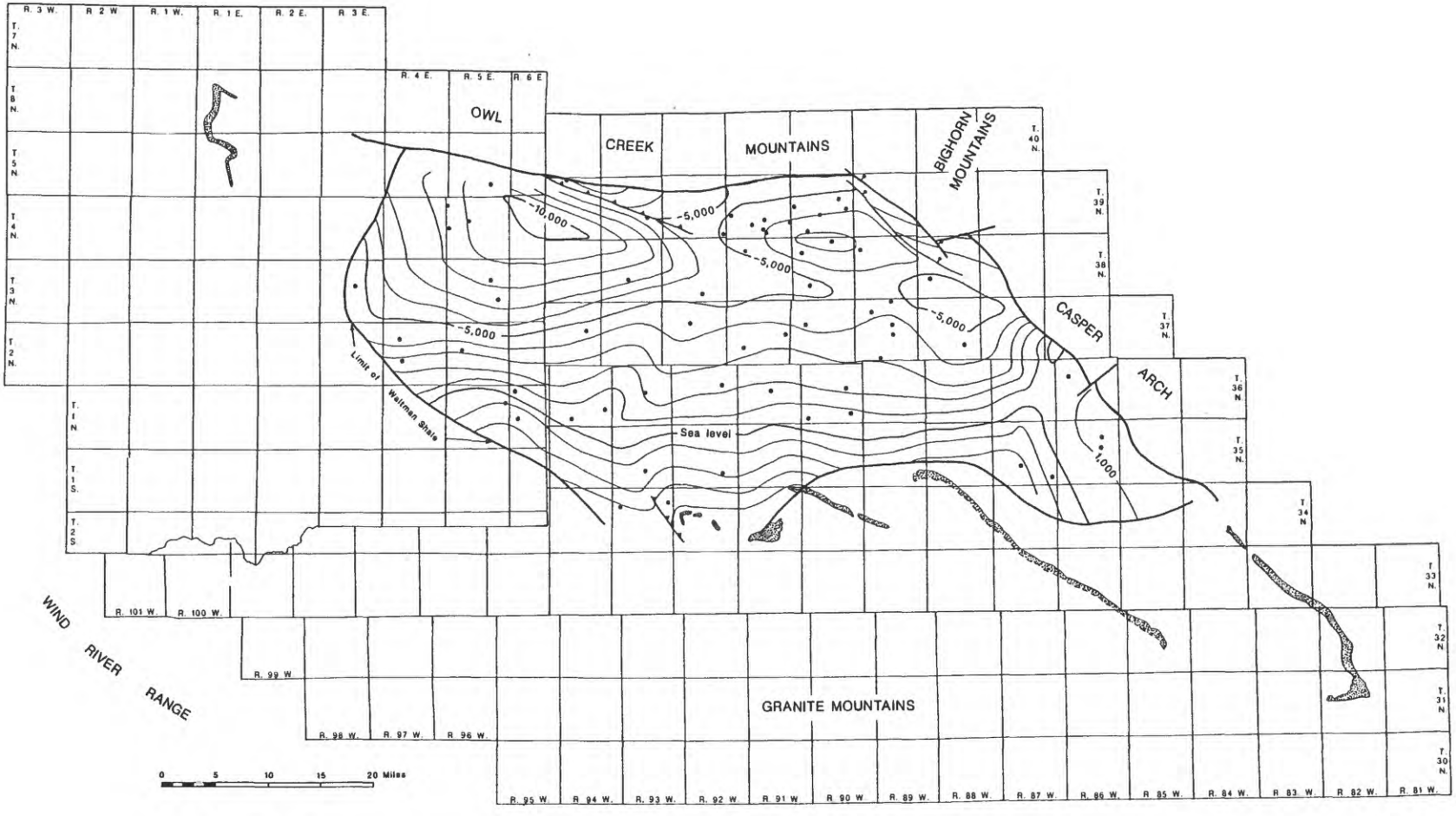


Figure 13: Structure contour map on the top of the Upper Cretaceous Lance Formation. Contour interval: 1,000 ft. Shaded areas are present-day outcrops of Mesaverde Formation.

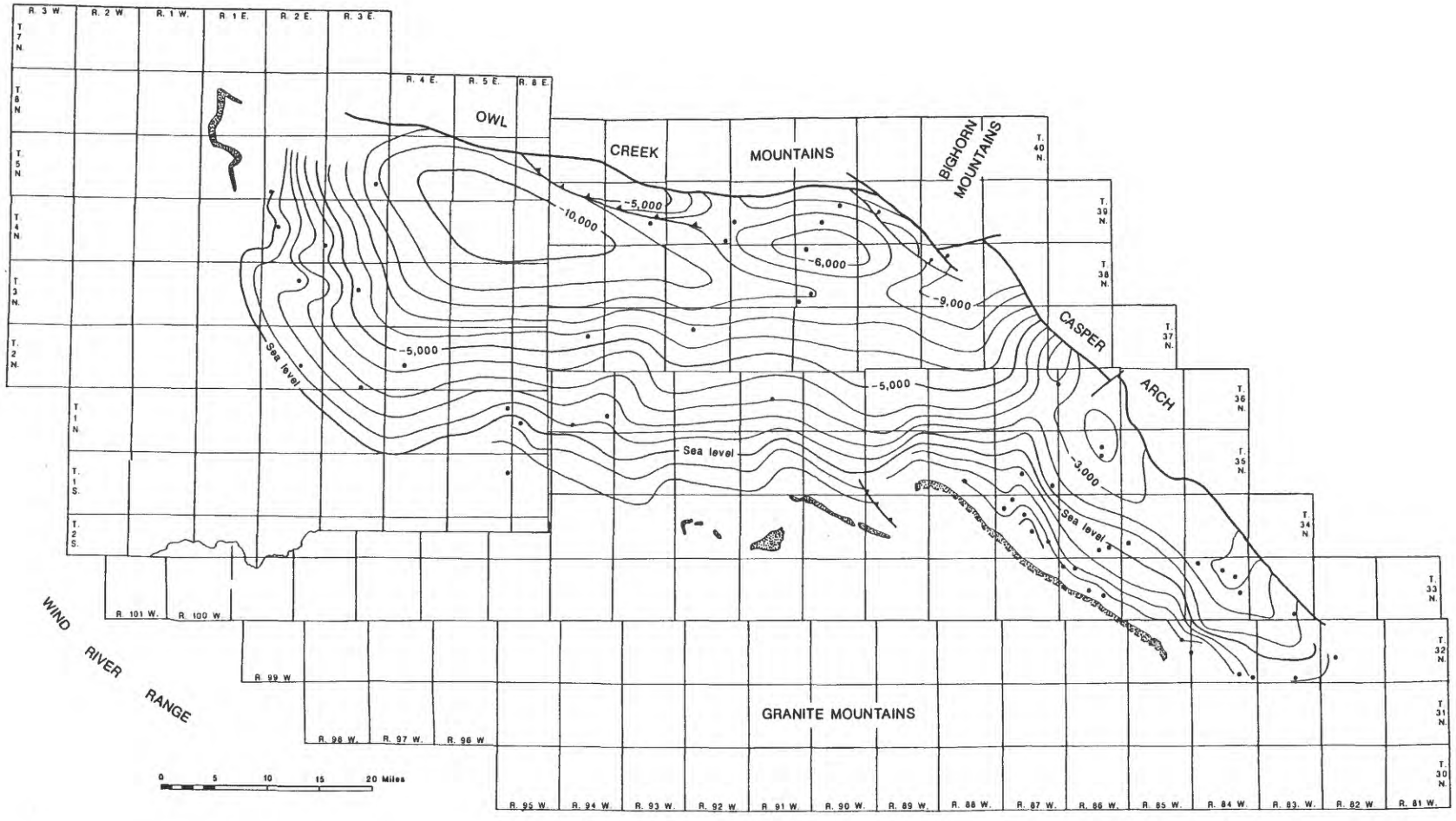


Figure 14: Structure contour map on the middle of the Upper Cretaceous Lance Formation. Contour interval: 1,000 ft. Shaded areas are present-day outcrops of Mesaverde Formation.

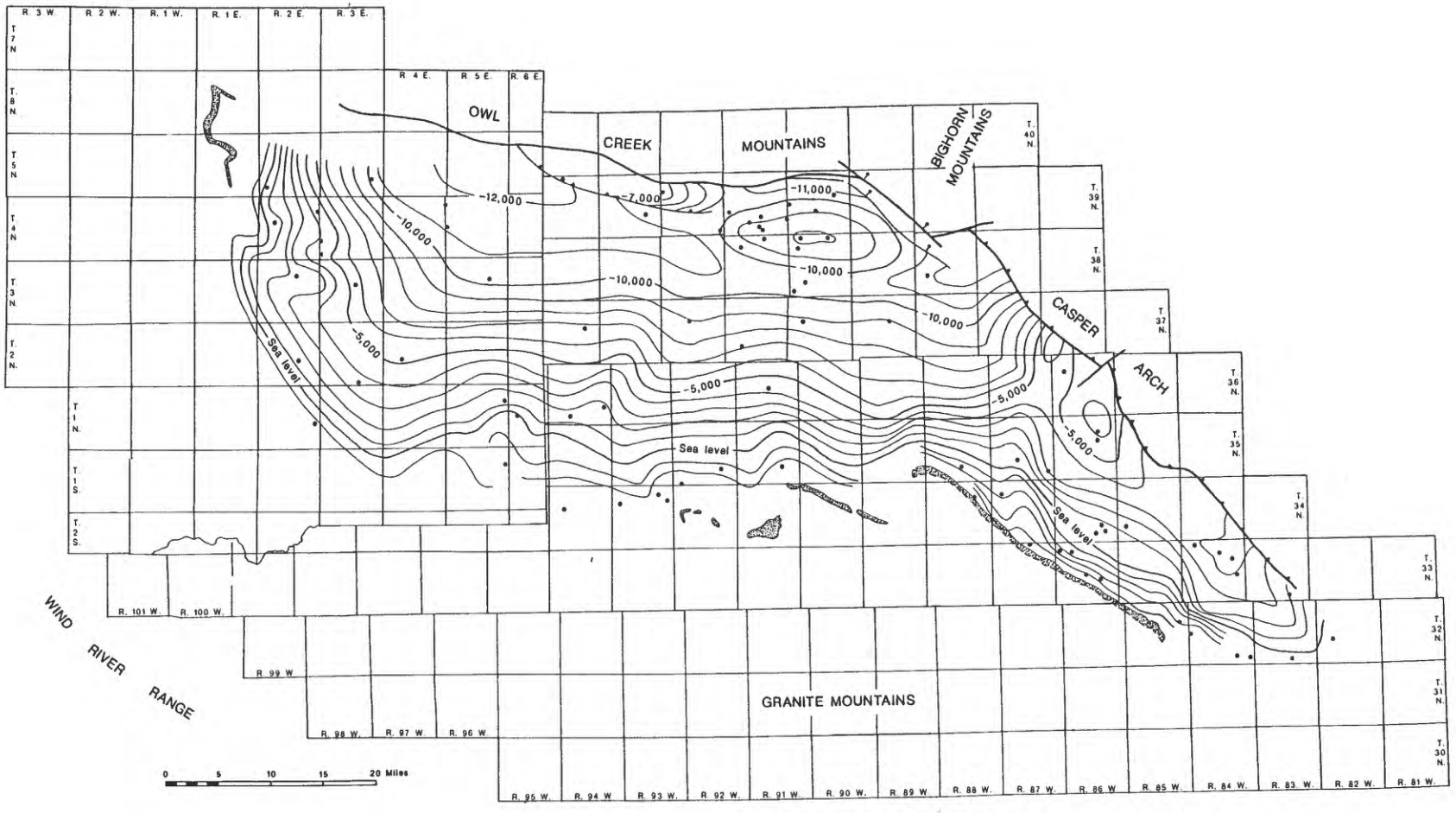


Figure 15: Structure contour map of the base of the Upper Cretaceous Lance Formation. Contour interval: 1,000 ft. Shaded areas are present-day outcrops of Mesaverde Formation.

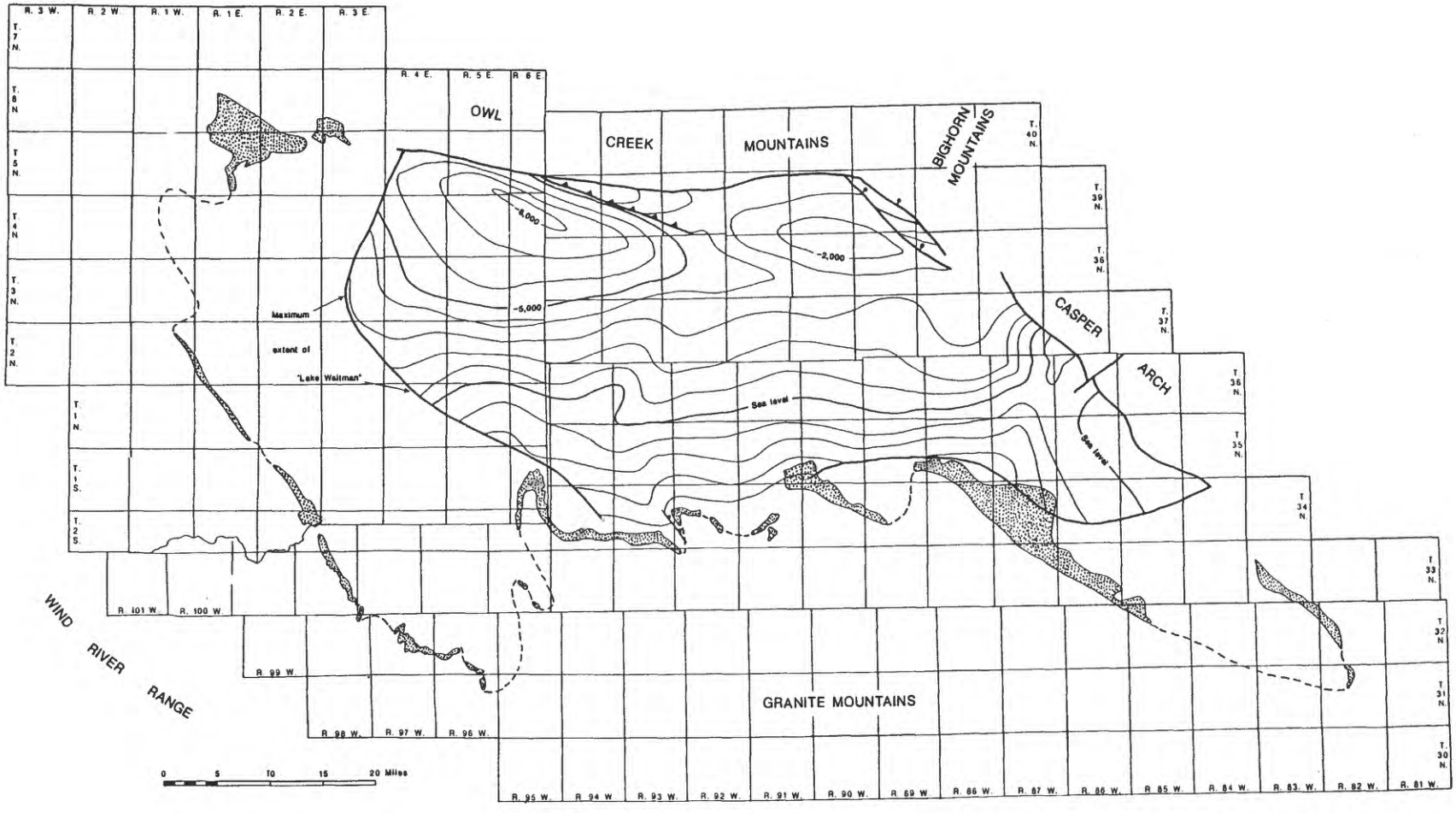


Figure 16: Structure contour map on the middle of the lower unnamed member of the Paleocene Fort Union Formation. Contour interval: 1,000 ft. Shaded areas are present-day outcrops of Mesaverde Formation.

the 200 ft line, then some average thickness value between 100 and 150 ft would be chosen.

The probability program used here requires that the same temperature gradient and pressure gradient be assigned to all of the subplays within a play. Average pressure gradients used were: 1) 0.727 psi/ft of depth for the highly overpressured plays; 2) 0.52 psi/ft of depth for the moderately overpressured plays; and 3) a normal pressure gradient of 0.41 psi/ft of depth for the transition plays. A normal pressure gradient was assumed for both Fort Union plays although slightly overpressured conditions exist locally in the Fort Union play where the Waltman seal is present. Thermal gradients in the basin are within 0.2^0 F of 1.6^0 F/100 ft over about 80% of the basin, and hence a thermal gradient of 1.6^0 F was assumed for the entire basin. The need to assume a constant thermal gradient for all of the subplays within a play created some relatively minor inconsistencies. This is because the 300^0 F line, used to define the boundaries of the highly overpressured plays, was determined using variable thermal gradients while a constant gradient had to be assumed for all of the subplays in a play when calculating in-place gas. Temperatures of the subplays are listed on the tables for each of the plays in degrees Rankin. A temperature of 300^0 F corresponds to a temperature of 760^0 Rankin. Therefore, all of the subplays listed on the tables within each highly overpressured play should have a temperature of 760^0 Rankin or greater, and all of the subplays within the moderately overpressured zones, defined by the Rm 1.1% and 300^0 F lines, should have a temperature of 760^0 Rankin or less. Most of the discrepancies occur in the northwest part of the basin on the Wind River Indian Reservation where thermal gradients of less than 1.2^0 F/100 ft occur.

The northern boundary of all the plays along the Owl Creek Mountains is placed at the complex of down-to-the-north normal faults that cut off the Owl Creek thrust. For a seismic cross section showing the relationship between the Owl Creek thrust and the younger normal faults see Ray and Keefer (1985). Many of the stratigraphic units included in the basin-centered gas accumulation continue beneath the thrust, north of the normal faults. This part of the subthrust area was not included in the assessment because there is no drillhole information. There is some drillhole information further to the east along the Owl Creek thrust, on the Casper Arch, and Johnson and others (1996b) included this area in their original assessment.

CALCULATING Z FACTOR

Gases in nature seldom, if ever, obey the ideal gas equation, and the gas compressibility factor or Z factor is a correction factor which was derived to quantify this deviation. The value of Z varies with pressure, temperature, and gas composition (Standing, 1977). An average gas composition for each of the plays was estimated using data from Johnson and Rice (1993). For the shallower plays (Rm 0.73 to 1.1 and Rm>1.1), Z factor varied only slightly between the various subplays, and only a very modest error in in-place gas for the subplays was introduced if a single value for Z was applied to all of the subplays. For the highly overpressured plays, however, the Z factor varied markedly between the shallower and deeper subplays. For instance, in the highly overpressured Frontier play, Z varies from 1.92 to 0.96 between the deepest and

shallowest parts of the play. In order to closely approximate the in-place gas in each of the subplays for the highly overpressured plays, the Z factor for each play was varied using simple linear equations which closely approximate the variation using the equations in Standing (1977).

CALCULATION OF PROBABILITY DISTRIBUTIONS OF ESTIMATES FOR EACH PLAY

In order to calculate probability distributions, estimates were made of the range for each play attribute at the 95th and 5th percentile levels. For the Lance > 1.1 play for instance, probability estimates for the play attributes at the 95th and 5th percentile levels are depth: 30%, closure: 30%, sandstone thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation-40%. If, for instance, the mean thickness of sandstone in a subplay is 1000 ft then the thickness at the 95th and 5th percentile probabilities vary from this mean by 50% or 500 ft. Another way of expressing this variation would be 1,000 plus or minus 250 ft. The play attributes in each play were given different probability ranges based on geologic inference. However, because of limitations in the program used, the same ranges had to be applied to every subplay within a play. The play attributes of porosity, trap fill, and hydrocarbon saturation were given large ranges in the relatively shallow transition plays where complex mixes of tight gas reservoirs, gas reservoirs with conventional permeabilities, and water-bearing reservoirs occur. These play attributes are considered less variable in the deeper, mostly gas saturated plays.

The attributes were treated as independent continuously random variables, and ranges of in-place gas for each subplay were then calculated using probability theory. The subplays were aggregated assuming perfectly positive correlation to calculate the range of in-place gas for each play. Finally, all of the plays were aggregated assuming perfect positive correlation to assess the total in-place gas in all of the plays in the Wind River Indian Reservation.

PLAYS

The file names of the 17 play spreadsheets consist of a "G", representing GRASS, followed by the play codes. The play codes were used to efficiently identify the plays in the play spreadsheets and refer to the plays in the WR-agg spreadsheet. For a more detailed discussion of the probability methodology see part B of this report. The file names, including the play codes, and abbreviated descriptive names of the 17 play spreadsheets are the following:

1. Gtfu1, Waltman present
2. Gtfu2, no Waltman
3. Glance1, Lance > 1.1
4. Glance2, Lance 0.73-1.1
5. Gmeet1, Meeteetse>300 F
6. Gmeet2, Meeteetse > 1.1
7. Gmeet3, Meeteetse 0.73-1.1
8. Gkmv1, Marine Kmv > 300 F
9. Gkmv2, Marine Kmv > 1.1

10. Gkmv3, Marine Kmv 0.73-1.1
11. Gkmv4, Nonmarine Kmv > 300 F
12. Gkmv5, Nonmarine Kmv > 1.1
13. Gkmv6, Nonmarine Kmv 0.73-1.1
14. Gcody3, Cody 0.73-1.1
15. Gfront1, Frontier > 300 F
16. Gfront2, Frontier > 1.1
17. Gfront3, Frontier 0.73-1.1

FRONTIER FORMATION PLAYS

The Frontier Formation is the deepest formation considered in the assessment and includes all three plays, a highly overpressured, a moderately overpressured, and a transition play (Figures 17 and 18). The play map was constructed by overlaying the isopach map of total sandstone in the Frontier Formation 10 ft thick or greater (Johnson and others, 1996a, fig. 9) on a structure contour map on the top of the Frontier Formation (Johnson and others, 1996a, Plate 1). Overburden was calculated using the structure contour map on the top of the Frontier Formation and assuming an average surface elevation in the Indian Reservation of 5,500 ft.

Frontier Formation highly overpressured play (T>300°F, the play code on the spread sheets is front1): Of the total of 117 subplays defined by Johnson and others (1996b) in this play, 35 occur partially or totally within the boundaries of the Wind River Indian Reservation (Figure 18, Tables 1-3) for a total area of 582.36 square miles. Average depth of the subplays ranges from 13,000 to 24,000 ft and sandstone thicknesses range from 140 to 280 ft. An average porosity of 6%, trap fill of 100%, and hydrocarbon saturation of 50% is assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 2). Estimated total mean in-place gas is 37.3 tcf (Tables 1 and 3). Estimates of total in-place gas at the 95th and 5th percentile levels are 24.3 tcf and 54.1 tcf respectively (Table 3)

Frontier Formation moderately overpressured play (Rm>1.1%, the play code on the spread sheets is front2): Of the total of 68 subplays defined by Johnson and others (1996b) in this play, 43 occur partially or totally within the boundaries of the Reservation (Figure 18, Tables 4-6) for a total area of 350.46 square miles. Average depth ranges from 7,000 to 22,000 ft. Average sandstone thickness ranges from 125 to 270 ft. An average porosity of 7%, trap fill of 100% and hydrocarbon saturation of 50% is assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 5). Estimated total mean in-place gas is 18.4 tcf (Tables 4 and 6). Estimates of total in-place gas at the 95th and 5th percentile levels are 11.9 tcf and 26.9 tcf respectively (Table 6)

Frontier Formation transition play (Rm 0.73 to 1.1%, the play code on the spread sheets is front3): Of the total of 49 subplays defined by Johnson and others (1996b) in the Frontier Formation transition play, 26 occur partially or totally within the Reservation boundaries (Figure 18, Tables 7-9) for a total area of 102.8 square miles. Average depth ranges from 6,000 to 11,500 ft, and sandstone thicknesses range from 90 to 250 ft. An average porosity of 7%, and hydrocarbon saturation of 50% is assumed for

all of the subplays (Table 7). These numbers may be somewhat conservative since many of the reservoirs have near conventional to conventional porosities and permeabilities. Trap fill for all of the subplays was assumed to be 50%. In other words, only half of the available sandstone volume will be gas-bearing, while half will contain only water. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 60%, trap fill: 100%, and hydrocarbon saturation: 80% (Table 8). This transition play is much more heterogeneous than the deeper overpressured plays and, as a result, ranges for porosity, trap fill, and hydrocarbon saturation are large. Estimated total mean in-place gas is 1.72 tcf (Tables 7 and 9).

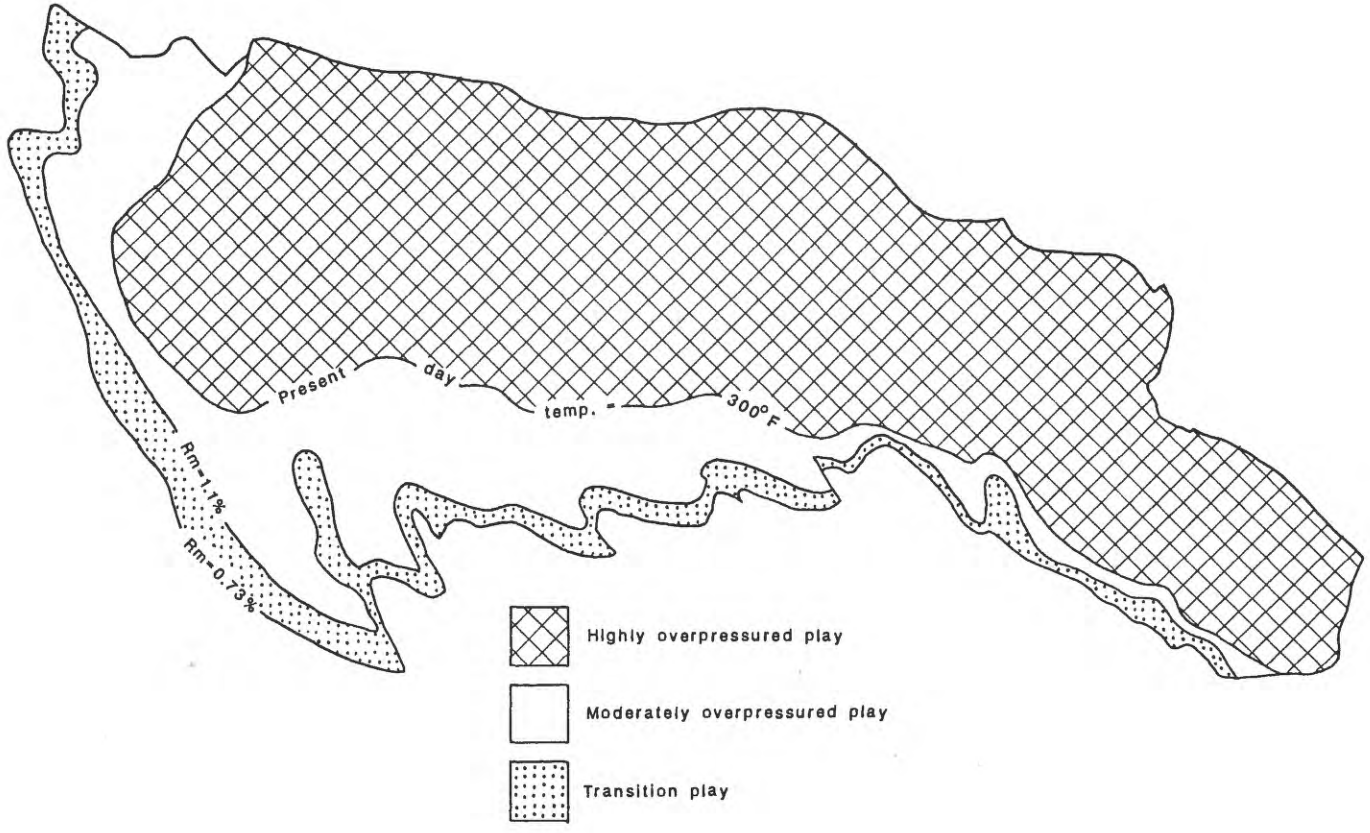
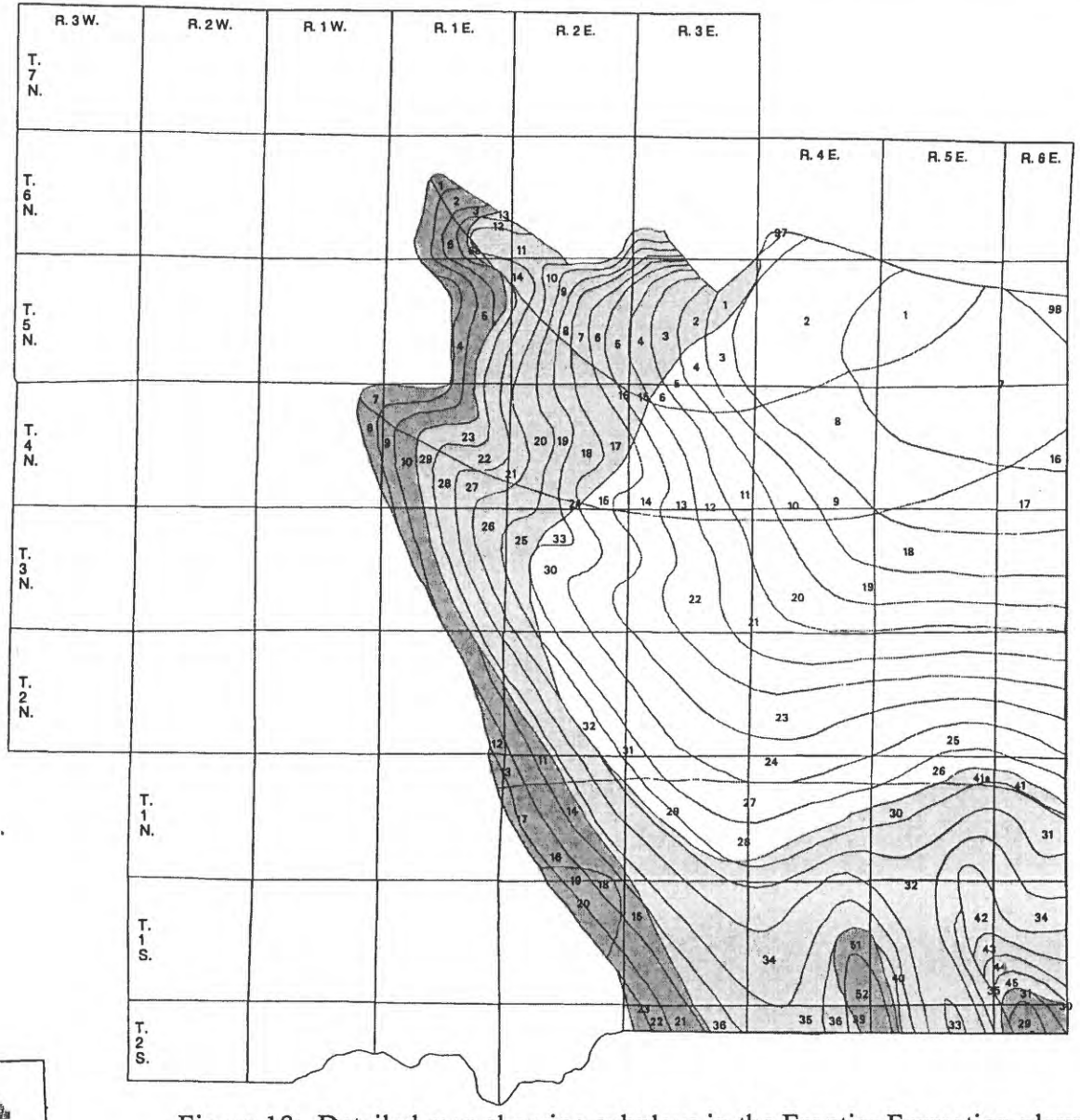


Figure 17: Generalized map showing areas of Frontier Formation highly overpressured, moderately overpressured, and transition plays, Wind River Basin.



Wind River Basin
Frontier Formation Plays
Wind River Indian Reservation

Plays

- >300°F (Highly Overpressured)
- >Rm1.1% (Moderately Overpressured)
- Rm.73%-1.1% (Transition)

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Figure 18: Detailed map showing subplays in the Frontier Formation plays, Wind River Indian Reservation. Outlines of play areas are from figure 17. Subplay areas were generated by overlaying the structure contour map on the top of the Frontier Formation (Johnson and others, 1996, Plate 1) on the isopach map of total sandstone in beds 10 ft thick or greater in the Frontier Formation (Johnson and others, 1996, Figure 9). Subplay identification numbers are keyed to Tables 1-9.

Estimates of total in-place gas at the 95th and 5th percentile levels are 0.72 tcf and 3.31 tcf respectively (Table 9).

CODY SHALE PLAYS

The Cody Shale in the Wind River Basin includes all three plays, the highly overpressured, the moderately overpressured, and the transition play (Figures 19 and 20), however only a relatively small area of one of these plays, the transition play, occurs in the southeast corner of the Wind River Indian Reservation (Figure 20). Overburden was calculated using the structure contour map on the top of the Cody Shale from Johnson and others (1996a, Plate 1). Sandstones occur through an interval in the upper part of the Cody which is as much as 1,800 ft thick and hence the overburdens calculated from the structure map are minimum values.

Cody Shale transition play (Rm 0.73-1.1%, the play code on the spread sheets is cody3): Of the total of 49 subplays in the Cody transition play in the basin defined by Johnson and others (1996b), 16 occur partially or totally within the Reservation boundaries for a total of 52.8 square miles (Figure 20, Tables 10-12). A porosity of 7% and hydrocarbon saturation of 50% is assumed for all of the subplays. An average trap fill of only 30% was assumed for the subplays because of the high probability of surface recharge into the sandstones from the south margin of the basin. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth-30%, closure-30%, thickness-50%, porosity-60%, trap fill-100%, and hydrocarbon saturation-80% (Table 11). Estimated total mean in-place gas is 279 bcf (Tables 10 and 12). Estimates of total in-place gas at the 95th and 5th percentile levels are 117 bcf and 538 bcf respectively (Table 12).

FALES SANDSTONE MEMBER PLAYS

The Fales Sandstone Member of the Mesaverde Formation is present only in the eastern part of the basin east of the Reservation boundary and is not considered in this report.

MARGINAL MARINE PART OF THE MESAVERDE FORMATION PLAYS

The marginal marine part of the Mesaverde Formation is in the lower part of the unit and is characterized by marginal marine, predominantly shoreface sandstones (Figure 10). It also includes some fluvial sandstones, coal and carbonaceous shale. The highly overpressured, moderately overpressured, and transition plays occur in the marginal marine Mesaverde (Figures 21 and 22). The interval varies widely in thickness across the basin from less than 50 ft to over 1,200 ft (Johnson and others, 1996a, Figure 21) and is thickest near the east margin of the Reservation. Thick buildups of marginal marine sandstones in the Mesaverde Formation occur in two areas of the Reservation: 1) the central part where the interval is over 400 ft thick and includes over 200 ft of total sandstone in beds 10 ft thick or greater; and 2) along the east margin where the interval is 1,200 ft thick and includes over 500 ft of sandstone.

These marginal marine sandstone buildups represent areas where the overall eastern retreat of the Upper Cretaceous seaway stalled for extended periods of time. Marginal marine sandstones in the interval appear to trend generally north-south or

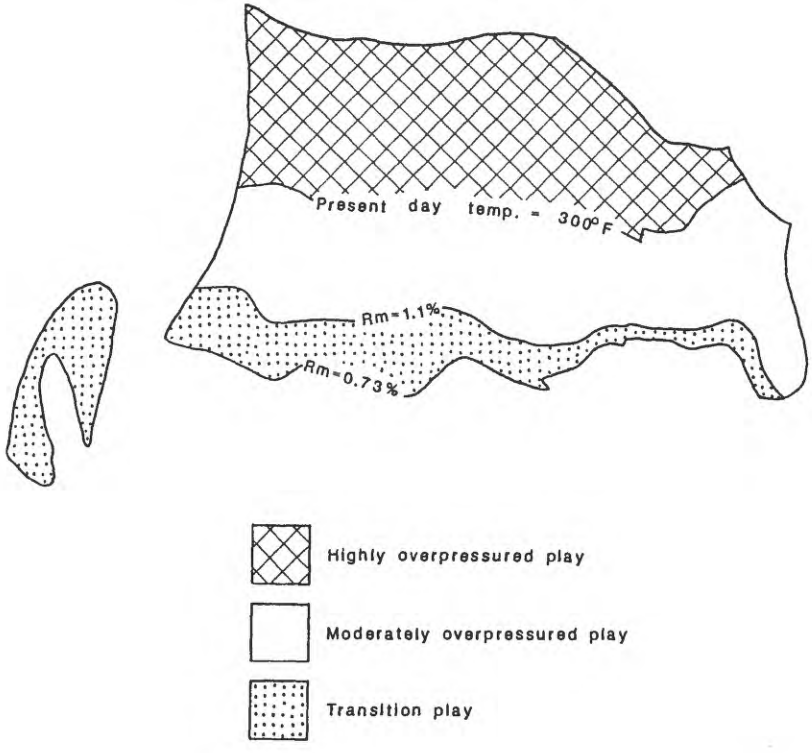
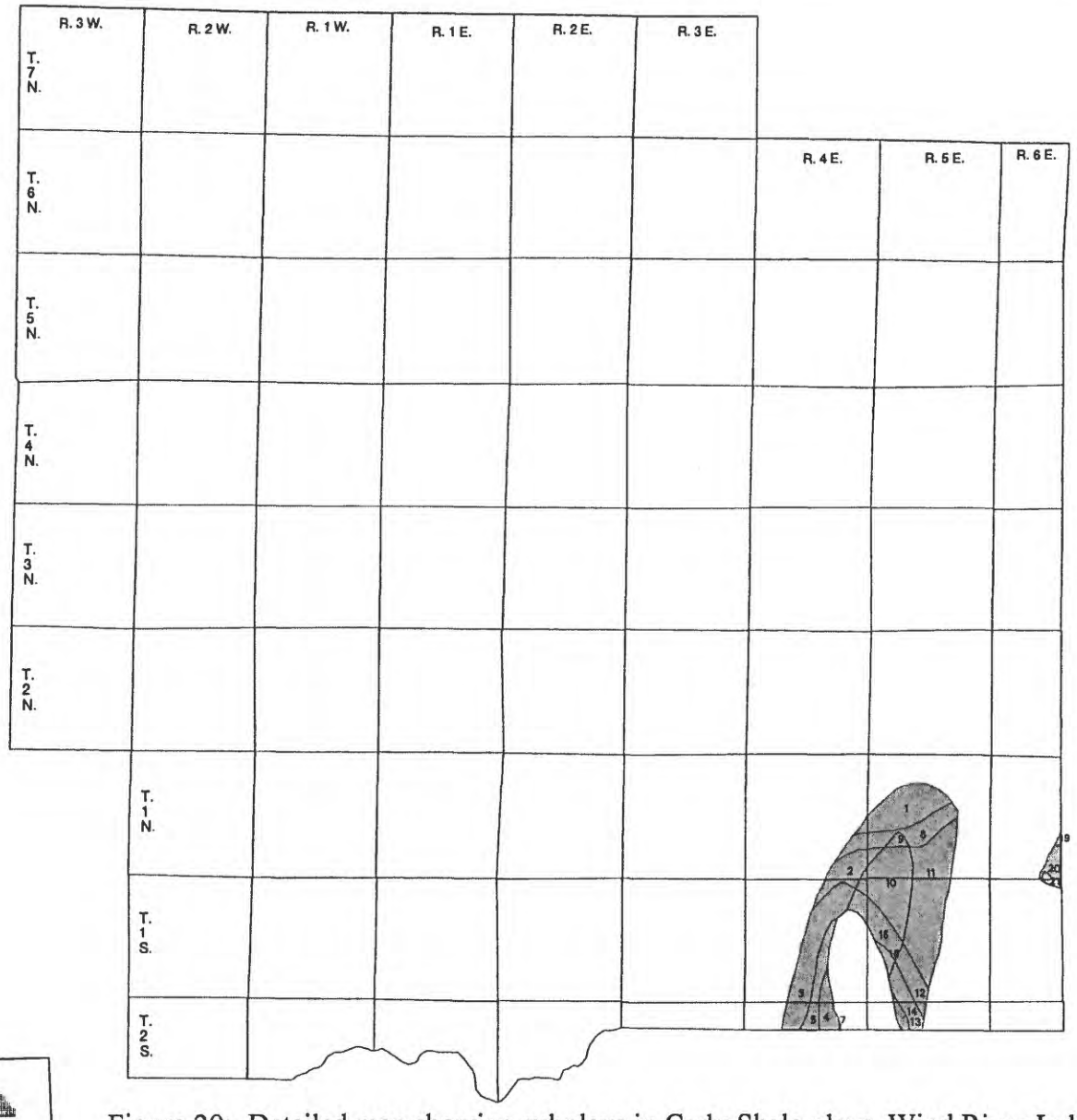


Figure 19: Generalized map showing areas of Cody Shale highly overpressured, moderately overpressured, and transition plays, Wind River Basin.



Wind River Basin
Cody Formation Plays
Wind River Indian Reservation

Plays

- >300°F (Highly Overpressured)
- >Rm1.1% (Moderately Overpressured)
- Rm.73%-1.1% (Transition)

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Figure 20: Detailed map showing subplays in Cody Shale plays, Wind River Indian Reservation. Outlines of play areas are from Figure 19. Subplay areas were generated by overlaying the structure contour map on the top of the Cody Shale (Johnson and others, 1996, Plate 1) on the isopach map of total sandstone in beds 10 ft thick or greater in the Cody Shale (Johnson and others, 1996, Figure 20. Subplay identification numbers are keyed to Tables 10-12.

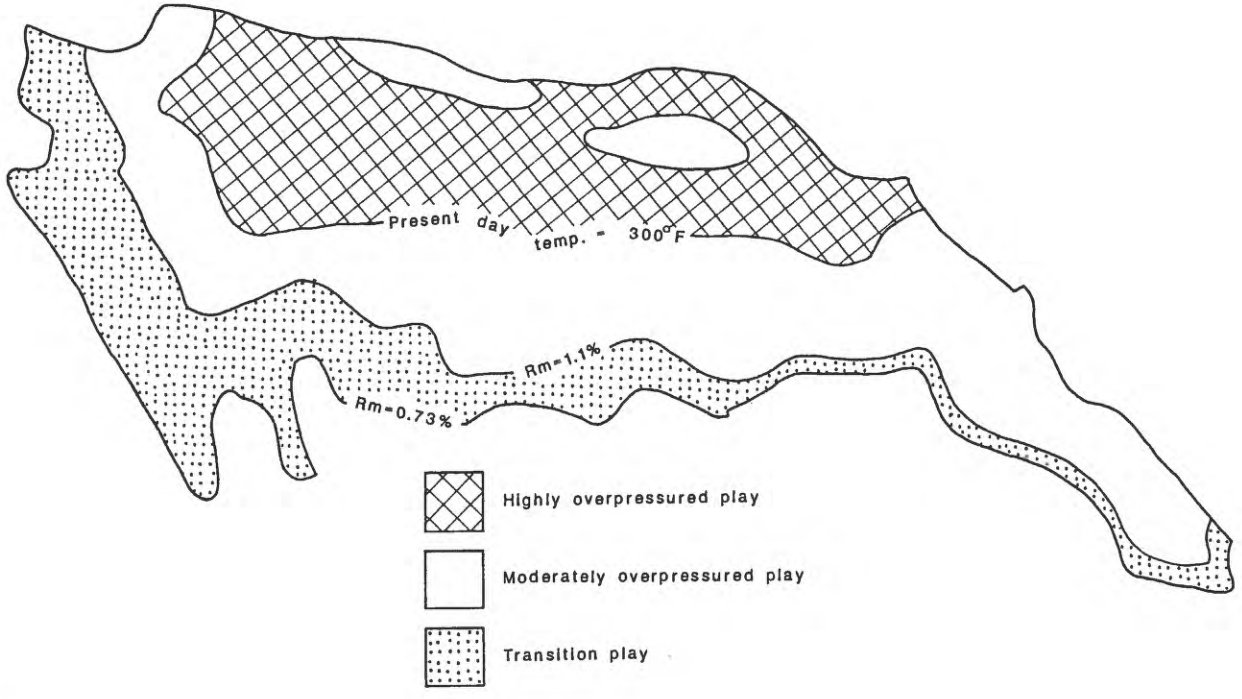


Figure 21: Generalized map showing areas of marginal marine interval of the Mesaverde Formation highly overpressured, moderately overpressured, and transition plays, Wind River Basin.

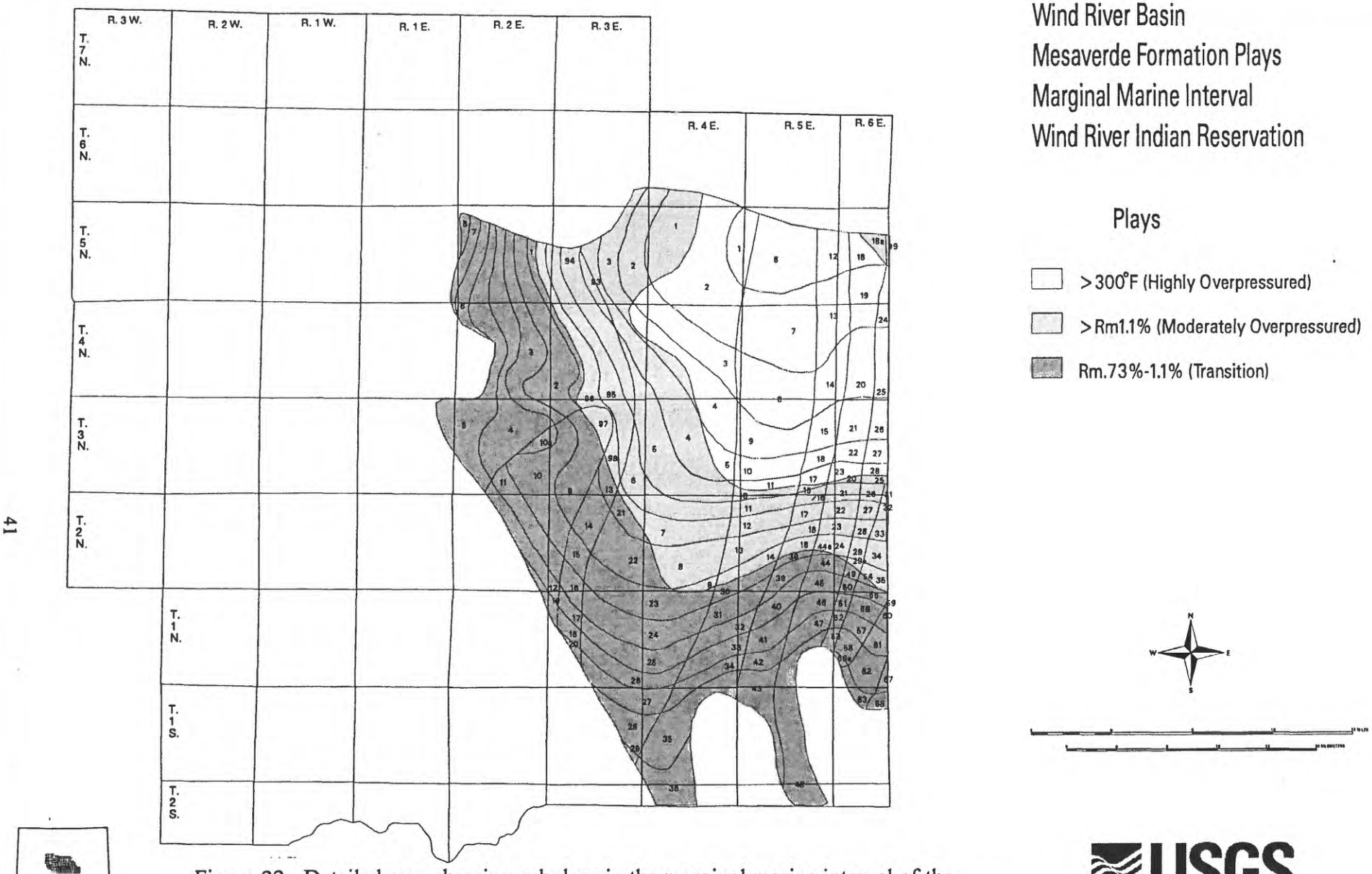


Figure 22: Detailed map showing subplays in the marginal marine interval of the Mesaverde Formation, Wind River Indian Reservation. Outlines of play area are from Figure 21. Subplay areas were generated by overlaying the structure contour map on the top of the marginal marine interval of the Mesaverde Formation (Figure 11) on the isopach map of total sandstone in bed 10 ft thick or greater in the marginal marine Mesaverde (Johnson and others 1996, Figure 27). Subplay identification numbers are keyed to Tables 13-21.

parallel to paleoshoreline while fluvial sandstones in the interval trend generally east-west or perpendicular to paleoshoreline. The laterally persistent marginal marine sandstones are subject to surface water recharge from outcrops near Alkali Butte and Pilot Butte on the Reservation and appear to be water-wet further into the basin than sandstones that do not crop out in these recharge areas. A structure contour map on the top of the marginal marine interval is shown on Figure 11 and was used to calculate overburden for the subplays.

Marginal marine part of Mesaverde Formation highly overpressured play (T>300°F, the play code on the spreadsheets is kmv1): Of the total of 63 subplays defined by Johnson and others (1996b) in this play, 27 occur partially or totally within the Reservation boundaries for a total area of 208.9 square miles (Figure 22, Tables 13-15), and average depth for individual subplays ranges from 16,000 to 21,000 ft. Estimates of total sandstone thickness in beds 10 ft thick or greater range from 80 to 450 ft. A porosity of 6%, trap fill of 100% and hydrocarbon saturation of 50% were assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 14). Estimated total mean in-place gas is 13.0 tcf (Tables 13 and 15). Estimates of total in-place gas at the 95th and 5th percentile levels are 8.46 tcf and 18.8 tcf respectively (Table 15).

Marginal marine part of Mesaverde Formation moderately overpressured play (Rm>1.1%, the play code on the spreadsheets is kmv2): Of the total of 108 subplays defined by Johnson and others (1996b) in this play, 40 occur partially or totally within the Reservation boundaries with a total area of 200.9 square miles (Figures 21-22, Tables 16-18). Total sandstone thickness varies from 80 to 530 ft, and average depth for individual subplays ranges from 11,500 to 20,000 ft. A porosity of 7% and hydrocarbon saturation of 50% was assumed for all of the subplays. A comparatively low trap fill of only 50% was assumed for all of the subplays. This is because the marginal marine sandstones which comprise most of the sandstones in this play are laterally persistent in a north-south direction or roughly parallel to paleoshoreline (Johnson and others, 1996a). As a result, many of these sandstones crop out near Pilot Butte and Alkali Butte. There is evidence that surface water recharge from these outcrops has invaded the basin-centered gas accumulation, liberating much of the gas that was originally in place (Johnson and others, 1996a). Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 17). Estimated total mean in-place gas is 4.48 tcf (Tables 16 and 18). Estimates of total in-place gas at the 95th and 5th percentile levels are 2.89 tcf and 6.53 tcf respectively (Table 18).

Marginal marine part of Mesaverde Formation transition play (Rm 0.73-1.1%, the play code on the spreadsheets is kmv3): Of the total of 91 subplays defined by Johnson and others (1996b) in this play, 68 partially or totally occur within the Reservation boundaries for a total area of 347.9 square miles (Figures 21-22, Tables 19-21). Total sandstone thickness varies from 50 to 525 ft. A porosity of 7%, and hydrocarbon saturation of 50% was assumed for all of the subplays. A trap fill of only 20% was assumed for all of the subplays because of the close proximity to surface water recharge areas along the south margin of the basin. Average depth for the subplays ranges from

6,000 to 14,000 ft. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 60%, trap fill: 100%, and hydrocarbon saturation: 80% (Table 20). Estimated total mean in-place gas is 2.97 tcf (Tables 19 and 21). Estimates of total in-place gas at the 95th and 5th percentile levels are 1.25 tcf and 5.72 tcf respectively (Table 21).

NONMARINE PART OF THE MESAVERDE FORMATION PLAYS

The nonmarine part of the Mesaverde Formation is above the interval that has marginal marine sandstones and includes the Teapot Sandstone Member (Figure 10). It varies in thickness from less than 500 ft in the southeast corner of the basin to over 2,200 ft in the northwest corner. Total sandstone in beds 10 ft thick or greater varies from less than 100 ft in the southeast corner of the basin to over 1,000 ft in the northwest corner. The nonmarine Mesaverde is divided into three plays: 1) the highly overpressured; 2) the moderately overpressured; and 3) the transition play (Figures 23 and 24). Overburden was estimated by using a structure contour map drawn on the middle of the nonmarine Mesaverde (Figure 12). This map was constructed by overlaying the isopach map of the nonmarine Mesaverde Formation (Johnson and others, 1996a, fig. 28) on the structure contour map of the top of the Teapot Sandstone (Johnson and others, 1996a, Plate 1).

Nonmarine part of Mesaverde Formation highly overpressured play (T>300°F, the play code on the spreadsheets is kmv4): Of the total of 28 subplays defined by Johnson and others (1996b) in this play 20 occur partially or totally within the boundaries of the Reservation for a total area of 211.7 square miles (Figure 24, Tables 22-24). Total sandstone thickness in beds 10 ft thick or greater for the subplays varies from 150 to 450 ft, and average depth ranges from 16,000 to 20,000 ft. An average porosity of 6%, trap fill of 100%, and hydrocarbon saturation of 50% were estimated for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 23).

In stratigraphically thick intervals such as the nonmarine Mesaverde in the Wind River Indian Reservation, the positions where the Rm 0.73%, Rm 1.1%, and 300° isotherm intersect the top and the bottom of the interval vary significantly in map view. In these areas, sandstone volume in the stratigraphic interval is approximately equally divided between two plays. The approximately wedge-shaped areas created by these intersections are illustrated in the schematic cross section shown in Figure 25. Wherever wedge-shaped areas such as these are created, it is assumed that one-half of the sandstone volume occurs in each of the plays, and an asterisk is used in the Tables at the beginning of the subplay row whenever the sandstone volume in a subplay is split in half between two plays. Assigning half of the sandstones to each of the plays in these subplay areas is only an approximation since the partitioning of sandstone actually varies from almost all occurring in one play at one end of the wedge to almost all occurring in the other play at the other end of the wedge. Estimated total mean in-place gas is 20.8 tcf (Tables 22 and 24). Estimates of total in-place gas at the 95th and 5th percentile levels are 13.5 tcf and 30.1 tcf respectively (Table 24).

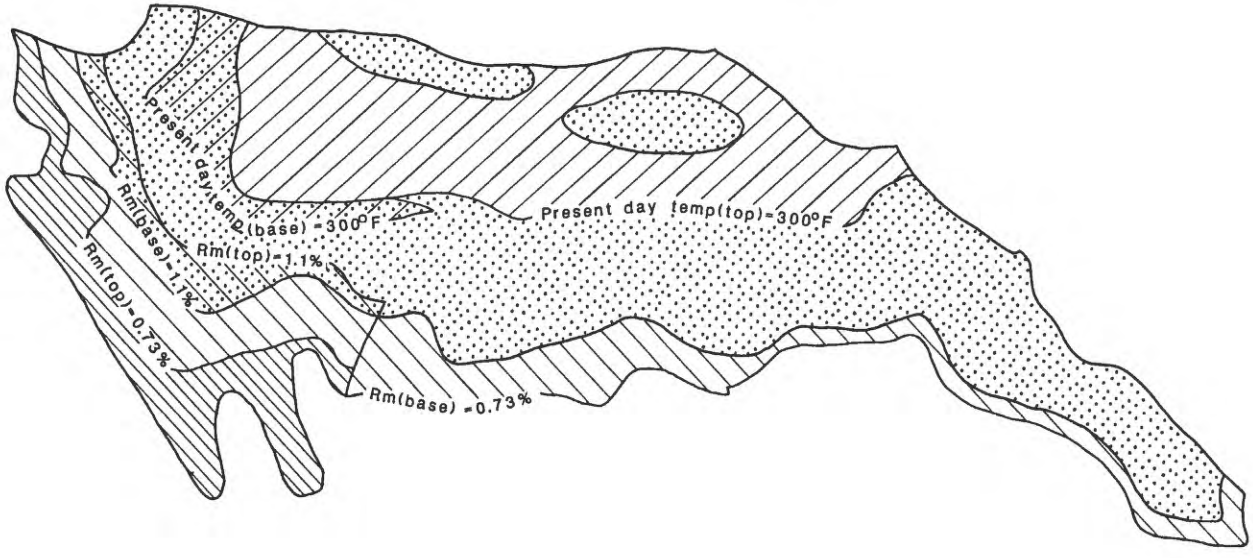
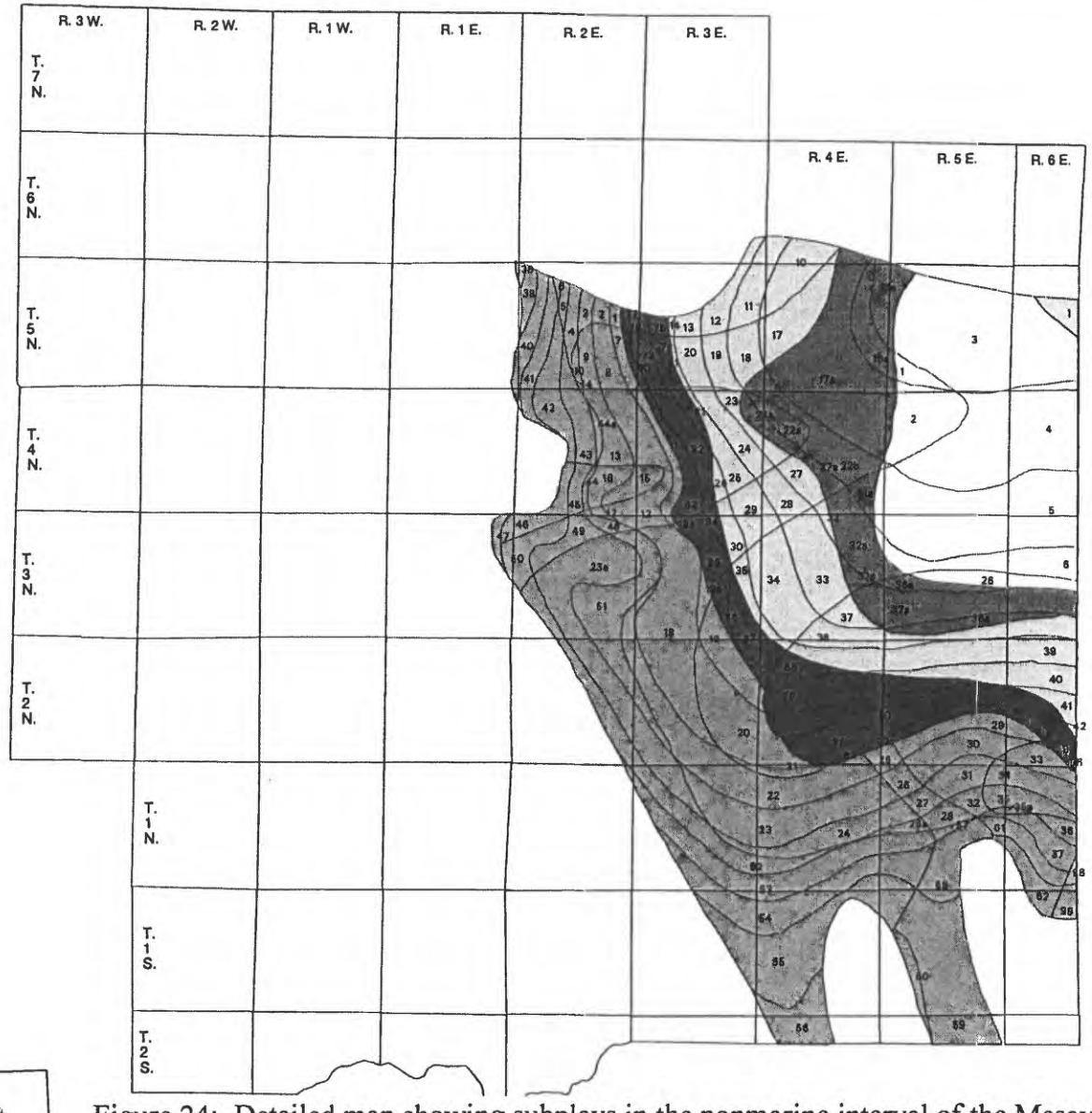


Figure 23: Generalized map showing areas of the nonmarine interval of the Mesaverde Formation highly overpressured, moderately overpressured, and transition plays, Wind River Basin. Areas where the nonmarine interval is divided between two different plays are also shown.



Wind River Basin
Mesaverde Formation Plays
Nonmarine Interval
Wind River Indian Reservation

Plays

- >300°F (Highly Overpressured)
- >Rm1.1% (Moderately Overpressured)
- Rm.73%-1.1% (Transition)
- Both >300°F & >Rm1.1% Plays
- Both >Rm1.1% & Rm.73%-1.1% Plays

Figure 24: Detailed map showing subplays in the nonmarine interval of the Mesaverde Formation, Wind River Indian Reservation. Outlines of play areas are from Figure 23. Subplay areas were generated by overlaying the structure contour map on the middle of the nonmarine interval of the Mesaverde Formation (Figure 12) on the isopach map of total sandstone in beds 10 ft thick or greater in the nonmarine Mesaverde (Johnson and others, 1996, Figure 43). Subplay identification numbers are keyed to Tables 22-30. Some subplays are divided between two different plays and are listed in both plays.

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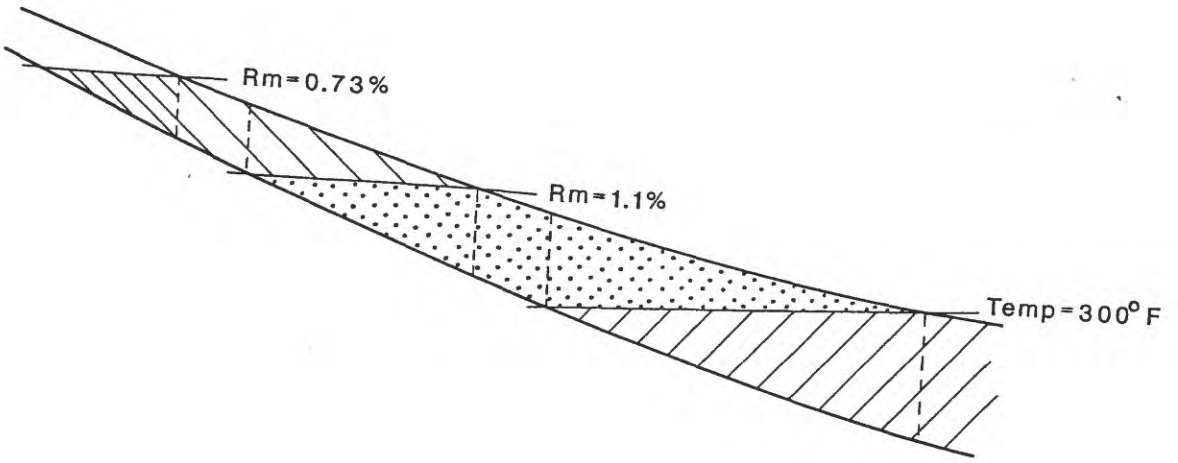

Figure 25: Cross section showing plays in the nonmarine interval of the Mesaverde Formation in the western part of the basin where the interval is locally more than 2,200 ft thick. Wedge-shaped subplay areas are created by intersections of the top and base of the stratigraphic interval with the thermal maturity and present day 300° F lines which define the plays.

Nonmarine part of Mesaverde Formation moderately overpressured play (Rm>1.1%, the play code on the spreadsheets is kmv5): Of the total of 96 subplays defined by Johnson and others (1996b) for this play, 64 occur partially or totally within the boundaries of the Reservation for a total area of 287.3 square miles (Figure 24, Tables 25-27). Total sandstone thickness in beds 10 ft thick or greater for the subplays varies from 90 to 550 ft, and average depth ranges from 11,000 to 19,000 ft. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth-30%, closure-30%, thickness-50%, porosity-30%, trap fill-20%, and hydrocarbon saturation-40% (Table 26). Estimated total mean in-place gas is 24.3 tcf (Tables 25 and 27). Estimates of total in-place gas at the 95th and 5th percentile levels are 15.7 tcf and 35.5 tcf respectively (Table 27).

Nonmarine part of Mesaverde Formation transition play (Rm 0.73-1.1%, the play code on the spreadsheets is kmv6): Of the total of 120 subplays defined by Johnson and others (1996b) in this play, 92 occur partially or totally within the boundaries of the Reservation for a total area of 435.76 square miles (Figure 24, Table 28-30). Total sandstone thickness for the subplays ranges from 90 to 620 ft. A porosity of 7%, trap fill of 50% and hydrocarbon saturation of 50% is assumed for all of the subplays. This trap fill is somewhat higher than that for the marginal marine Mesaverde transition play (50% versus 20%) because sandstones in the nonmarine part of the Mesaverde should have less communication with surface recharge areas along the south and west margins of the basin because they tend to be elongate perpendicular to paleoshoreline or in a general east-west direction, and hence these sandstones would tend to lens out before reaching outcrop. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 60%, trap fill: 100%, and hydrocarbon saturation: 80% (Table 29). Estimated total mean in-place gas is 14.9 tcf (Tables 28 and 30). Estimates of total in-place gas at the 95th and 5th percentile levels are 6.25 tcf and 28.7 tcf respectively (Table 30).

MEETEETSE FORMATION PLAYS

The Meeteetse Formation varies from over 1,250 ft thick in the northern and central parts of the Reservation to less than 250 ft thick in the southeast corner of the Reservation where it is truncated by unconformities. It contains from less than 100 ft to over 500 ft of sandstone in beds 10 ft thick or greater (Johnson and others, 1996, Figure 50). All three of the Meeteetse plays: 1) the highly overpressured; the moderately overpressured; and the transition play occur within the boundaries of the Reservation (Figures 26 and 27). A structure contour map on the top of the Teapot Sandstone Member of the Mesaverde Formation from Johnson and others (1996a, Plate 1) was used to estimate overburden.

Meeteetse Formation highly overpressured play (T>300°F, the play code on the spreadsheets is meet1): Of the total of 40 subplays defined by Johnson and others (1996b) in this play, 7 occur partially or totally within the Reservation boundaries for a total area of 126.6 square miles (Figure 27, Tables 31-33). Total sandstone in the subplays ranges from 260 to 375 ft (Figure 27). A porosity of 6%, trap fill of 100% and hydrocarbon saturation of 50% was assumed for all of the subplays. Average depth for the subplays varies from 16,000 to 19,000 ft. Estimated ranges for the play attributes in

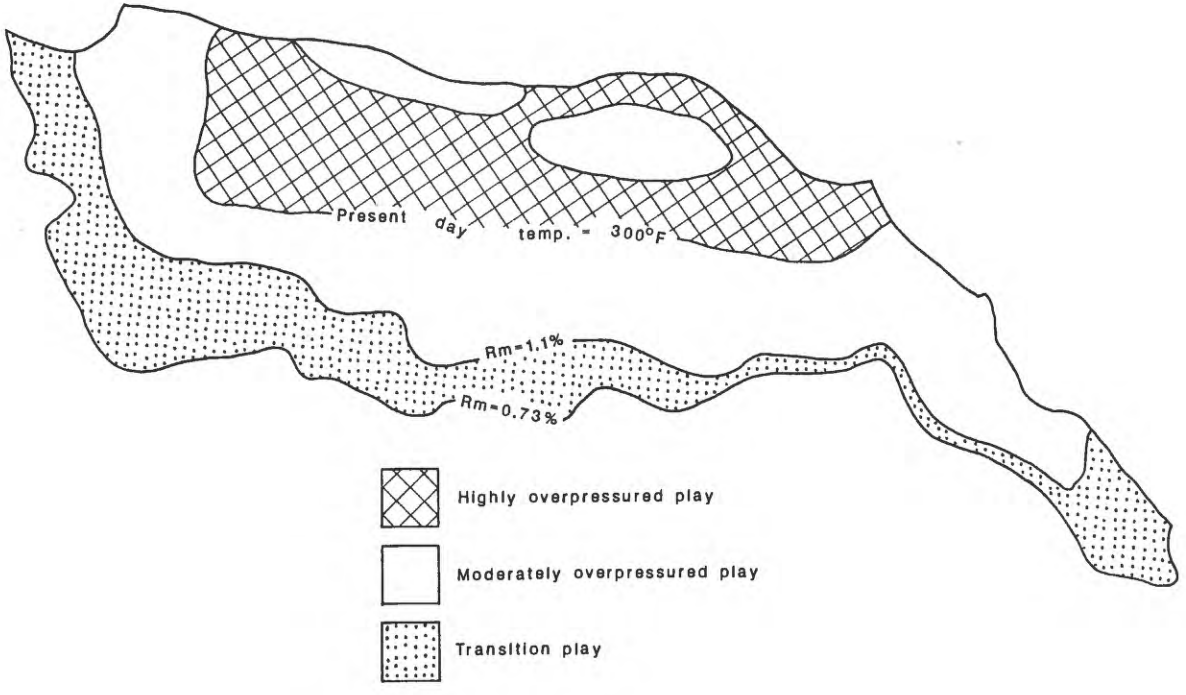

Figure 26: Generalized map showing areas of Meeteetse Formation highly overpressured, moderately overpressured, and transition plays, Wind River Basin.

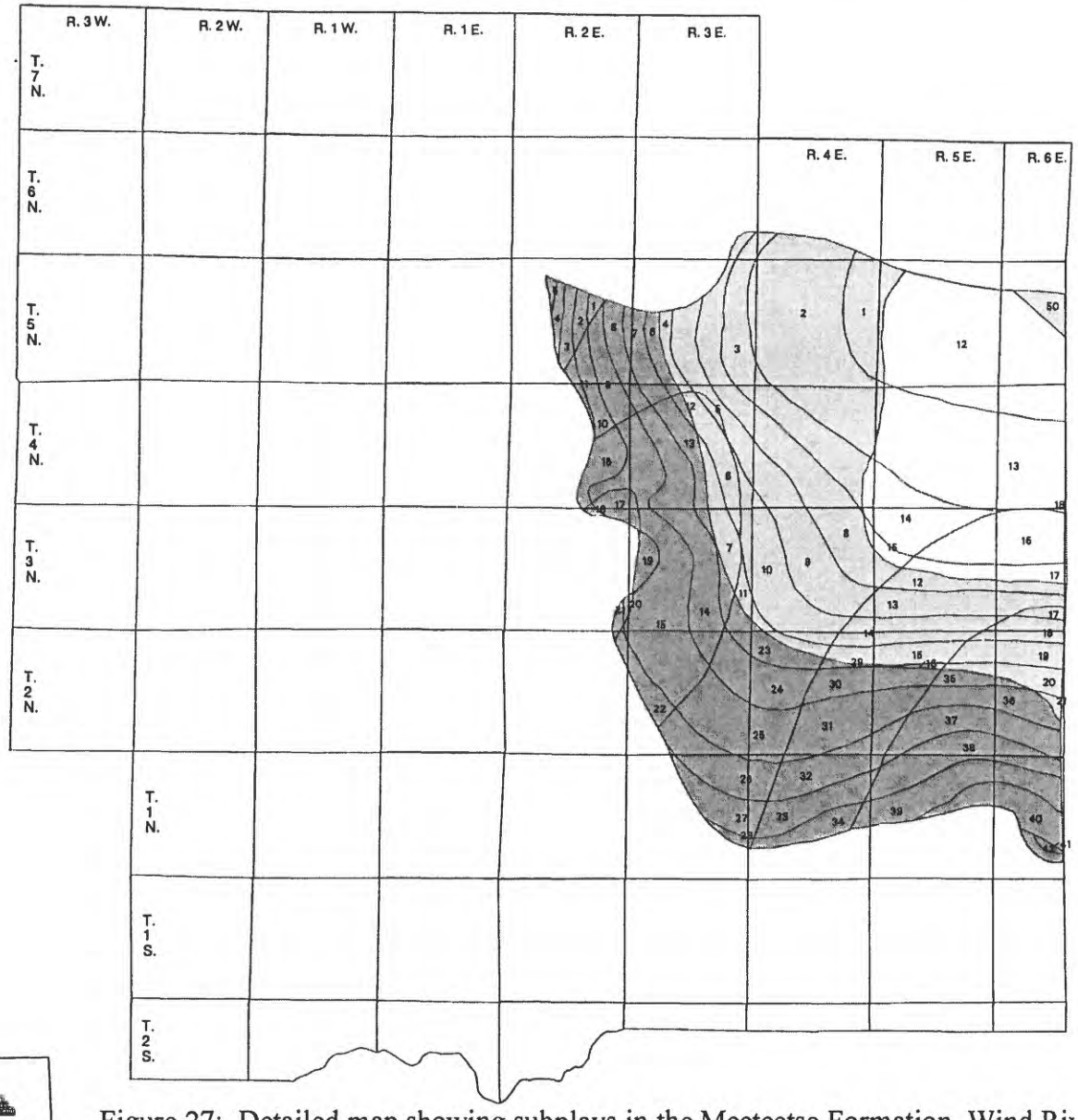

Figure 27: Detailed map showing subplays in the Meeteetse Formation, Wind River Indian Reservation. Outlines of plays are from Figure 26. Subplay areas were generated by overlaying the structure contour map on the Teapot Sandstone Member of the underlying Mesaverde Formation (Johnson and others, 1996, Plate 1) on the isopach map of total sandstone in beds 10 ft thick or greater in the Meeteetse Formation (Johnson and others, 1996, Figure 50). Subplay identification numbers are keyed to Tables 31-39.

Wind River Basin
Meeteetse Formation Plays
Wind River Indian Reservation

Plays

- >300°F (Highly Overpressured)
- >Rm1.1% (Moderately Overpressured)
- Rm.73%-1.1% (Transition)

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the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 32). Estimated total mean in-place gas is 14.7 tcf (Tables 31 and 33). Estimates of total in-place gas at the 95th and 5th percentile levels are 9.56 tcf and 21.2 tcf respectively (Table 33).

Meeteetse Formation moderately overpressured play (Rm>1.1%, the play code on the spreadsheets is meet2): Of the total of 68 subplays defined by Johnson and others (1996b) for this play, 22 occur partially or totally within the Reservation boundaries for a total area of 213.7 square miles (Figure 27, Tables 34-36). Total sandstone thickness in beds 10 ft thick or greater for the subplays ranges from 170 to 415 ft. Average depth for the subplays varies from 11,000 to 18,500 ft. A porosity of 7%, trap fill of 100% and hydrocarbon saturation of 50% was assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 35). Estimated total mean in-place gas is 21.4 tcf (Tables 34 and 36). Estimates of total in-place gas at the 95th and 5th percentile levels are 13.8 tcf and 31.2 tcf respectively (Table 36).

Meeteetse Formation transition play (Rm 0.73-1.1%, the play code on the spreadsheets is meet3): Of the total of 62 subplays defined by Johnson and others (1996b) in this play, 42 occur partially or totally within the boundaries of the Reservation for a total area of 247.55 square miles (Figure 27, Tables 37-39). Total sandstone thickness in beds 10 ft thick or greater varies from 100 ft to 520 ft. Average depth ranges from 6,500 to 13,500 ft. A porosity of 7%, trap fill of 50%, and hydrocarbon saturation of 50% was assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 60%, trap fill: 100%, and hydrocarbon saturation: 80% (Table 38). Estimated total mean in-place gas is 8.97 tcf (Tables 37 and 39). Estimates of total in-place gas at the 95th and 5th percentile levels are 3.76 tcf and 17.3 tcf respectively (Table 39).

LANCE FORMATION PLAYS

The Lance Formation is over 6,000 ft thick along the northeast margin of the basin adjacent to the Casper Arch but thins toward the southwest and is missing along the southwest margin near the Wind River Range (Johnson and others, 1996a). Total sandstone in beds 10 ft thick or greater ranges to over 2,000 ft in the north-central part of the basin adjacent to the Owl Creek Mountains (Johnson and others, 1996, Figure 57). Maximum thickness of Lance sandstones in the Reservation is between 1,000 and 1,500 ft in the northeast part of the Reservation adjacent to the Owl Creek Mountains. The Lance does not include a highly overpressured play because average temperatures for the Lance do not exceed 300° F anywhere in the basin. A structure contour map on the middle of the Lance was used to calculate average overburden (Figure 14).

Because of its great thickness, wedge-shaped volumes are created by the intersection of the Rm 1.1% and Rm 0.73% thermal maturity levels with the top and base of the Lance Formation. Calculating gas volumes in these wedge-shaped subplay areas is more complex than calculating volumes in similar wedge-shaped areas in the nonmarine Mesaverde plays because thermal maturity lines criss-cross on the play map (Figure 29).

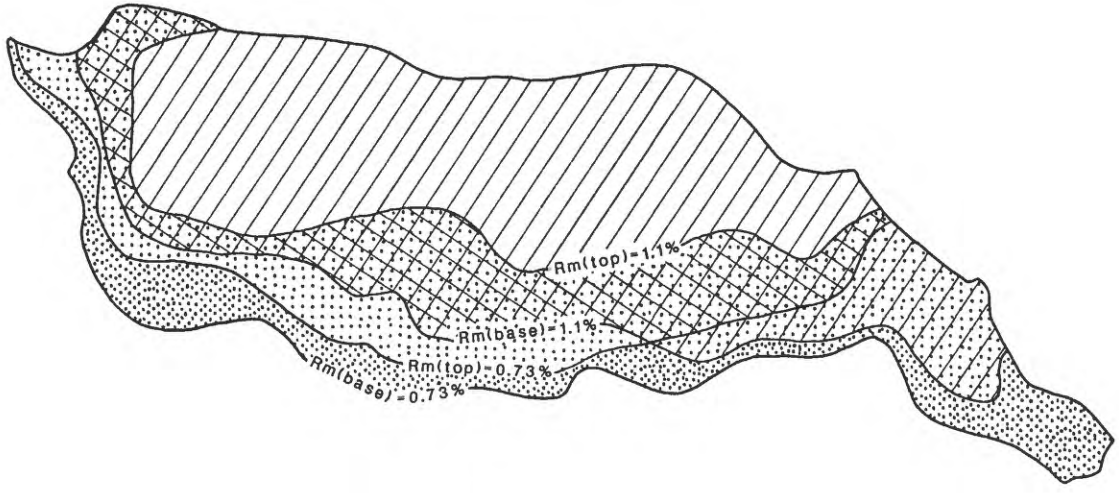
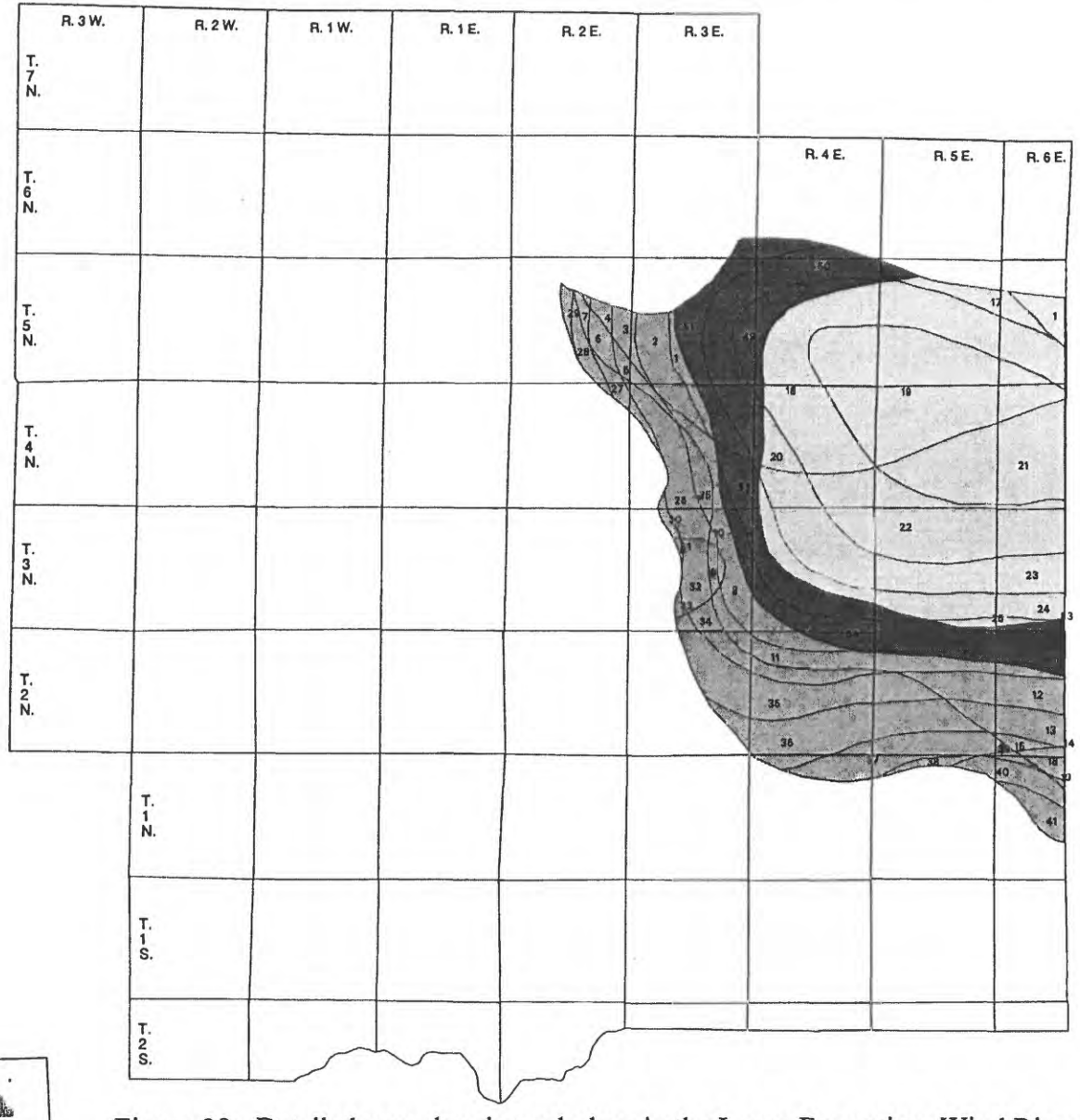


Figure 28: Generalized map showing areas of Lance Formation moderately overpressured and transition plays, Wind River Basin. Areas where the Lance Formation is divided between two different plays are also shown.



Wind River Basin
Lance Formation Plays
Wind River Indian Reservation

Plays

- >300°F (Highly Overpressured)
- >Rm1.1% (Moderately Overpressured)
- Rm.73%-1.1% (Transition)
- Both >300°F & >Rm1.1% Plays
- Both >Rm1.1% & Rm.73%-1.1% Plays

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Figure 29: Detailed map showing subplays in the Lance Formation, Wind River Indian Reservation. Outlines of play areas are from Figure 28. Subplay areas were generated by overlaying structure contour map on the middle of the Lance (Figure 13) on the isopach map of total sandstone in beds 10 ft thick or greater in the Lance Formation (Johnson and others, 1996, Figure 57). Subplay identification numbers are listed in Tables 40-45. Some subplays are divided between two different plays and are listed in both.

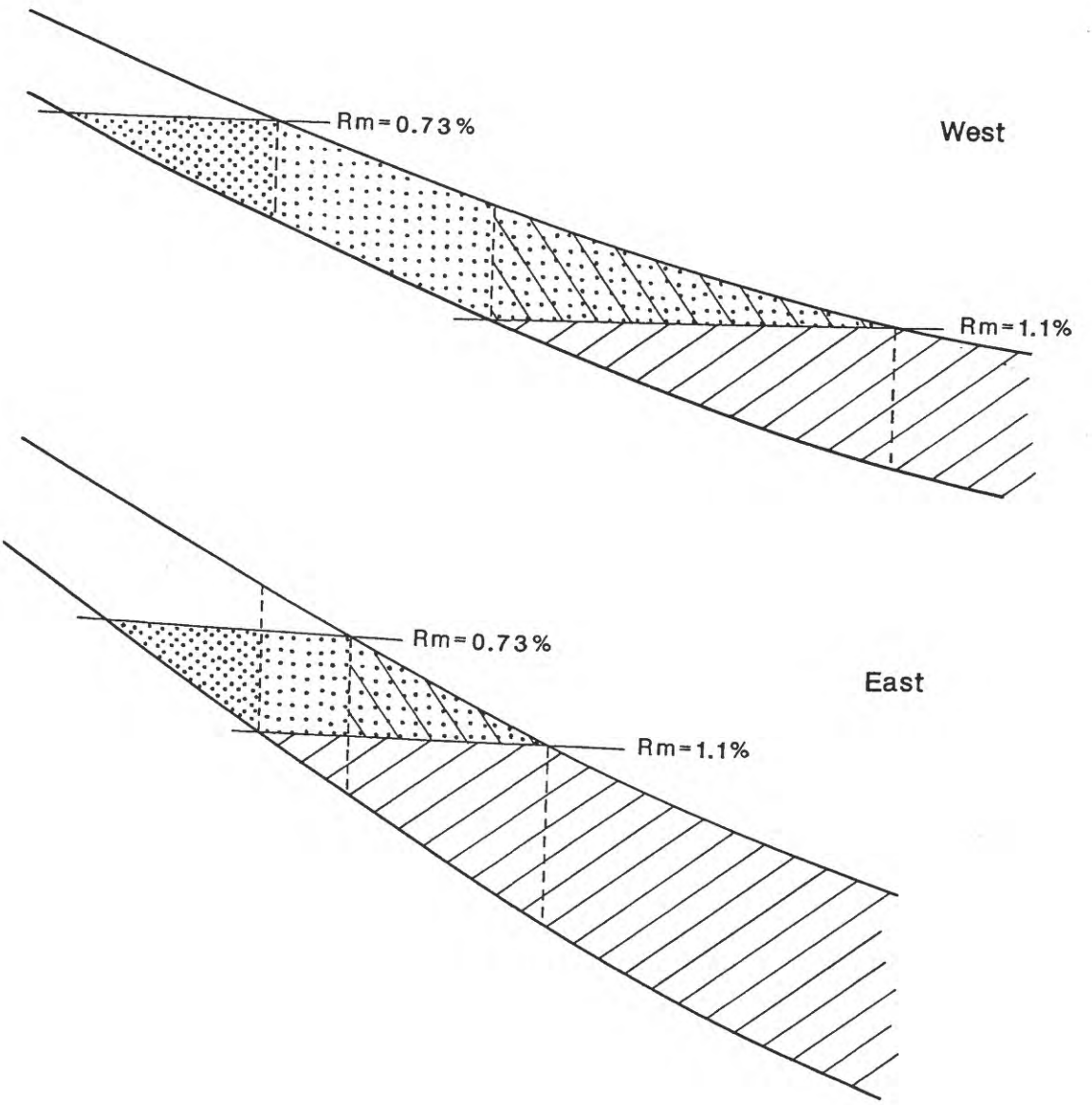

Figure 30: Cross sections of the Lance plays showing the variation in the geometry of the plays between the western and eastern parts of the basin. Wedge-shaped areas are defined by different line intersections in the western and eastern parts of the basin because of varying dips on stratigraphic contacts, and the Rm 0.73% and Rm 1.1% thermal maturity lines.

This complexity is illustrated in two schematic cross sections (Figure 30). In the western part of the basin, including all of the Wind River Indian Reservation area, the positions where the Rm 0.73% thermal maturity line intersects the top and base of the Lance occur more towards the margin of the basin than the intersection of the Rm 1.1% thermal maturity line with either the top or the base of the Lance. This case is similar to that found in the nonmarine Mesaverde plays. In the eastern part of the basin the geometry is more complex. Here, for instance, the area between where the Rm 0.73% line intersects the top of the Lance and the Rm 1.1% line intersects the base of the Lance is mainly within the transition play but includes a small amount of moderately overpressured play as well as a small amount of non-gas bearing strata. For an explanation of how this complex situation was handled see Johnson and others (1996b).

Lance Formation moderately overpressured play (Rm>1.1%, the play code on the spreadsheets is lance1): Of the total of 95 subplays defined by Johnson and others (1996a) in this play, 17 occur partially or totally within the Reservation for a total area of 312.3 square miles (Figure 29, Tables 40-42). Seven of these subplays are wedge-shaped, and in these plays, the thickness of sandstone indicated on the sandstone isopach is halved before a gas volume is calculated. Total sandstone thickness in beds 10 ft thick or greater varies widely between the subplays from 400 ft to 1,200 ft. Average depth for the subplays varies from 10,000 ft to 16,000 ft. A porosity of 7%, trap fill of 100% and hydrocarbon saturation of 50% is assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 30%, trap fill: 20%, and hydrocarbon saturation: 40% (Table 41). Estimated total mean in-place gas is 83 tcf (Tables 40 and 42). Estimates of total in-place gas at the 95th and 5th percentile levels are 53 tcf and 121 tcf respectively (Table 42).

Lance Formation transition play (Rm 0.73-1.1%, the play code on the spreadsheets is lance2): Of the total of 99 subplays defined by Johnson and others (1996b) for this play, 43 occur partially or totally within the Reservation for a total area of 254.02 square miles (Figure 29, Tables 43-45). Twenty-four of the subplays are wedge-shaped. Average sandstone thickness in beds 10 ft thick or greater varies from 200 to 1,100 ft. A porosity of 7%, trap fill of 50%, and hydrocarbon saturation of 50% was assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 60%, trap fill: 100%, and hydrocarbon saturation: 80% (Table 44). Estimated total mean in-place gas is 15.6 tcf (Tables 43 and 45). Estimates of total in-place gas at the 95th and 5th percentile levels are 6.56 tcf and 30.1 tcf respectively (Table 45).

LOWER MEMBER OF THE FORT UNION FORMATION PLAYS

Unlike the tight gas sandstone plays for the other stratigraphic units considered here, the plays for the lower member of the Fort Union Formation are not defined by present day levels of thermal maturity and present-day temperatures. Instead, the lower member of the Fort Union is subdivided into two plays based on the presence or absence of the overlying Waltman Shale (Figures 31 and 32). The Waltman Shale appears to be acting as a seal, inhibiting the vertical migration of gases in the basin (Johnson and Rice, 1993). Available mudlogs suggest that gas is more-or-less ubiquitous in the lower

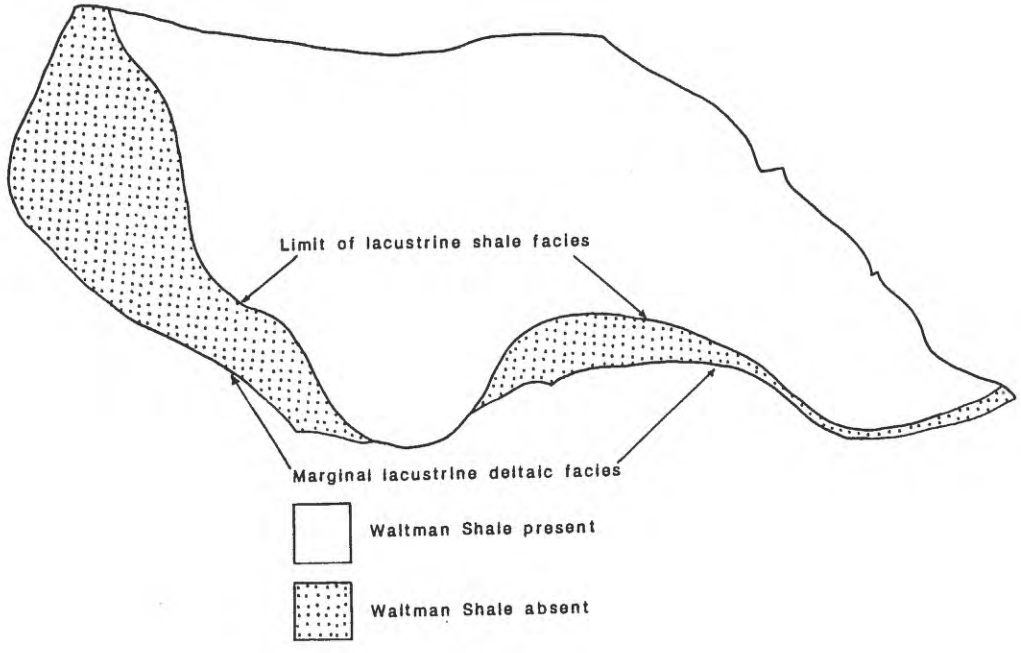

Figure 31: Generalized map showing areas of lower unnamed member of the Fort Union Formation plays, Wind River Basin. The lower member is divided into two plays: 1) where the Waltman Shale is present; and 2) where the Waltman Shale is absent.

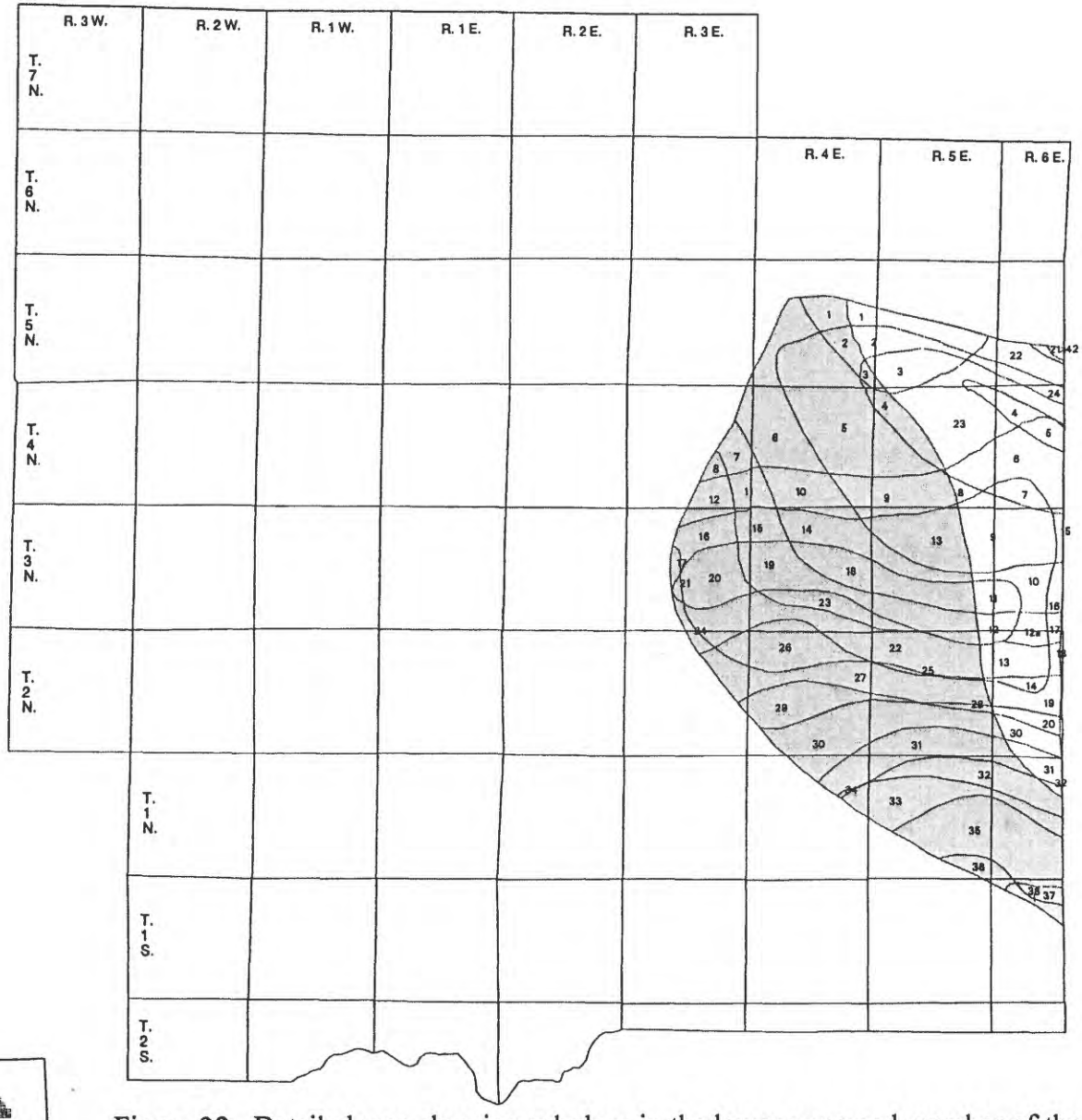

Figure 32: Detailed map showing subplays in the lower unnamed member of the Fort Union Formation, Wind River Indian Reservation. Outlines of play areas are from Figure 31. Subplay areas were generated by overlaying the structure contour map on the middle of the lower unnamed member (Figure 14) on the isopach map of total sandstone in beds 10 ft thick or greater in the lower unnamed member (Johnson and others, 1996, Figure 64).

Wind River Basin
Fort Union Formation Plays
Wind River Indian Reservation

Plays

Waltman Shale Present

Waltman Shale Absent

USGS
science for a changing world

member of the Fort Union Formation wherever the Waltman Shale is present, even at thermal maturity levels of only Rm 0.5% to Rm 0.6% (Figure 4). Gases from below the Waltman are isotopically much heavier than gases produced from sandstones within or above the Waltman and are probably sourced by thermally mature coals and carbonaceous shales within the lower member and in the underlying Upper Cretaceous rocks. The isotopically light gases produced from the Waltman and above, in contrast, are probably sourced by the Waltman. Published data indicate that permeabilities in the lower unnamed member vary from conventional to tight. Ptasynski (1989) reported permeabilities from 3 to 186 millidarcies at Waltman field in the east part of the basin while Specht (1989) reported permeabilities of from 0.1 to 55 millidarcies at Fuller Reservoir field, a few miles east of the Reservation. Low permeabilities are also indicated at Madden field where the lower member is moderately overpressured. All gas in the lower member is assessed here and no attempt was made to distinguish between gas in tight reservoirs and conventional reservoirs. The structure contour map on the middle of the lower member (Figure 16) was used to estimate overburden.

Lower member of Fort Union Formation, Waltman Shale present play (the play code on the spreadsheets is tfu1): Of the total of 119 subplays defined by Johnson and others (1996b) in this play, 28 occur totally or partially within the boundaries of the Reservation for a total area of 115.0 square miles (Figures 31, 32, Tables 46-48). Total sandstone in beds 10 ft thick or greater varies from 450 to 1,300 ft. A porosity of 7% and hydrocarbon saturation of 50% and a trap fill of 70% is assumed for all of the subplays. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth: 30%, closure: 30%, thickness: 50%, porosity: 60%, trap fill: 80%, and hydrocarbon saturation: 80% (Table 47). Estimated total mean in-place gas is 16.3 tcf (Tables 46 and 48). Estimates of total in-place gas at the 95th and 5th percentile levels are 7.34 tcf and 30.0 tcf respectively (Table 48).

Lower member of Fort Union Formation, Waltman Shale not present play (the play code on the spreadsheets is tfu2): This play occurs marginal to the pinchout of the Waltman Shale Member in a zone from about 0.5 to 14 miles wide where distinctive coarsening upwards lacustrine deltaic cycles occur but recognizable intervals of lacustrine shale are not present (Figures 4, 31, 32). In marginal areas of the basin where both the Waltman Shale and the lacustrine deltas are absent, the Fort Union cannot be subdivided into members. No attempt was made to estimate gas in the Fort Union Formation in these marginal areas. Of the total of 56 subplays defined in this play by Johnson and others (1996b) 38 occur partially or totally within the boundaries of the Reservation for a total area of 296.83 square miles (Tables 49-51). Total sandstone in beds 10 ft thick or greater ranges from 200 to 1,300 ft. A porosity of 8% and hydrocarbon saturation of 50% was assumed for all of the plays. Trap fill was varied from 10% to 30%. Estimated ranges for the play attributes in the 95% to 5% probability range are: depth-30%, closure-30%, thickness-50%, porosity-60%, trap fill-100%, and hydrocarbon saturation-80% (Table 50). Estimated total mean in-place gas is 18.2 tcf (Tables 49 and 51). Estimates of total in-place gas at the 95th and 5th percentile levels are 7.63 tcf and 35.0 tcf respectively (Table 51).

DISTRIBUTION OF GAS WITH DEPTH

Because each subplay in the 17 plays is assigned an average depth, the spreadsheets were reorganized according to depth. Tables 53-69 list mean in-place gas in each of the seventeen plays on the Reservation found in 500 ft depth increments. Table 70 is a summary of the mean in-place gas for all of the plays listed according to depth. Figure 33 is a graph showing cumulative total versus depth of mean in-place gas for all the 17 plays combined. The cumulative total follows a general hyperbolic shape, with little gas occurring at either depth extreme. About 80% of the in-place gas occurs in the mid-depth range, from 10,000 to 19,000 ft, while only about 10% of the gas occurs at the shallow end of the depth range, from 3,000 to 10,000 ft, and only about 10% of the in-place gas occurs at the deep end of the depth range, from 19,000 to 24,000 ft. About 50% of the gas in place occurs at depths of greater than 14,500 ft or close to the midpoint in the depth range. The reasons for this distribution of gas appear to be complex. Little gas occurs at the shallow end of the depth range primarily because this gas is found in the transition plays (Rm 0.73 to 1.1%) where percent trap fills and pressures are low. Little gas occurs at the deep end of the depth range because very little of the total volume of sandstone within the basin-centered accumulation occurs at these great depths.

DISCUSSION

A total of 316 tcf of mean in-place gas is estimated for the 17 plays that occur within the boundaries of the Reservation (Table 52). This is about 31% of the total of 995 tcf of mean gas in place is estimated by Johnson and others (1996b, Table 67) for the 22 plays in the entire Wind River Basin. Using probability theory, there is a 95% chance that there is at least 187 tcf of gas in place in the basin centered gas accumulation in the Wind River Basin and a 5% chance that there is as much as 496 tcf of gas in place. It cannot be overemphasized that this is a dispersed, low-grade resource, and that only the most economic parts, or sweet spots, will probably ever be produced. As an example, Law and others (1989) estimated that the low-permeability basin-centered gas accumulation in the Greater Green River Basin contained about 5,063 tcf mean in-place gas (Law and others, 1989). Of this total, Law and others (1989) estimated that only 73 tcf was recoverable using current technology and that 433 tcf was recoverable using future technology. Although recoverable gas was not estimated for the low-permeability gas accumulation in the Wind River Indian Reservation, it is assumed that, as in the Green River Basin, only a small percentage of the in-place gas will ever be recoverable.

The tables presented in this report contain a huge amount of information which may be used for other purposes than estimating total in-place gas. The tables listing mean in-place gas broken down by depth provide a powerful tool in helping to determine what percentage of the in-place gas can be produced economically. For instance if it is determined that, at the present time, is uneconomic to produce gas from depths greater than 12,000 ft in the Reservation, then it can be determined from Figure 33 that about 77 tcf or 24% of the total in-place gas occurs at depths favorable for development. In-place gas determined for each subplay area can be divided by the number of acres in the subarea to generate an estimate of in-place gas per acre within the subplay. This

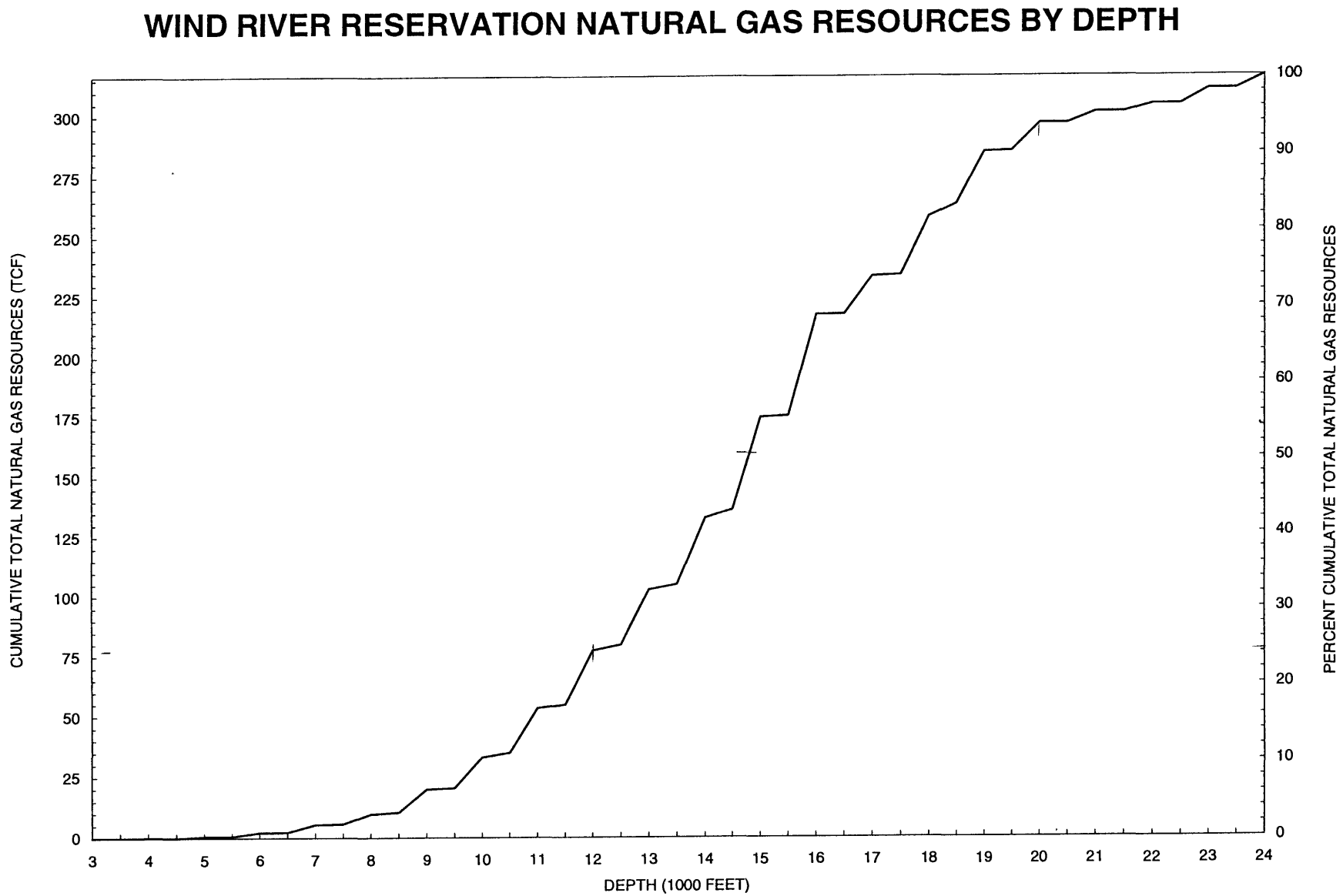

Figure 33: Graph showing cumulative in-place gas by depth in both trillions of cubic feet and percent of total, Wind River Indian Reservation. Data from last column of Table 70.

information can be used to help determine optimum well spacing. In addition, assessing each stratigraphic unit separately is important for gas exploration because gas leases commonly cover only certain stratigraphic intervals within the lease boundaries.

In conclusion, the Wind River Indian Reservation appears to contain a huge in-place resource of gas in a continuous or basin-centered type, low-permeability accumulation. Our detailed approach to estimating this in-place gas will help future workers determine how much of this gas can be produced economically.

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Play Name :	Frontier > 300F									(Panel 1)
						a =	0.727	0.016	0.00008	
						b =	14.7	505	0	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	19.88	260	6	100	50	24,000	17462.7	889	1.92	1.56E+12
2	37.82	270	6	100	50	23,000	16735.7	873	1.84	3.14E+12
3	7.72	280	6	100	50	22,000	16008.7	857	1.76	6.77E+11
4	4.13	260	6	100	50	21,000	15281.7	841	1.68	3.43E+11
5	2.5	260	6	100	50	20,000	14554.7	825	1.6	2.12E+11
6	1.02	250	6	100	50	19,000	13827.7	809	1.52	8.47E+10
7	56.98	225	6	100	50	24,000	17462.7	889	1.92	3.87E+12
8	30.34	225	6	100	50	23,000	16735.7	873	1.84	2.10E+12
9	10.79	225	6	100	50	22,000	16008.7	857	1.76	7.61E+11
10	9.04	225	6	100	50	21,000	15281.7	841	1.68	6.50E+11
11	9.3	225	6	100	50	20,000	14554.7	825	1.6	6.81E+11
12	7.27	225	6	100	50	19,000	13827.7	809	1.52	5.43E+11
13	6.63	225	6	100	50	18,000	13100.7	793	1.44	5.05E+11
14	5.8	225	6	100	50	17,000	12373.7	777	1.36	4.51E+11
15	3.64	215	6	100	50	16,000	11646.7	761	1.28	2.76E+11
16	2.72	190	6	100	50	24,000	17462.7	889	1.92	1.56E+11
17	19.74	175	6	100	50	23,000	16735.7	873	1.84	1.06E+12
18	23.58	175	6	100	50	22,000	16008.7	857	1.76	1.29E+12
19	23.33	175	6	100	50	21,000	15281.7	841	1.68	1.30E+12
20	26.77	175	6	100	50	20,000	14554.7	825	1.6	1.53E+12
21	33.26	175	6	100	50	19,000	13827.7	809	1.52	1.93E+12
22	36.48	175	6	100	50	18,000	13100.7	793	1.44	2.16E+12
23	47.19	175	6	100	50	17,000	12373.7	777	1.36	2.86E+12
24	55.89	165	6	100	50	16,000	11646.7	761	1.28	3.26E+12
25	15.45	160	6	100	50	15,000	10919.7	745	1.2	8.92E+11
26	7.92	160	6	100	50	14,000	10192.7	729	1.12	4.67E+11
27	11.55	145	6	100	50	15,000	10919.7	745	1.2	6.04E+11
28	17.58	145	6	100	50	14,000	10192.7	729	1.12	9.40E+11
29	3.29	140	6	100	50	13,000	9465.7	713	1.04	1.74E+11
30	25.03	175	6	100	50	15,000	10919.7	745	1.2	1.58E+12
31	8.78	170	6	100	50	14,000	10192.7	729	1.12	5.50E+11
32	5.9	160	6	100	50	13,000	9465.7	713	1.04	3.56E+11
33	1.42	190	6	100	50	14,500	10556.2	737	1.16	9.84E+10
97	0.44	280	6	100	50	21,500	15645.2	849	1.72	3.90E+10
98	3.18	220	6	100	50	18,000	13100.7	793	1.44	2.37E+11
									Total =	3.73E+13

Table 1: List of subplays in the Frontier highly overpressured play (T>300°F), Wind River Indian Reservation. The play code for the spreadsheet is front1. Point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Frontier > 300F								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe /TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe /TZ*	*Pe /TZ*	*Pe /TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe /TZ*)^2	(Gas)^2
1	10.23	10.94	9.61	398.50	69161.3	36.30	10037.0	2536.95	104.83	2.59E+24
2	10.42	11.12	9.80	1442.25	74583.7	36.30	10037.0	2536.95	108.71	1.05E+25
3	10.61	11.31	10.00	60.09	80210.8	36.30	10037.0	2536.95	112.81	4.87E+23
4	10.82	11.51	10.20	17.20	69161.3	36.30	10037.0	2536.95	117.14	1.25E+23
5	11.03	11.71	10.42	6.30	69161.3	36.30	10037.0	2536.95	121.73	4.75E+22
6	11.24	11.92	10.64	1.05	63943.5	36.30	10037.0	2536.95	126.60	7.60E+21
7	10.23	10.94	9.61	3273.72	51794.3	36.30	10037.0	2536.95	104.83	1.59E+25
8	10.42	11.12	9.80	928.17	51794.3	36.30	10037.0	2536.95	108.71	4.68E+24
9	10.61	11.31	10.00	117.39	51794.3	36.30	10037.0	2536.95	112.81	6.14E+23
10	10.82	11.51	10.20	82.40	51794.3	36.30	10037.0	2536.95	117.14	4.48E+23
11	11.03	11.71	10.42	87.21	51794.3	36.30	10037.0	2536.95	121.73	4.92E+23
12	11.24	11.92	10.64	53.29	51794.3	36.30	10037.0	2536.95	126.60	3.13E+23
13	11.47	12.14	10.88	44.32	51794.3	36.30	10037.0	2536.95	131.76	2.71E+23
14	11.71	12.36	11.12	33.92	51794.3	36.30	10037.0	2536.95	137.25	2.16E+23
15	11.96	12.59	11.38	13.36	47292.6	36.30	10037.0	2536.95	143.10	8.09E+22
16	10.23	10.94	9.61	7.46	36933.8	36.30	10037.0	2536.95	104.83	2.59E+22
17	10.42	11.12	9.80	392.91	31332.3	36.30	10037.0	2536.95	108.71	1.20E+24
18	10.61	11.31	10.00	560.64	31332.3	36.30	10037.0	2536.95	112.81	1.77E+24
19	10.82	11.51	10.20	548.81	31332.3	36.30	10037.0	2536.95	117.14	1.80E+24
20	11.03	11.71	10.42	722.59	31332.3	36.30	10037.0	2536.95	121.73	2.47E+24
21	11.24	11.92	10.64	1115.43	31332.3	36.30	10037.0	2536.95	126.60	3.96E+24
22	11.47	12.14	10.88	1341.86	31332.3	36.30	10037.0	2536.95	131.76	4.96E+24
23	11.71	12.36	11.12	2245.41	31332.3	36.30	10037.0	2536.95	137.25	8.65E+24
24	11.96	12.59	11.38	3149.66	27853.8	36.30	10037.0	2536.95	143.10	1.12E+25
25	12.21	12.84	11.65	240.69	26191.3	36.30	10037.0	2536.95	149.32	8.43E+23
26	12.48	13.09	11.93	63.25	26191.3	36.30	10037.0	2536.95	155.97	2.31E+23
27	12.21	12.84	11.65	134.51	21510.6	36.30	10037.0	2536.95	149.32	3.87E+23
28	12.48	13.09	11.93	311.63	21510.6	36.30	10037.0	2536.95	155.97	9.36E+23
29	12.77	13.35	12.23	10.91	20052.7	36.30	10037.0	2536.95	163.07	3.20E+22
30	12.21	12.84	11.65	631.71	31332.3	36.30	10037.0	2536.95	149.32	2.65E+24
31	12.48	13.09	11.93	77.73	29567.5	36.30	10037.0	2536.95	155.97	3.21E+23
32	12.77	13.35	12.23	35.10	26191.3	36.30	10037.0	2536.95	163.07	1.34E+23
33	12.35	12.96	11.79	2.03	36933.8	36.30	10037.0	2536.95	152.59	1.03E+22
97	10.71	11.41	10.10	0.20	80210.8	36.30	10037.0	2536.95	114.94	1.61E+21
98	11.47	12.14	10.88	10.20	49517.9	36.30	10037.0	2536.95	131.76	5.96E+22

Table 2: List of subplays in the Frontier highly overpressured play (T>300°F), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is front1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Frontier > 300F								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	1.56E+12	1.49E+23	3.86E+11	28.047	0.24357	1.02E+12	1.29E+12	1.52E+12	1.79E+12	2.26E+12
2	3.14E+12	6.02E+23	7.76E+11	28.746	0.24342	2.04E+12	2.59E+12	3.05E+12	3.59E+12	4.55E+12
3	6.77E+11	2.80E+22	1.67E+11	27.212	0.24326	4.41E+11	5.58E+11	6.58E+11	7.75E+11	9.81E+11
4	3.43E+11	7.16E+21	8.46E+10	26.531	0.2431	2.23E+11	2.83E+11	3.33E+11	3.92E+11	4.97E+11
5	2.12E+11	2.72E+21	5.22E+10	26.049	0.24295	1.38E+11	1.74E+11	2.05E+11	2.42E+11	3.06E+11
6	8.47E+10	4.35E+20	2.09E+10	25.132	0.24279	5.51E+10	6.98E+10	8.22E+10	9.68E+10	1.23E+11
7	3.87E+12	9.17E+23	9.57E+11	28.955	0.24357	2.52E+12	3.19E+12	3.76E+12	4.43E+12	5.61E+12
8	2.10E+12	2.69E+23	5.19E+11	28.343	0.24342	1.37E+12	1.73E+12	2.04E+12	2.40E+12	3.04E+12
9	7.61E+11	3.53E+22	1.88E+11	27.328	0.24326	4.95E+11	6.27E+11	7.39E+11	8.70E+11	1.10E+12
10	6.50E+11	2.57E+22	1.60E+11	27.17	0.2431	4.23E+11	5.35E+11	6.31E+11	7.43E+11	9.41E+11
11	6.81E+11	2.82E+22	1.68E+11	27.218	0.24295	4.44E+11	5.62E+11	6.61E+11	7.79E+11	9.86E+11
12	5.43E+11	1.79E+22	1.34E+11	26.991	0.24279	3.54E+11	4.48E+11	5.27E+11	6.21E+11	7.86E+11
13	5.05E+11	1.55E+22	1.24E+11	26.919	0.24262	3.29E+11	4.17E+11	4.91E+11	5.78E+11	7.31E+11
14	4.51E+11	1.23E+22	1.11E+11	26.806	0.24246	2.94E+11	3.72E+11	4.38E+11	5.16E+11	6.53E+11
15	2.76E+11	4.62E+21	6.79E+10	26.315	0.2423	1.80E+11	2.28E+11	2.68E+11	3.16E+11	4.00E+11
16	1.56E+11	1.49E+21	3.86E+10	25.744	0.24357	1.02E+11	1.29E+11	1.52E+11	1.79E+11	2.26E+11
17	1.06E+12	6.89E+22	2.63E+11	27.662	0.24342	6.91E+11	8.76E+11	1.03E+12	1.22E+12	1.54E+12
18	1.29E+12	1.02E+23	3.19E+11	27.859	0.24326	8.41E+11	1.07E+12	1.26E+12	1.48E+12	1.87E+12
19	1.30E+12	1.03E+23	3.22E+11	27.867	0.2431	8.49E+11	1.07E+12	1.27E+12	1.49E+12	1.89E+12
20	1.53E+12	1.41E+23	3.76E+11	28.024	0.24295	9.93E+11	1.26E+12	1.48E+12	1.74E+12	2.21E+12
21	1.93E+12	2.27E+23	4.76E+11	28.26	0.24279	1.26E+12	1.59E+12	1.88E+12	2.21E+12	2.80E+12
22	2.16E+12	2.84E+23	5.32E+11	28.373	0.24262	1.41E+12	1.78E+12	2.10E+12	2.47E+12	3.13E+12
23	2.86E+12	4.94E+23	7.03E+11	28.651	0.24246	1.86E+12	2.35E+12	2.77E+12	3.26E+12	4.13E+12
24	3.26E+12	6.41E+23	8.01E+11	28.782	0.2423	2.12E+12	2.69E+12	3.16E+12	3.72E+12	4.71E+12
25	8.92E+11	4.80E+22	2.19E+11	27.487	0.24214	5.81E+11	7.35E+11	8.66E+11	1.02E+12	1.29E+12
26	4.67E+11	1.32E+22	1.15E+11	26.84	0.24198	3.05E+11	3.85E+11	4.54E+11	5.34E+11	6.75E+11
27	6.04E+11	2.20E+22	1.48E+11	27.097	0.24214	3.94E+11	4.98E+11	5.87E+11	6.91E+11	8.74E+11
28	9.40E+11	5.32E+22	2.31E+11	27.539	0.24198	6.13E+11	7.75E+11	9.12E+11	1.07E+12	1.36E+12
29	1.74E+11	1.81E+21	4.26E+10	25.851	0.24182	1.13E+11	1.43E+11	1.69E+11	1.98E+11	2.51E+11
30	1.58E+12	1.51E+23	3.88E+11	28.059	0.24214	1.03E+12	1.30E+12	1.53E+12	1.81E+12	2.28E+12
31	5.50E+11	1.83E+22	1.35E+11	27.004	0.24198	3.59E+11	4.54E+11	5.34E+11	6.29E+11	7.96E+11
32	3.56E+11	7.62E+21	8.73E+10	26.568	0.24182	2.32E+11	2.94E+11	3.46E+11	4.07E+11	5.14E+11
33	9.84E+10	5.84E+20	2.42E+10	25.283	0.24206	6.41E+10	8.11E+10	9.55E+10	1.12E+11	1.42E+11
97	3.90E+10	9.25E+19	9.62E+09	24.357	0.24318	2.54E+10	3.21E+10	3.78E+10	4.46E+10	5.64E+10
98	2.37E+11	3.41E+21	5.84E+10	26.162	0.24262	1.54E+11	1.95E+11	2.30E+11	2.71E+11	3.43E+11
P.P.C.	3.73E+13	8.47E+25	9.20E+12			2.43E+13	3.08E+13	3.63E+13	4.27E+13	5.41E+13

Table 3: List of subplays in the Frontier highly overpressured play (T>300°F), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is front1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Front 2 > 1.1									(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.095	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	3.64	270	7	100	50	22,000	11454.7	857	1.095	4.13E+11
2	3.43	270	7	100	50	21,000	10934.7	841	1.095	3.79E+11
3	5.96	265	7	100	50	20,000	10414.7	825	1.095	6.27E+11
4	6.23	265	7	100	50	19,000	9894.7	809	1.095	6.35E+11
5	6.88	265	7	100	50	18,000	9374.7	793	1.095	6.78E+11
6	4.51	265	7	100	50	17,000	8854.7	777	1.095	4.28E+11
7	4.53	265	7	100	50	16,000	8334.7	761	1.095	4.14E+11
8	3.52	265	7	100	50	15,000	7814.7	745	1.095	3.08E+11
9	3.77	265	7	100	50	14,000	7294.7	729	1.095	3.14E+11
10	4.1	265	7	100	50	13,000	6774.7	713	1.095	3.25E+11
11	6.72	255	7	100	50	12,000	6254.7	697	1.095	4.84E+11
12	1.15	255	7	100	50	11,000	5734.7	681	1.095	7.77E+10
13	0.29	255	7	100	50	10,500	5474.7	673	1.095	1.89E+10
14	2.34	255	7	100	50	11,000	5734.7	681	1.095	1.58E+11
15	0.89	245	7	100	50	18,000	9374.7	793	1.095	8.11E+10
16	2.39	245	7	100	50	17,000	8854.7	777	1.095	2.10E+11
17	8.72	230	7	100	50	16,000	8334.7	761	1.095	6.91E+11
18	8.2	225	7	100	50	15,000	7814.7	745	1.095	6.09E+11
19	6.79	225	7	100	50	14,000	7294.7	729	1.095	4.81E+11
20	8.36	225	7	100	50	13,000	6774.7	713	1.095	5.62E+11
21	6.88	225	7	100	50	12,000	6254.7	697	1.095	4.37E+11
22	8.45	225	7	100	50	11,000	5734.7	681	1.095	5.04E+11
23	6.74	225	7	100	50	10,000	5214.7	665	1.095	3.74E+11
24	0.49	200	7	100	50	15,000	7814.7	745	1.095	3.23E+10
25	7.62	190	7	100	50	14,000	7294.7	729	1.095	4.56E+11
26	11.77	185	7	100	50	13,000	6774.7	713	1.095	6.51E+11
27	14.65	175	7	100	50	12,000	6254.7	697	1.095	7.24E+11
28	14.85	175	7	100	50	11,000	5734.7	681	1.095	6.88E+11
29	8.83	175	7	100	50	10,000	5214.7	665	1.095	3.81E+11
30	8.1	140	7	100	50	14,000	7294.7	729	1.095	3.57E+11
31	24.95	140	7	100	50	13,000	6774.7	713	1.095	1.04E+12
32	50.43	125	7	100	50	12,000	6254.7	697	1.095	1.78E+12
33	1.04	135	7	100	50	13,000	6774.7	713	1.095	4.20E+10
34	37.24	130	7	100	50	11,000	5734.7	681	1.095	1.28E+12
35	26.88	130	7	100	50	10,000	5214.7	665	1.095	8.62E+11
36	5	130	7	100	50	9,000	4694.7	649	1.095	1.48E+11
40	1.25	145	7	100	50	10,000	5214.7	665	1.095	4.47E+10
41	0.66	155	7	100	50	13,000	6774.7	713	1.095	3.06E+10
41a	3.76	150	7	100	50	13,500	7034.7	721	1.095	1.73E+11
42	8.79	125	7	100	50	10,000	5214.7	665	1.095	2.71E+11
43	4.1	120	7	100	50	9,000	4694.7	649	1.095	1.12E+11
44	3.08	125	7	100	50	8,000	4174.7	633	1.095	7.99E+10
45	2.48	125	7	100	50	7,000	3654.7	617	1.095	5.78E+10
									Total =	1.84E+13

Table 4

Table 4: List of subplays in the Frontier moderately overpressured play (Rm>1.1), Wind River Indian Reservation. The play code for the spreadsheet is front2. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Front 2 > 1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	12.21	11.06	13.22	13.36	74583.7	49.41	10037.0	2536.95	149.43	1.81E+23
2	11.87	10.74	12.88	11.86	74583.7	49.41	10037.0	2536.95	141.42	1.52E+23
3	11.53	10.41	12.53	35.82	71847.0	49.41	10037.0	2536.95	133.32	4.18E+23
4	11.17	10.06	12.16	39.14	71847.0	49.41	10037.0	2536.95	125.17	4.29E+23
5	10.80	9.71	11.77	47.73	71847.0	49.41	10037.0	2536.95	116.95	4.89E+23
6	10.41	9.34	11.37	20.51	71847.0	49.41	10037.0	2536.95	108.69	1.95E+23
7	10.00	8.96	10.95	20.69	71847.0	49.41	10037.0	2536.95	100.41	1.82E+23
8	9.58	8.56	10.51	12.49	71847.0	49.41	10037.0	2536.95	92.12	1.01E+23
9	9.14	8.15	10.04	14.33	71847.0	49.41	10037.0	2536.95	83.84	1.05E+23
10	8.68	7.72	9.56	16.95	71847.0	49.41	10037.0	2536.95	75.61	1.12E+23
11	8.20	7.27	9.05	45.53	66526.9	49.41	10037.0	2536.95	67.45	2.49E+23
12	7.69	6.80	8.51	1.33	66526.9	49.41	10037.0	2536.95	59.41	6.42E+21
13	7.43	6.56	8.23	0.08	66526.9	49.41	10037.0	2536.95	55.45	3.81E+20
14	7.69	6.80	8.51	5.52	66526.9	49.41	10037.0	2536.95	59.41	2.66E+22
15	10.80	9.71	11.77	0.80	61411.4	49.41	10037.0	2536.95	116.95	6.99E+21
16	10.41	9.34	11.37	5.76	61411.4	49.41	10037.0	2536.95	108.69	4.68E+22
17	10.00	8.96	10.95	76.67	54121.8	49.41	10037.0	2536.95	100.41	5.08E+23
18	9.58	8.56	10.51	67.80	51794.3	49.41	10037.0	2536.95	92.12	3.94E+23
19	9.14	8.15	10.04	46.49	51794.3	49.41	10037.0	2536.95	83.84	2.46E+23
20	8.68	7.72	9.56	70.47	51794.3	49.41	10037.0	2536.95	75.61	3.36E+23
21	8.20	7.27	9.05	47.73	51794.3	49.41	10037.0	2536.95	67.45	2.03E+23
22	7.69	6.80	8.51	72.00	51794.3	49.41	10037.0	2536.95	59.41	2.70E+23
23	7.16	6.32	7.95	45.81	51794.3	49.41	10037.0	2536.95	51.53	1.49E+23
24	9.58	8.56	10.51	0.24	40923.9	49.41	10037.0	2536.95	92.12	1.11E+21
25	9.14	8.15	10.04	58.55	36933.8	49.41	10037.0	2536.95	83.84	2.21E+23
26	8.68	7.72	9.56	139.68	35015.5	49.41	10037.0	2536.95	75.61	4.51E+23
27	8.20	7.27	9.05	216.41	31332.3	49.41	10037.0	2536.95	67.45	5.57E+23
28	7.69	6.80	8.51	222.36	31332.3	49.41	10037.0	2536.95	59.41	5.04E+23
29	7.16	6.32	7.95	78.62	31332.3	49.41	10037.0	2536.95	51.53	1.55E+23
30	9.14	8.15	10.04	66.16	20052.7	49.41	10037.0	2536.95	83.84	1.36E+23
31	8.68	7.72	9.56	627.68	20052.7	49.41	10037.0	2536.95	75.61	1.16E+24
32	8.20	7.27	9.05	2564.33	15985.9	49.41	10037.0	2536.95	67.45	3.37E+24
33	8.68	7.72	9.56	1.09	18645.9	49.41	10037.0	2536.95	75.61	1.87E+21
34	7.69	6.80	8.51	1398.35	17290.3	49.41	10037.0	2536.95	59.41	1.75E+24
35	7.16	6.32	7.95	728.54	17290.3	49.41	10037.0	2536.95	51.53	7.91E+23
36	6.61	5.81	7.35	25.21	17290.3	49.41	10037.0	2536.95	43.86	2.33E+22
40	7.16	6.32	7.95	1.58	21510.6	49.41	10037.0	2536.95	51.53	2.13E+21
41	8.68	7.72	9.56	0.44	24579.9	49.41	10037.0	2536.95	75.61	9.95E+20
41a	8.91	7.93	9.80	14.26	23019.7	49.41	10037.0	2536.95	79.72	3.19E+22
42	7.16	6.32	7.95	77.91	15985.9	49.41	10037.0	2536.95	51.53	7.82E+22
43	6.61	5.81	7.35	16.95	14732.6	49.41	10037.0	2536.95	43.86	1.33E+22
44	6.02	5.28	6.72	9.57	15985.9	49.41	10037.0	2536.95	36.47	6.80E+21
45	5.41	4.73	6.05	6.20	15985.9	49.41	10037.0	2536.95	29.42	3.55E+21

Table 5

Table 5: List of subplays in the Frontier moderately overpressured play (Rm>1.1), Wind River Indian Reservation, with estimates of ranges in percent for the six play attributes. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The play code for the spreadsheet is front2.

Play Name :		Front 2 > 1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	4.13E+11	1.07E+22	1.03E+11	26.717	0.24627	2.67E+11	3.40E+11	4.01E+11	4.73E+11	6.01E+11
2	3.79E+11	8.99E+21	9.48E+10	26.63	0.24649	2.45E+11	3.11E+11	3.67E+11	4.34E+11	5.51E+11
3	6.27E+11	2.47E+22	1.57E+11	27.134	0.24673	4.05E+11	5.15E+11	6.08E+11	7.18E+11	9.13E+11
4	6.35E+11	2.54E+22	1.59E+11	27.147	0.24698	4.10E+11	5.22E+11	6.16E+11	7.28E+11	9.25E+11
5	6.78E+11	2.90E+22	1.70E+11	27.212	0.24724	4.38E+11	5.57E+11	6.58E+11	7.77E+11	9.88E+11
6	4.28E+11	1.16E+22	1.08E+11	26.753	0.24752	2.77E+11	3.52E+11	4.16E+11	4.91E+11	6.24E+11
7	4.14E+11	1.08E+22	1.04E+11	26.717	0.24781	2.67E+11	3.39E+11	4.01E+11	4.74E+11	6.03E+11
8	3.08E+11	6.02E+21	7.76E+10	26.422	0.24813	1.98E+11	2.53E+11	2.98E+11	3.53E+11	4.49E+11
9	3.14E+11	6.30E+21	7.94E+10	26.443	0.24846	2.03E+11	2.58E+11	3.05E+11	3.61E+11	4.59E+11
10	3.25E+11	6.74E+21	8.21E+10	26.475	0.24882	2.09E+11	2.66E+11	3.15E+11	3.72E+11	4.74E+11
11	4.84E+11	1.50E+22	1.22E+11	26.874	0.2492	3.11E+11	3.96E+11	4.69E+11	5.55E+11	7.07E+11
12	7.77E+10	3.88E+20	1.97E+10	25.045	0.2496	4.99E+10	6.36E+10	7.53E+10	8.91E+10	1.14E+11
13	1.89E+10	2.31E+19	4.80E+09	23.633	0.24981	1.22E+10	1.55E+10	1.83E+10	2.17E+10	2.77E+10
14	1.58E+11	1.61E+21	4.01E+10	25.755	0.2496	1.02E+11	1.29E+11	1.53E+11	1.81E+11	2.31E+11
15	8.11E+10	4.14E+20	2.04E+10	25.088	0.24724	5.24E+10	6.66E+10	7.87E+10	9.29E+10	1.18E+11
16	2.10E+11	2.78E+21	5.28E+10	26.039	0.24752	1.35E+11	1.72E+11	2.04E+11	2.41E+11	3.06E+11
17	6.91E+11	3.02E+22	1.74E+11	27.231	0.24781	4.46E+11	5.67E+11	6.70E+11	7.92E+11	1.01E+12
18	6.09E+11	2.35E+22	1.53E+11	27.104	0.24813	3.93E+11	4.99E+11	5.90E+11	6.98E+11	8.88E+11
19	4.81E+11	1.47E+22	1.21E+11	26.868	0.24846	3.10E+11	3.94E+11	4.66E+11	5.51E+11	7.02E+11
20	5.62E+11	2.02E+22	1.42E+11	27.024	0.24882	3.62E+11	4.61E+11	5.45E+11	6.45E+11	8.21E+11
21	4.37E+11	1.22E+22	1.11E+11	26.772	0.2492	2.81E+11	3.58E+11	4.24E+11	5.01E+11	6.38E+11
22	5.04E+11	1.63E+22	1.28E+11	26.914	0.2496	3.24E+11	4.13E+11	4.88E+11	5.78E+11	7.36E+11
23	3.74E+11	9.03E+21	9.50E+10	26.617	0.25004	2.40E+11	3.06E+11	3.63E+11	4.29E+11	5.47E+11
24	3.23E+10	6.64E+19	8.15E+09	24.169	0.24813	2.08E+10	2.65E+10	3.14E+10	3.71E+10	4.72E+10
25	4.56E+11	1.32E+22	1.15E+11	26.814	0.24846	2.94E+11	3.74E+11	4.42E+11	5.22E+11	6.65E+11
26	6.51E+11	2.71E+22	1.64E+11	27.171	0.24882	4.19E+11	5.34E+11	6.31E+11	7.46E+11	9.50E+11
27	7.24E+11	3.36E+22	1.83E+11	27.277	0.2492	4.66E+11	5.93E+11	7.02E+11	8.30E+11	1.06E+12
28	6.88E+11	3.05E+22	1.75E+11	27.227	0.2496	4.43E+11	5.64E+11	6.67E+11	7.90E+11	1.01E+12
29	3.81E+11	9.37E+21	9.68E+10	26.635	0.25004	2.45E+11	3.12E+11	3.69E+11	4.37E+11	5.57E+11
30	3.57E+11	8.11E+21	9.01E+10	26.57	0.24846	2.30E+11	2.93E+11	3.46E+11	4.09E+11	5.21E+11
31	1.04E+12	6.96E+22	2.64E+11	27.643	0.24882	6.72E+11	8.56E+11	1.01E+12	1.20E+12	1.52E+12
32	1.78E+12	2.03E+23	4.50E+11	28.176	0.2492	1.14E+12	1.46E+12	1.73E+12	2.04E+12	2.60E+12
33	4.20E+10	1.12E+20	1.06E+10	24.429	0.24882	2.70E+10	3.44E+10	4.07E+10	4.81E+10	6.13E+10
34	1.28E+12	1.06E+23	3.25E+11	27.849	0.2496	8.25E+11	1.05E+12	1.24E+12	1.47E+12	1.87E+12
35	8.62E+11	4.79E+22	2.19E+11	27.451	0.25004	5.54E+11	7.06E+11	8.35E+11	9.89E+11	1.26E+12
36	1.48E+11	1.42E+21	3.76E+10	25.689	0.2505	9.49E+10	1.21E+11	1.43E+11	1.70E+11	2.16E+11
40	4.47E+10	1.29E+20	1.14E+10	24.492	0.25004	2.87E+10	3.66E+10	4.33E+10	5.13E+10	6.54E+10
41	3.06E+10	5.97E+19	7.73E+09	24.113	0.24882	1.97E+10	2.51E+10	2.96E+10	3.51E+10	4.46E+10
41a	1.73E+11	1.91E+21	4.37E+10	25.846	0.24864	1.11E+11	1.42E+11	1.68E+11	1.98E+11	2.53E+11
42	2.71E+11	4.74E+21	6.88E+10	26.294	0.25004	1.74E+11	2.22E+11	2.63E+11	3.11E+11	3.96E+11
43	1.12E+11	8.12E+20	2.85E+10	25.41	0.2505	7.19E+10	9.16E+10	1.09E+11	1.28E+11	1.64E+11
44	7.99E+10	4.15E+20	2.04E+10	25.072	0.25099	5.12E+10	6.54E+10	7.74E+10	9.17E+10	1.17E+11
45	5.78E+10	2.18E+20	1.48E+10	24.748	0.25153	3.70E+10	4.72E+10	5.60E+10	6.63E+10	8.46E+10
P.P.C.	1.84E+13	2.17E+25	4.65E+12			1.19E+13	1.51E+13	1.79E+13	2.11E+13	2.69E+13

Table 6

Table 6: List of subplays in the Frontier moderately overpressured play (Rm>1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is front2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Front .73-1.1									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.9074	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	0.78	250	7	50	50	8,000	3294.7	633	0.9074	1.93E+10
2	1.58	250	7	50	50	9,000	3704.7	649	0.9074	4.28E+10
3	1	255	7	50	50	10,000	4114.7	665	0.9074	2.99E+10
4	9.85	225	7	50	50	8,000	3294.7	633	0.9074	2.19E+11
5	10.02	225	7	50	50	9,000	3704.7	649	0.9074	2.44E+11
6	3.57	245	7	50	50	10,000	4114.7	665	0.9074	1.03E+11
6a	0.83	250	7	50	50	11,500	4729.7	689	0.9074	2.70E+10
7	4.77	215	7	50	50	7,000	2884.7	617	0.9074	9.10E+10
8	2.95	195	7	50	50	7,000	2884.7	617	0.9074	5.10E+10
9	5.02	190	7	50	50	8,000	3294.7	633	0.9074	9.42E+10
11	3.75	160	7	50	50	10,000	4114.7	665	0.9074	7.05E+10
12	2.96	155	7	50	50	8,000	3294.7	633	0.9074	4.53E+10
13	0.81	150	7	50	50	7,000	2884.7	617	0.9074	1.08E+10
14	3.8	140	7	50	50	10,000	4114.7	665	0.9074	6.25E+10
15	10.55	125	7	50	50	9,000	3704.7	649	0.9074	1.43E+11
16	4.76	125	7	50	50	8,000	3294.7	633	0.9074	5.88E+10
17	1.81	125	7	50	50	7,000	2884.7	617	0.9074	2.01E+10
18	1.57	100	7	50	50	8,500	3499.7	641	0.9074	1.63E+10
19	4.14	95	7	50	50	8,000	3294.7	633	0.9074	3.89E+10
20	3.46	90	7	50	50	7,000	2884.7	617	0.9074	2.76E+10
21	6.97	120	7	50	50	8,000	3294.7	633	0.9074	8.26E+10
22	3.83	125	7	50	50	7,000	2884.7	617	0.9074	4.25E+10
30	0.91	120	7	50	50	7,000	2884.7	617	0.9074	9.69E+09
31	2.52	120	7	50	50	6,000	2474.7	601	0.9074	2.36E+10
51	4.86	125	7	50	50	9,000	3704.7	649	0.9074	6.58E+10
52	5.77	140	7	50	50	8,000	3294.7	633	0.9074	7.98E+10
									Total =	1.72E+12

Table 7: List of subplays in the Frontier transition play (Rm 0.73-1.1), Wind River Indian Reservation. 1 The play code for the spreadsheet is front3. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Front .73-1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe /TZ*	
	Range (%) =	30		30	50	60	100	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe /TZ*	*Pe /TZ*	*Pe /TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe /TZ*)^2	(Gas)^2
1	5.74	5.03	6.40	0.61	63943.5	50.63	2731.0	2647.82	33.07	4.60E+20
2	6.29	5.54	7.00	2.52	63943.5	50.63	2731.0	2647.82	39.77	2.27E+21
3	6.82	6.02	7.57	1.01	66526.9	50.63	2731.0	2647.82	46.72	1.11E+21
4	5.74	5.03	6.40	97.83	51794.3	50.63	2731.0	2647.82	33.07	5.94E+22
5	6.29	5.54	7.00	101.24	51794.3	50.63	2731.0	2647.82	39.77	7.40E+22
6	6.82	6.02	7.57	12.85	61411.4	50.63	2731.0	2647.82	46.72	1.31E+22
6a	7.57	6.70	8.36	0.69	63943.5	50.63	2731.0	2647.82	57.49	9.05E+20
7	5.15	4.51	5.76	22.94	47292.6	50.63	2731.0	2647.82	26.69	1.03E+22
8	5.15	4.51	5.76	8.77	38903.2	50.63	2731.0	2647.82	26.69	3.23E+21
9	5.74	5.03	6.40	25.41	36933.8	50.63	2731.0	2647.82	33.07	1.10E+22
11	6.82	6.02	7.57	14.18	26191.3	50.63	2731.0	2647.82	46.72	6.15E+21
12	5.74	5.03	6.40	8.83	24579.9	50.63	2731.0	2647.82	33.07	2.55E+21
13	5.15	4.51	5.76	0.66	23019.7	50.63	2731.0	2647.82	26.69	1.44E+20
14	6.82	6.02	7.57	14.56	20052.7	50.63	2731.0	2647.82	46.72	4.84E+21
15	6.29	5.54	7.00	112.23	15985.9	50.63	2731.0	2647.82	39.77	2.53E+22
16	5.74	5.03	6.40	22.85	15985.9	50.63	2731.0	2647.82	33.07	4.28E+21
17	5.15	4.51	5.76	3.30	15985.9	50.63	2731.0	2647.82	26.69	5.00E+20
18	6.02	5.29	6.70	2.49	10231.0	50.63	2731.0	2647.82	36.39	3.28E+20
19	5.74	5.03	6.40	17.28	9233.4	50.63	2731.0	2647.82	33.07	1.87E+21
20	5.15	4.51	5.76	12.07	8287.1	50.63	2731.0	2647.82	26.69	9.47E+20
21	5.74	5.03	6.40	48.98	14732.6	50.63	2731.0	2647.82	33.07	8.46E+21
22	5.15	4.51	5.76	14.79	15985.9	50.63	2731.0	2647.82	26.69	2.24E+21
30	5.15	4.51	5.76	0.83	14732.6	50.63	2731.0	2647.82	26.69	1.16E+20
31	4.54	3.96	5.09	6.40	14732.6	50.63	2731.0	2647.82	20.71	6.93E+20
51	6.29	5.54	7.00	23.82	15985.9	50.63	2731.0	2647.82	39.77	5.37E+21
52	5.74	5.03	6.40	33.57	20052.7	50.63	2731.0	2647.82	33.07	7.90E+21

Table 8: List of subplays in the Frontier transition play (Rm 0.73-1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is front3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Front .73-1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	1.93E+10	8.90E+19	9.43E+09	23.574	0.46354	8.07E+09	1.27E+10	1.73E+10	2.36E+10	3.71E+10
2	4.28E+10	4.38E+20	2.09E+10	24.372	0.46328	1.79E+10	2.81E+10	3.84E+10	5.25E+10	8.24E+10
3	2.99E+10	2.14E+20	1.46E+10	24.016	0.46303	1.26E+10	1.97E+10	2.69E+10	3.68E+10	5.76E+10
4	2.19E+11	1.15E+22	1.07E+11	26.005	0.46354	9.17E+10	1.44E+11	1.97E+11	2.69E+11	4.22E+11
5	2.44E+11	1.43E+22	1.20E+11	26.114	0.46328	1.02E+11	1.61E+11	2.19E+11	3.00E+11	4.70E+11
6	1.03E+11	2.52E+21	5.02E+10	25.248	0.46303	4.31E+10	6.75E+10	9.23E+10	1.26E+11	1.98E+11
6a	2.70E+10	1.74E+20	1.32E+10	23.913	0.46268	1.13E+10	1.78E+10	2.43E+10	3.32E+10	5.20E+10
7	9.10E+10	1.99E+21	4.46E+10	25.127	0.46383	3.81E+10	5.98E+10	8.17E+10	1.12E+11	1.75E+11
8	5.10E+10	6.26E+20	2.50E+10	24.548	0.46383	2.14E+10	3.35E+10	4.58E+10	6.27E+10	9.83E+10
9	9.42E+10	2.13E+21	4.61E+10	25.162	0.46354	3.95E+10	6.19E+10	8.46E+10	1.16E+11	1.81E+11
11	7.05E+10	1.19E+21	3.45E+10	24.871	0.46303	2.96E+10	4.63E+10	6.33E+10	8.65E+10	1.36E+11
12	4.53E+10	4.92E+20	2.22E+10	24.43	0.46354	1.90E+10	2.98E+10	4.07E+10	5.56E+10	8.73E+10
13	1.08E+10	2.79E+19	5.28E+09	22.994	0.46383	4.51E+09	7.08E+09	9.68E+09	1.32E+10	2.08E+10
14	6.25E+10	9.33E+20	3.06E+10	24.751	0.46303	2.62E+10	4.11E+10	5.61E+10	7.67E+10	1.20E+11
15	1.43E+11	4.89E+21	6.99E+10	25.578	0.46328	5.99E+10	9.39E+10	1.28E+11	1.75E+11	2.75E+11
16	5.88E+10	8.28E+20	2.88E+10	24.69	0.46354	2.46E+10	3.86E+10	5.28E+10	7.22E+10	1.13E+11
17	2.01E+10	9.68E+19	9.84E+09	23.615	0.46383	8.41E+09	1.32E+10	1.80E+10	2.46E+10	3.87E+10
18	1.63E+10	6.34E+19	7.96E+09	23.405	0.46341	6.82E+09	1.07E+10	1.46E+10	2.00E+10	3.13E+10
19	3.89E+10	3.62E+20	1.90E+10	24.276	0.46354	1.63E+10	2.55E+10	3.49E+10	4.77E+10	7.48E+10
20	2.76E+10	1.83E+20	1.35E+10	23.935	0.46383	1.16E+10	1.82E+10	2.48E+10	3.39E+10	5.32E+10
21	8.26E+10	1.64E+21	4.05E+10	25.03	0.46354	3.46E+10	5.43E+10	7.42E+10	1.01E+11	1.59E+11
22	4.25E+10	4.33E+20	2.08E+10	24.365	0.46383	1.78E+10	2.79E+10	3.82E+10	5.22E+10	8.18E+10
30	9.69E+09	2.25E+19	4.75E+09	22.887	0.46383	4.06E+09	6.37E+09	8.70E+09	1.19E+10	1.87E+10
31	2.36E+10	1.34E+20	1.16E+10	23.778	0.46413	9.89E+09	1.55E+10	2.12E+10	2.90E+10	4.55E+10
51	6.58E+10	1.04E+21	3.22E+10	24.803	0.46328	2.76E+10	4.33E+10	5.91E+10	8.08E+10	1.27E+11
52	7.98E+10	1.53E+21	3.91E+10	24.995	0.46354	3.34E+10	5.24E+10	7.17E+10	9.80E+10	1.54E+11
P.P.C.	1.72E+12	7.08E+23	8.41E+11			7.20E+11	1.13E+12	1.54E+12	2.11E+12	3.31E+12

Table 9: List of subplays in the Frontier transition play (Rm 0.73-1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is front3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Cody 1.1-.73									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.913	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	6.29	70	7	30	50	10,000	4114.7	665	0.913	3.08E+10
2	3.28	75	7	30	50	8,000	3294.7	633	0.913	1.45E+10
3	7.83	75	7	30	50	7,000	2884.7	617	0.913	3.11E+10
7	0.02	105	7	30	50	5,500	2269.7	593	0.913	9.10E+07
8	4.62	75	7	30	50	9,000	3704.7	649	0.913	2.24E+10
9	0.51	100	7	30	50	9,000	3704.7	649	0.913	3.30E+09
10	7.49	110	7	30	50	8,000	3294.7	633	0.913	4.85E+10
11	11.96	75	7	30	50	8,000	3294.7	633	0.913	5.28E+10
12	2.39	75	7	30	50	7,000	2884.7	617	0.913	9.49E+09
13	2.35	70	7	30	50	6,000	2474.7	601	0.913	7.67E+09
14	0.63	60	7	30	50	5,500	2269.7	593	0.913	1.64E+09
15	3.35	110	7	30	50	7,000	2884.7	617	0.913	1.95E+10
16	0.58	105	7	30	50	6,500	2679.7	609	0.913	3.03E+09
19	0.1	425	7	30	50	8,000	3294.7	633	0.913	2.50E+09
20	1.05	425	7	30	50	7,000	2884.7	617	0.913	2.36E+10
21	0.39	425	7	30	50	6,500	2679.7	609	0.913	8.26E+09
									Total =	2.79E+11

Table 10: List of subplays in the Cody transition play (Rm 0.73-1.1), Wind River Indian Reservation. The play code for the spreadsheet is cody3. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Cody 1.1-.73								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe /TZ*	
	Range (%) =	30		30	50	60	100	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe /TZ*	*Pe /TZ*	*Pe /TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe /TZ*)^2	(Gas)^2
1	6.78	5.98	7.52	39.89	5013.2	50.63	983.1	2647.82	46.15	1.18E+21
2	5.70	5.00	6.36	10.85	5754.9	50.63	983.1	2647.82	32.67	2.60E+20
3	5.12	4.48	5.73	61.82	5754.9	50.63	983.1	2647.82	26.37	1.20E+21
7	4.19	3.65	4.71	0.00	11279.6	50.63	983.1	2647.82	17.68	1.03E+16
8	6.25	5.50	6.95	21.52	5754.9	50.63	983.1	2647.82	39.29	6.21E+20
9	6.25	5.50	6.95	0.26	10231.0	50.63	983.1	2647.82	39.29	1.35E+19
10	5.70	5.00	6.36	56.57	12379.5	50.63	983.1	2647.82	32.67	2.92E+21
11	5.70	5.00	6.36	144.23	5754.9	50.63	983.1	2647.82	32.67	3.46E+21
12	5.12	4.48	5.73	5.76	5754.9	50.63	983.1	2647.82	26.37	1.12E+20
13	4.51	3.93	5.06	5.57	5013.2	50.63	983.1	2647.82	20.46	7.29E+19
14	4.19	3.65	4.71	0.40	3683.1	50.63	983.1	2647.82	17.68	3.33E+18
15	5.12	4.48	5.73	11.32	12379.5	50.63	983.1	2647.82	26.37	4.72E+20
16	4.82	4.21	5.40	0.34	11279.6	50.63	983.1	2647.82	23.36	1.14E+19
19	5.70	5.00	6.36	0.01	184796.8	50.63	983.1	2647.82	32.67	7.77E+18
20	5.12	4.48	5.73	1.11	184796.8	50.63	983.1	2647.82	26.37	6.92E+20
21	4.82	4.21	5.40	0.15	184796.8	50.63	983.1	2647.82	23.36	8.45E+19

Table 11: List of subplays in the Cody transition play (Rm 0.73-1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is cody3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Cody 1.1-.73								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	3.08E+10	2.27E+20	1.51E+10	24.045	0.46303	1.29E+10	2.03E+10	2.77E+10	3.78E+10	5.93E+10
2	1.45E+10	5.03E+19	7.10E+09	23.289	0.46354	6.07E+09	9.52E+09	1.30E+10	1.78E+10	2.79E+10
3	3.11E+10	2.32E+20	1.52E+10	24.052	0.46383	1.30E+10	2.04E+10	2.79E+10	3.81E+10	5.99E+10
7	9.10E+07	1.99E+15	4.46E+07	18.218	0.46429	3.81E+07	5.97E+07	8.17E+07	1.12E+08	1.75E+08
8	2.24E+10	1.20E+20	1.10E+10	23.724	0.46328	9.39E+09	1.47E+10	2.01E+10	2.75E+10	4.31E+10
9	3.30E+09	2.60E+18	1.61E+09	21.808	0.46328	1.38E+09	2.17E+09	2.96E+09	4.04E+09	6.34E+09
10	4.85E+10	5.65E+20	2.38E+10	24.498	0.46354	2.03E+10	3.19E+10	4.36E+10	5.96E+10	9.35E+10
11	5.28E+10	6.69E+20	2.59E+10	24.583	0.46354	2.21E+10	3.47E+10	4.75E+10	6.49E+10	1.02E+11
12	9.49E+09	2.16E+19	4.65E+09	22.865	0.46383	3.97E+09	6.23E+09	8.52E+09	1.16E+10	1.83E+10
13	7.67E+09	1.41E+19	3.76E+09	22.652	0.46413	3.21E+09	5.03E+09	6.88E+09	9.41E+09	1.48E+10
14	1.64E+09	6.45E+17	8.03E+08	21.109	0.46429	6.85E+08	1.08E+09	1.47E+09	2.01E+09	3.16E+09
15	1.95E+10	9.13E+19	9.55E+09	23.586	0.46383	8.17E+09	1.28E+10	1.75E+10	2.39E+10	3.76E+10
16	3.03E+09	2.21E+18	1.49E+09	21.725	0.46398	1.27E+09	1.99E+09	2.72E+09	3.72E+09	5.84E+09
19	2.50E+09	1.50E+18	1.23E+09	21.534	0.46354	1.05E+09	1.65E+09	2.25E+09	3.07E+09	4.82E+09
20	2.36E+10	1.34E+20	1.16E+10	23.778	0.46383	9.89E+09	1.55E+10	2.12E+10	2.90E+10	4.55E+10
21	8.26E+09	1.64E+19	4.05E+09	22.726	0.46398	3.46E+09	5.42E+09	7.41E+09	1.01E+10	1.59E+10
P.P.C.	2.79E+11	1.87E+22	1.37E+11			1.17E+11	1.84E+11	2.51E+11	3.43E+11	5.38E+11

Table 12: List of subplays in the Cody transition play (Rm 0.73-1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is cody3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :		Marine Kmv > 300								(Panel 1)
						a =	0.727	0.016	0.00008	
						b =	14.7	505	0	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	6.23	90	6	100	50	21,000	15281.7	841	1.68	1.79E+11
2	27.93	80	6	100	50	20,000	14554.7	825	1.6	7.27E+11
3	13.2	80	6	100	50	19,000	13827.7	809	1.52	3.51E+11
4	14.91	90	6	100	50	18,000	13100.7	793	1.44	4.55E+11
5	2.98	100	6	100	50	17,000	12373.7	777	1.36	1.03E+11
6	17.42	150	6	100	50	21,000	15281.7	841	1.68	8.34E+11
7	22.76	150	6	100	50	20,000	14554.7	825	1.6	1.11E+12
8	17.25	150	6	100	50	19,000	13827.7	809	1.52	8.59E+11
9	9.69	150	6	100	50	18,000	13100.7	793	1.44	4.92E+11
10	5.88	150	6	100	50	17,000	12373.7	777	1.36	3.05E+11
12	5.93	250	6	100	50	21,000	15281.7	841	1.68	4.73E+11
13	9.75	250	6	100	50	20,000	14554.7	825	1.6	7.94E+11
14	6.88	250	6	100	50	19,000	13827.7	809	1.52	5.71E+11
15	4.55	250	6	100	50	18,000	13100.7	793	1.44	3.85E+11
16	2.17	250	6	100	50	17,000	12373.7	777	1.36	1.88E+11
17	1.79	250	6	100	50	16,000	11646.7	761	1.28	1.58E+11
18	3.15	350	6	100	50	21,000	15281.7	841	1.68	3.52E+11
19	7.3	350	6	100	50	20,000	14554.7	825	1.6	8.32E+11
20	7.29	350	6	100	50	19,000	13827.7	809	1.52	8.47E+11
21	5.35	350	6	100	50	18,000	13100.7	793	1.44	6.34E+11
22	2.41	350	6	100	50	17,000	12373.7	777	1.36	2.92E+11
23	2.09	350	6	100	50	16,000	11646.7	761	1.28	2.58E+11
24	2.12	450	6	100	50	20,000	14554.7	825	1.6	3.11E+11
25	3.74	450	6	100	50	19,000	13827.7	809	1.52	5.59E+11
26	2.71	450	6	100	50	18,000	13100.7	793	1.44	4.13E+11
27	2.1	450	6	100	50	17,000	12373.7	777	1.36	3.27E+11
28	1.18	450	6	100	50	16,000	11646.7	761	1.28	1.87E+11
									Total =	1.30E+13

Table 13: List of subplays in the marginal marine interval of the Mesaverde Formation highly overpressured play (T>300°F), Wind River Indian Reservation. The play code for the spreadsheet is kmv1. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Marine Kmv > 300								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	10.82	11.51	10.20	39.14	8287.1	36.30	10037.0	2536.95	117.14	3.40E+22
2	11.03	11.71	10.42	786.57	6547.8	36.30	10037.0	2536.95	121.73	5.61E+23
3	11.24	11.92	10.64	175.69	6547.8	36.30	10037.0	2536.95	126.60	1.30E+23
4	11.47	12.14	10.88	224.16	8287.1	36.30	10037.0	2536.95	131.76	2.19E+23
5	11.71	12.36	11.12	8.95	10231.0	36.30	10037.0	2536.95	137.25	1.13E+22
6	10.82	11.51	10.20	305.98	23019.7	36.30	10037.0	2536.95	117.14	7.39E+23
7	11.03	11.71	10.42	522.32	23019.7	36.30	10037.0	2536.95	121.73	1.31E+24
8	11.24	11.92	10.64	300.04	23019.7	36.30	10037.0	2536.95	126.60	7.83E+23
9	11.47	12.14	10.88	94.68	23019.7	36.30	10037.0	2536.95	131.76	2.57E+23
10	11.71	12.36	11.12	34.86	23019.7	36.30	10037.0	2536.95	137.25	9.86E+22
12	10.82	11.51	10.20	35.46	63943.5	36.30	10037.0	2536.95	117.14	2.38E+23
13	11.03	11.71	10.42	95.85	63943.5	36.30	10037.0	2536.95	121.73	6.68E+23
14	11.24	11.92	10.64	47.73	63943.5	36.30	10037.0	2536.95	126.60	3.46E+23
15	11.47	12.14	10.88	20.87	63943.5	36.30	10037.0	2536.95	131.76	1.57E+23
16	11.71	12.36	11.12	4.75	63943.5	36.30	10037.0	2536.95	137.25	3.73E+22
17	11.96	12.59	11.38	3.23	63943.5	36.30	10037.0	2536.95	143.10	2.65E+22
18	10.82	11.51	10.20	10.01	125329.3	36.30	10037.0	2536.95	117.14	1.32E+23
19	11.03	11.71	10.42	53.73	125329.3	36.30	10037.0	2536.95	121.73	7.34E+23
20	11.24	11.92	10.64	53.59	125329.3	36.30	10037.0	2536.95	126.60	7.61E+23
21	11.47	12.14	10.88	28.86	125329.3	36.30	10037.0	2536.95	131.76	4.27E+23
22	11.71	12.36	11.12	5.86	125329.3	36.30	10037.0	2536.95	137.25	9.02E+22
23	11.96	12.59	11.38	4.40	125329.3	36.30	10037.0	2536.95	143.10	7.07E+22
24	11.03	11.71	10.42	4.53	207177.1	36.30	10037.0	2536.95	121.73	1.02E+23
25	11.24	11.92	10.64	14.10	207177.1	36.30	10037.0	2536.95	126.60	3.31E+23
26	11.47	12.14	10.88	7.41	207177.1	36.30	10037.0	2536.95	131.76	1.81E+23
27	11.71	12.36	11.12	4.45	207177.1	36.30	10037.0	2536.95	137.25	1.13E+23
28	11.96	12.59	11.38	1.40	207177.1	36.30	10037.0	2536.95	143.10	3.73E+22

Table 14: List of subplays in the marginal marine interval of the Mesaverde Formation highly overpressured play (T>300°F), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is kmv1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Marine Kmv > 300								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	1.79E+11	1.95E+21	4.42E+10	25.881	0.2431	1.17E+11	1.48E+11	1.74E+11	2.05E+11	2.59E+11
2	7.27E+11	3.22E+22	1.79E+11	27.283	0.24295	4.74E+11	6.00E+11	7.06E+11	8.32E+11	1.05E+12
3	3.51E+11	7.46E+21	8.64E+10	26.553	0.24279	2.28E+11	2.89E+11	3.40E+11	4.01E+11	5.08E+11
4	4.55E+11	1.25E+22	1.12E+11	26.813	0.24262	2.96E+11	3.75E+11	4.41E+11	5.20E+11	6.58E+11
5	1.03E+11	6.43E+20	2.54E+10	25.329	0.24246	6.71E+10	8.50E+10	1.00E+11	1.18E+11	1.49E+11
6	8.34E+11	4.24E+22	2.06E+11	27.421	0.2431	5.43E+11	6.88E+11	8.10E+11	9.54E+11	1.21E+12
7	1.11E+12	7.51E+22	2.74E+11	27.707	0.24295	7.24E+11	9.16E+11	1.08E+12	1.27E+12	1.61E+12
8	8.59E+11	4.48E+22	2.12E+11	27.45	0.24279	5.59E+11	7.08E+11	8.34E+11	9.82E+11	1.24E+12
9	4.92E+11	1.47E+22	1.21E+11	26.893	0.24262	3.21E+11	4.06E+11	4.78E+11	5.63E+11	7.13E+11
10	3.05E+11	5.63E+21	7.50E+10	26.414	0.24246	1.99E+11	2.51E+11	2.96E+11	3.49E+11	4.41E+11
12	4.73E+11	1.36E+22	1.17E+11	26.854	0.2431	3.08E+11	3.90E+11	4.60E+11	5.41E+11	6.86E+11
13	7.94E+11	3.83E+22	1.96E+11	27.37	0.24295	5.17E+11	6.54E+11	7.70E+11	9.08E+11	1.15E+12
14	5.71E+11	1.98E+22	1.41E+11	27.041	0.24279	3.72E+11	4.71E+11	5.54E+11	6.53E+11	8.27E+11
15	3.85E+11	9.00E+21	9.49E+10	26.648	0.24262	2.51E+11	3.18E+11	3.74E+11	4.41E+11	5.58E+11
16	1.88E+11	2.13E+21	4.62E+10	25.928	0.24246	1.22E+11	1.55E+11	1.82E+11	2.14E+11	2.71E+11
17	1.58E+11	1.51E+21	3.88E+10	25.756	0.2423	1.03E+11	1.30E+11	1.53E+11	1.81E+11	2.29E+11
18	3.52E+11	7.55E+21	8.69E+10	26.558	0.2431	2.29E+11	2.90E+11	3.42E+11	4.03E+11	5.10E+11
19	8.32E+11	4.21E+22	2.05E+11	27.417	0.24295	5.42E+11	6.86E+11	8.08E+11	9.51E+11	1.20E+12
20	8.47E+11	4.36E+22	2.09E+11	27.436	0.24279	5.52E+11	6.98E+11	8.23E+11	9.69E+11	1.23E+12
21	6.34E+11	2.44E+22	1.56E+11	27.146	0.24262	4.13E+11	5.23E+11	6.16E+11	7.25E+11	9.18E+11
22	2.92E+11	5.15E+21	7.18E+10	26.369	0.24246	1.90E+11	2.40E+11	2.83E+11	3.33E+11	4.22E+11
23	2.58E+11	4.03E+21	6.35E+10	26.248	0.2423	1.68E+11	2.13E+11	2.51E+11	2.95E+11	3.74E+11
24	3.11E+11	5.86E+21	7.66E+10	26.432	0.24295	2.02E+11	2.56E+11	3.02E+11	3.55E+11	4.50E+11
25	5.59E+11	1.90E+22	1.38E+11	27.02	0.24279	3.64E+11	4.61E+11	5.43E+11	6.39E+11	8.09E+11
26	4.13E+11	1.03E+22	1.02E+11	26.717	0.24262	2.69E+11	3.41E+11	4.01E+11	4.72E+11	5.98E+11
27	3.27E+11	6.46E+21	8.04E+10	26.483	0.24246	2.13E+11	2.69E+11	3.17E+11	3.74E+11	4.73E+11
28	1.87E+11	2.12E+21	4.61E+10	25.927	0.2423	1.22E+11	1.55E+11	1.82E+11	2.14E+11	2.71E+11
P.P.C.	1.30E+13	1.03E+25	3.20E+12			8.46E+12	1.07E+13	1.26E+13	1.49E+13	1.88E+13

Table 15: List of subplays in the marginal marine interval of the Mesaverde Formation highly overpressured play (T>300°F), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is kmv1.

For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Marine Kmv > 1.1									(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.16	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	13.48	80	7	50	50	20,000	10414.7	825	1.16	2.02E+11
2	10.44	80	7	50	50	19,000	9894.7	809	1.16	1.52E+11
3	11.26	90	7	50	50	18,000	9374.7	793	1.16	1.78E+11
4	22.09	80	7	50	50	17,000	8854.7	777	1.16	2.99E+11
5	19.43	80	7	50	50	16,000	8334.7	761	1.16	2.53E+11
6	11.4	80	7	50	50	15,000	7814.7	745	1.16	1.42E+11
7	9.51	80	7	50	50	14,000	7294.7	729	1.16	1.13E+11
8	10.08	90	7	50	50	13,000	6774.7	713	1.16	1.28E+11
9	1.37	100	7	50	50	12,500	6514.7	705	1.16	1.88E+10
10	2.26	150	7	50	50	16,000	8334.7	761	1.16	5.51E+10
11	3.62	150	7	50	50	15,000	7814.7	745	1.16	8.46E+10
12	4.6	150	7	50	50	14,000	7294.7	729	1.16	1.03E+11
13	5.89	150	7	50	50	13,000	6774.7	713	1.16	1.25E+11
14	3.33	150	7	50	50	12,500	6514.7	705	1.16	6.85E+10
15	0.49	250	7	50	50	15,500	8074.7	753	1.16	1.95E+10
16	1.75	250	7	50	50	15,000	7814.7	745	1.16	6.81E+10
17	2.11	250	7	50	50	14,000	7294.7	729	1.16	7.84E+10
18	1.8	250	7	50	50	13,000	6774.7	713	1.16	6.35E+10
19	1.95	250	7	50	50	12,000	6254.7	697	1.16	6.50E+10
20	0.57	350	7	50	50	15,500	8074.7	753	1.16	3.18E+10
21	2.39	350	7	50	50	15,000	7814.7	745	1.16	1.30E+11
22	2.46	350	7	50	50	14,000	7294.7	729	1.16	1.28E+11
23	2.29	350	7	50	50	13,000	6774.7	713	1.16	1.13E+11
24	2.56	350	7	50	50	12,000	6254.7	697	1.16	1.19E+11
25	0.81	450	7	50	50	15,500	8074.7	753	1.16	5.80E+10
26	1.56	450	7	50	50	15,000	7814.7	745	1.16	1.09E+11
27	1.47	450	7	50	50	14,000	7294.7	729	1.16	9.83E+10
28	1.29	450	7	50	50	13,000	6774.7	713	1.16	8.19E+10
29	1.38	450	7	50	50	12,000	6254.7	697	1.16	8.27E+10
32	0.55	530	7	50	50	14,000	7294.7	729	1.16	4.33E+10
33	1.17	530	7	50	50	13,000	6774.7	713	1.16	8.75E+10
34	2.28	530	7	50	50	12,000	6254.7	697	1.16	1.61E+11
35	1.82	530	7	50	50	11,500	5994.7	689	1.16	1.25E+11
93	2.14	100	7	50	50	16,500	8594.7	769	1.16	3.55E+10
94	11.07	120	7	50	50	16,000	8334.7	761	1.16	2.16E+11
95	14.02	130	7	50	50	15,000	7814.7	745	1.16	2.84E+11
96	8.59	140	7	50	50	14,000	7294.7	729	1.16	1.79E+11
97	2.97	210	7	50	50	14,000	7294.7	729	1.16	9.27E+10
98	2.21	175	7	50	50	14,000	7294.7	729	1.16	5.75E+10
99	0.43	450	7	50	50	14,000	7294.7	729	1.16	2.87E+10
									Total =	4.48E+12

Table 16

Table 16: List of subplays in the marine interval of the Mesaverde Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation. The play code for the spreadsheet is kmv2. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Marine Kmv > 1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	10.88	9.82	11.82	183.22	6547.8	49.41	2509.2	2536.95	118.80	4.34E+22
2	10.54	9.50	11.48	109.90	6547.8	49.41	2509.2	2536.95	111.53	2.45E+22
3	10.19	9.16	11.11	127.84	8287.1	49.41	2509.2	2536.95	104.21	3.36E+22
4	9.82	8.82	10.73	492.03	6547.8	49.41	2509.2	2536.95	96.85	9.51E+22
5	9.44	8.45	10.33	380.66	6547.8	49.41	2509.2	2536.95	89.47	6.79E+22
6	9.04	8.08	9.92	131.04	6547.8	49.41	2509.2	2536.95	82.08	2.15E+22
7	8.63	7.69	9.48	91.19	6547.8	49.41	2509.2	2536.95	74.71	1.36E+22
8	8.19	7.28	9.02	102.45	8287.1	49.41	2509.2	2536.95	67.37	1.74E+22
9	7.97	7.07	8.78	1.89	10231.0	49.41	2509.2	2536.95	63.73	3.76E+20
10	9.44	8.45	10.33	5.15	23019.7	49.41	2509.2	2536.95	89.47	3.23E+21
11	9.04	8.08	9.92	13.21	23019.7	49.41	2509.2	2536.95	82.08	7.61E+21
12	8.63	7.69	9.48	21.34	23019.7	49.41	2509.2	2536.95	74.71	1.12E+22
13	8.19	7.28	9.02	34.98	23019.7	49.41	2509.2	2536.95	67.37	1.65E+22
14	7.97	7.07	8.78	11.18	23019.7	49.41	2509.2	2536.95	63.73	5.00E+21
15	9.24	8.27	10.13	0.24	63943.5	49.41	2509.2	2536.95	85.78	4.05E+20
16	9.04	8.08	9.92	3.09	63943.5	49.41	2509.2	2536.95	82.08	4.94E+21
17	8.63	7.69	9.48	4.49	63943.5	49.41	2509.2	2536.95	74.71	6.53E+21
18	8.19	7.28	9.02	3.27	63943.5	49.41	2509.2	2536.95	67.37	4.29E+21
19	7.74	6.86	8.54	3.83	63943.5	49.41	2509.2	2536.95	60.11	4.49E+21
20	9.24	8.27	10.13	0.33	125329.3	49.41	2509.2	2536.95	85.78	1.07E+21
21	9.04	8.08	9.92	5.76	125329.3	49.41	2509.2	2536.95	82.08	1.81E+22
22	8.63	7.69	9.48	6.10	125329.3	49.41	2509.2	2536.95	74.71	1.74E+22
23	8.19	7.28	9.02	5.29	125329.3	49.41	2509.2	2536.95	67.37	1.36E+22
24	7.74	6.86	8.54	6.61	125329.3	49.41	2509.2	2536.95	60.11	1.52E+22
25	9.24	8.27	10.13	0.66	207177.1	49.41	2509.2	2536.95	85.78	3.58E+21
26	9.04	8.08	9.92	2.45	207177.1	49.41	2509.2	2536.95	82.08	1.27E+22
27	8.63	7.69	9.48	2.18	207177.1	49.41	2509.2	2536.95	74.71	1.03E+22
28	8.19	7.28	9.02	1.68	207177.1	49.41	2509.2	2536.95	67.37	7.14E+21
29	7.74	6.86	8.54	1.92	207177.1	49.41	2509.2	2536.95	60.11	7.28E+21
32	8.63	7.69	9.48	0.31	287387.8	49.41	2509.2	2536.95	74.71	2.00E+21
33	8.19	7.28	9.02	1.38	287387.8	49.41	2509.2	2536.95	67.37	8.14E+21
34	7.74	6.86	8.54	5.24	287387.8	49.41	2509.2	2536.95	60.11	2.76E+22
35	7.50	6.64	8.29	3.34	287387.8	49.41	2509.2	2536.95	56.51	1.65E+22
93	9.63	8.64	10.54	4.62	10231.0	49.41	2509.2	2536.95	93.16	1.34E+21
94	9.44	8.45	10.33	123.56	14732.6	49.41	2509.2	2536.95	89.47	4.96E+22
95	9.04	8.08	9.92	198.19	17290.3	49.41	2509.2	2536.95	82.08	8.57E+22
96	8.63	7.69	9.48	74.40	20052.7	49.41	2509.2	2536.95	74.71	3.40E+22
97	8.63	7.69	9.48	8.89	45118.6	49.41	2509.2	2536.95	74.71	9.13E+21
98	8.63	7.69	9.48	4.92	31332.3	49.41	2509.2	2536.95	74.71	3.51E+21
99	8.63	7.69	9.48	0.19	207177.1	49.41	2509.2	2536.95	74.71	8.79E+20

Table 17: List of subplays in the marine interval of the Mesaverde Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is kmv2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Marine Kmv > 1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	2.02E+11	2.56E+21	5.06E+10	26.002	0.24673	1.31E+11	1.66E+11	1.96E+11	2.32E+11	2.94E+11
2	1.52E+11	1.45E+21	3.80E+10	25.714	0.24698	9.80E+10	1.25E+11	1.47E+11	1.74E+11	2.21E+11
3	1.78E+11	1.99E+21	4.47E+10	25.874	0.24724	1.15E+11	1.46E+11	1.73E+11	2.04E+11	2.59E+11
4	2.99E+11	5.65E+21	7.52E+10	26.393	0.24752	1.93E+11	2.45E+11	2.90E+11	3.43E+11	4.36E+11
5	2.53E+11	4.05E+21	6.36E+10	26.225	0.24781	1.63E+11	2.07E+11	2.45E+11	2.90E+11	3.68E+11
6	1.42E+11	1.28E+21	3.58E+10	25.649	0.24813	9.16E+10	1.17E+11	1.38E+11	1.63E+11	2.07E+11
7	1.13E+11	8.14E+20	2.85E+10	25.42	0.24846	7.28E+10	9.27E+10	1.10E+11	1.30E+11	1.65E+11
8	1.28E+11	1.05E+21	3.23E+10	25.544	0.24882	8.24E+10	1.05E+11	1.24E+11	1.47E+11	1.87E+11
9	1.88E+10	2.26E+19	4.75E+09	23.626	0.249	1.21E+10	1.54E+10	1.82E+10	2.16E+10	2.74E+10
10	5.51E+10	1.92E+20	1.39E+10	24.702	0.24781	3.56E+10	4.52E+10	5.35E+10	6.32E+10	8.04E+10
11	8.46E+10	4.54E+20	2.13E+10	25.13	0.24813	5.45E+10	6.94E+10	8.20E+10	9.69E+10	1.23E+11
12	1.03E+11	6.69E+20	2.59E+10	25.322	0.24846	6.61E+10	8.41E+10	9.94E+10	1.18E+11	1.50E+11
13	1.25E+11	9.92E+20	3.15E+10	25.518	0.24882	8.03E+10	1.02E+11	1.21E+11	1.43E+11	1.82E+11
14	6.85E+10	3.00E+20	1.73E+10	24.92	0.249	4.41E+10	5.62E+10	6.64E+10	7.86E+10	1.00E+11
15	1.95E+10	2.41E+19	4.91E+09	23.663	0.24797	1.26E+10	1.60E+10	1.89E+10	2.24E+10	2.84E+10
16	6.81E+10	2.95E+20	1.72E+10	24.914	0.24813	4.39E+10	5.59E+10	6.61E+10	7.81E+10	9.94E+10
17	7.84E+10	3.91E+20	1.98E+10	25.054	0.24846	5.05E+10	6.43E+10	7.60E+10	8.98E+10	1.14E+11
18	6.35E+10	2.57E+20	1.60E+10	24.843	0.24882	4.09E+10	5.20E+10	6.16E+10	7.28E+10	9.27E+10
19	6.50E+10	2.70E+20	1.64E+10	24.866	0.2492	4.18E+10	5.32E+10	6.30E+10	7.45E+10	9.49E+10
20	3.18E+10	6.40E+19	8.00E+09	24.151	0.24797	2.05E+10	2.61E+10	3.08E+10	3.64E+10	4.63E+10
21	1.30E+11	1.08E+21	3.28E+10	25.562	0.24813	8.40E+10	1.07E+11	1.26E+11	1.49E+11	1.90E+11
22	1.28E+11	1.04E+21	3.23E+10	25.544	0.24846	8.24E+10	1.05E+11	1.24E+11	1.47E+11	1.87E+11
23	1.13E+11	8.17E+20	2.86E+10	25.42	0.24882	7.28E+10	9.27E+10	1.10E+11	1.30E+11	1.65E+11
24	1.19E+11	9.13E+20	3.02E+10	25.475	0.2492	7.68E+10	9.78E+10	1.16E+11	1.37E+11	1.74E+11
25	5.80E+10	2.14E+20	1.46E+10	24.754	0.24797	3.74E+10	4.76E+10	5.63E+10	6.65E+10	8.46E+10
26	1.09E+11	7.59E+20	2.76E+10	25.387	0.24813	7.05E+10	8.97E+10	1.06E+11	1.25E+11	1.59E+11
27	9.83E+10	6.15E+20	2.48E+10	25.28	0.24846	6.33E+10	8.06E+10	9.53E+10	1.13E+11	1.43E+11
28	8.19E+10	4.28E+20	2.07E+10	25.098	0.24882	5.27E+10	6.71E+10	7.94E+10	9.39E+10	1.20E+11
29	8.27E+10	4.39E+20	2.09E+10	25.108	0.2492	5.32E+10	6.78E+10	8.02E+10	9.49E+10	1.21E+11
32	4.33E+10	1.19E+20	1.09E+10	24.461	0.24846	2.79E+10	3.55E+10	4.20E+10	4.96E+10	6.32E+10
33	8.75E+10	4.89E+20	2.21E+10	25.164	0.24882	5.63E+10	7.17E+10	8.48E+10	1.00E+11	1.28E+11
34	1.61E+11	1.66E+21	4.08E+10	25.774	0.2492	1.04E+11	1.32E+11	1.56E+11	1.85E+11	2.35E+11
35	1.25E+11	9.96E+20	3.16E+10	25.517	0.2494	8.01E+10	1.02E+11	1.21E+11	1.43E+11	1.82E+11
93	3.55E+10	7.98E+19	8.93E+09	24.262	0.24766	2.29E+10	2.91E+10	3.44E+10	4.07E+10	5.18E+10
94	2.16E+11	2.96E+21	5.44E+10	26.068	0.24781	1.39E+11	1.77E+11	2.09E+11	2.48E+11	3.15E+11
95	2.84E+11	5.12E+21	7.15E+10	26.341	0.24813	1.83E+11	2.33E+11	2.75E+11	3.25E+11	4.14E+11
96	1.79E+11	2.03E+21	4.51E+10	25.878	0.24846	1.15E+11	1.47E+11	1.73E+11	2.05E+11	2.61E+11
97	9.27E+10	5.47E+20	2.34E+10	25.221	0.24846	5.97E+10	7.60E+10	8.98E+10	1.06E+11	1.35E+11
98	5.75E+10	2.10E+20	1.45E+10	24.743	0.24846	3.70E+10	4.71E+10	5.57E+10	6.59E+10	8.38E+10
99	2.87E+10	5.26E+19	7.25E+09	24.051	0.24846	1.85E+10	2.36E+10	2.79E+10	3.30E+10	4.19E+10
P.P.C.	4.48E+12	1.27E+24	1.13E+12			2.89E+12	3.67E+12	4.34E+12	5.13E+12	6.53E+12

Table 18: List of subplays in the marine interval of the Mesaverde Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is kmv2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Marine Kmv 1.1-.73									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.8989	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	4.55	150	7	20	50	13,500	5549.7	721	0.8989	4.03E+10
2	16.9	150	7	20	50	13,000	5344.7	713	0.8989	1.46E+11
3	12.97	150	7	20	50	12,000	4934.7	697	0.8989	1.06E+11
4	20.76	150	7	20	50	11,000	4524.7	681	0.8989	1.59E+11
5	21.49	150	7	20	50	10,000	4114.7	665	0.8989	1.53E+11
6	5.18	140	7	20	50	9,000	3704.7	649	0.8989	3.17E+10
7	3.36	140	7	20	50	8,000	3294.7	633	0.8989	1.88E+10
8	1.15	140	7	20	50	7,000	2884.7	617	0.8989	5.77E+09
9	10.98	210	7	20	50	13,000	5344.7	713	0.8989	1.32E+11
10	16.31	210	7	20	50	12,000	4934.7	697	0.8989	1.86E+11
10a	2.01	200	7	20	50	11,500	4729.7	689	0.8989	2.11E+10
11	7.98	220	7	20	50	11,000	4524.7	681	0.8989	8.94E+10
12	6.42	220	7	20	50	10,000	4114.7	665	0.8989	6.70E+10
13	2.18	150	7	20	50	14,000	5754.7	729	0.8989	1.98E+10
14	5.91	150	7	20	50	13,000	5344.7	713	0.8989	5.09E+10
15	3.01	150	7	20	50	12,000	4934.7	697	0.8989	2.45E+10
16	2.88	150	7	20	50	11,000	4524.7	681	0.8989	2.20E+10
17	1.81	150	7	20	50	10,000	4114.7	665	0.8989	1.29E+10
18	1.85	150	7	20	50	9,000	3704.7	649	0.8989	1.21E+10
19	1.96	210	7	20	50	9,000	3704.7	649	0.8989	1.80E+10
20	0.65	140	7	20	50	8,500	3499.7	641	0.8989	3.81E+09
21	2.9	80	7	20	50	14,000	5754.7	729	0.8989	1.40E+10
22	11.28	70	7	20	50	13,000	5344.7	713	0.8989	4.54E+10
23	14.56	70	7	20	50	12,000	4934.7	697	0.8989	5.53E+10
24	13.57	70	7	20	50	11,000	4524.7	681	0.8989	4.84E+10
25	9.7	70	7	20	50	10,000	4114.7	665	0.8989	3.22E+10
26	7.21	70	7	20	50	9,000	3704.7	649	0.8989	2.21E+10
27	8.06	70	7	20	50	8,000	3294.7	633	0.8989	2.25E+10
28	5.98	80	7	20	50	7,000	2884.7	617	0.8989	1.71E+10
29	0.45	90	7	20	50	6,500	2679.7	609	0.8989	1.37E+09
29a	0.48	500	7	20	50	11,000	4524.7	681	0.8989	1.22E+10
30	3.38	150	7	20	50	12,000	4934.7	697	0.8989	2.75E+10
31	5.6	150	7	20	50	11,000	4524.7	681	0.8989	4.28E+10
32	4.42	150	7	20	50	10,000	4114.7	665	0.8989	3.14E+10
33	4.98	150	7	20	50	9,000	3704.7	649	0.8989	3.27E+10
34	4.63	150	7	20	50	8,000	3294.7	633	0.8989	2.77E+10
35	12.41	150	7	20	50	7,000	2884.7	617	0.8989	6.67E+10
36	8.63	140	7	20	50	6,000	2474.7	601	0.8989	3.81E+10
38	1.07	250	7	20	50	12,000	4934.7	697	0.8989	1.45E+10
39	3.38	250	7	20	50	11,000	4524.7	681	0.8989	4.30E+10
40	4.42	250	7	20	50	10,000	4114.7	665	0.8989	5.24E+10
41	4.56	250	7	20	50	9,000	3704.7	649	0.8989	4.99E+10
42	2.91	250	7	20	50	8,000	3294.7	633	0.8989	2.90E+10
43	7.7	250	7	20	50	7,000	2884.7	617	0.8989	6.90E+10
44	2.34	350	7	20	50	11,000	4524.7	681	0.8989	4.17E+10
44a	0.28	320	7	20	50	11,500	4729.7	689	0.8989	4.71E+09

Table 19

45	3.19	350	7	20	50	10,000	4114.7	665	0.8989	5.29E+10
46	3.84	350	7	20	50	9,000	3704.7	649	0.8989	5.88E+10
47	4.03	350	7	20	50	8,000	3294.7	633	0.8989	5.63E+10
48	16.34	340	7	20	50	7,000	2884.7	617	0.8989	1.99E+11
49	0.76	450	7	20	50	11,000	4524.7	681	0.8989	1.74E+10
50	0.94	450	7	20	50	10,000	4114.7	665	0.8989	2.01E+10
51	0.97	450	7	20	50	9,000	3704.7	649	0.8989	1.91E+10
52	0.92	450	7	20	50	8,000	3294.7	633	0.8989	1.65E+10
53	1.06	450	7	20	50	7,000	2884.7	617	0.8989	1.71E+10
54	0.41	525	7	20	50	11,500	4729.7	689	0.8989	1.13E+10
55	1.84	525	7	20	50	10,000	4114.7	665	0.8989	4.58E+10
56	2.41	525	7	20	50	9,000	3704.7	649	0.8989	5.54E+10
57	2.1	525	7	20	50	8,000	3294.7	633	0.8989	4.40E+10
58	2.42	525	7	20	50	7,000	2884.7	617	0.8989	4.55E+10
58a	0.39	220	7	20	50	6,500	2679.7	609	0.8989	2.89E+09
59	0.02	440	7	20	50	10,000	4114.7	665	0.8989	4.17E+08
60	0.72	440	7	20	50	9,000	3704.7	649	0.8989	1.39E+10
61	2.09	440	7	20	50	8,000	3294.7	633	0.8989	3.67E+10
62	4.47	440	7	20	50	7,000	2884.7	617	0.8989	7.05E+10
63	1.81	440	7	20	50	6,000	2474.7	601	0.8989	2.51E+10
67	0.87	50	7	20	50	7,000	2884.7	617	0.8989	1.56E+09
68	1.13	50	7	20	50	6,000	2474.7	601	0.8989	1.78E+09
									Total =	2.97E+12

Table 19: List of subplays in the marginal marine interval of the Mesaverde Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation. The play code for the spreadsheet is kmv3. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Marine Kmv 1.1-.73								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe /TZ*	
	Range (%) =	30		30	50	60	100	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe /TZ*	*Pe /TZ*	*Pe /TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe /TZ*)^2	(Gas)^2
1	8.56	7.62	9.42	20.87	23019.7	50.63	437.0	2647.82	73.62	2.01E+21
2	8.34	7.42	9.18	287.98	23019.7	50.63	437.0	2647.82	69.83	2.63E+22
3	7.88	6.99	8.69	169.62	23019.7	50.63	437.0	2647.82	62.30	1.38E+22
4	7.39	6.54	8.18	434.56	23019.7	50.63	437.0	2647.82	54.88	3.12E+22
5	6.88	6.07	7.64	465.66	23019.7	50.63	437.0	2647.82	47.61	2.90E+22
6	6.35	5.59	7.06	27.06	20052.7	50.63	437.0	2647.82	40.53	1.25E+21
7	5.79	5.08	6.46	11.38	20052.7	50.63	437.0	2647.82	33.70	4.37E+20
8	5.20	4.55	5.82	1.33	20052.7	50.63	437.0	2647.82	27.20	4.13E+19
9	8.34	7.42	9.18	121.56	45118.6	50.63	437.0	2647.82	69.83	2.17E+22
10	7.88	6.99	8.69	268.23	45118.6	50.63	437.0	2647.82	62.30	4.28E+22
10a	7.64	6.77	8.44	4.07	40923.9	50.63	437.0	2647.82	58.58	5.54E+20
11	7.39	6.54	8.18	64.21	49517.9	50.63	437.0	2647.82	54.88	9.90E+21
12	6.88	6.07	7.64	41.56	49517.9	50.63	437.0	2647.82	47.61	5.56E+21
13	8.78	7.83	9.65	4.79	23019.7	50.63	437.0	2647.82	77.43	4.85E+20
14	8.34	7.42	9.18	35.22	23019.7	50.63	437.0	2647.82	69.83	3.21E+21
15	7.88	6.99	8.69	9.14	23019.7	50.63	437.0	2647.82	62.30	7.43E+20
16	7.39	6.54	8.18	8.36	23019.7	50.63	437.0	2647.82	54.88	6.00E+20
17	6.88	6.07	7.64	3.30	23019.7	50.63	437.0	2647.82	47.61	2.05E+20
18	6.35	5.59	7.06	3.45	23019.7	50.63	437.0	2647.82	40.53	1.83E+20
19	6.35	5.59	7.06	3.87	45118.6	50.63	437.0	2647.82	40.53	4.02E+20
20	6.07	5.34	6.77	0.43	20052.7	50.63	437.0	2647.82	37.08	1.80E+19
21	8.78	7.83	9.65	8.48	6547.8	50.63	437.0	2647.82	77.43	2.44E+20
22	8.34	7.42	9.18	128.30	5013.2	50.63	437.0	2647.82	69.83	2.55E+21
23	7.88	6.99	8.69	213.76	5013.2	50.63	437.0	2647.82	62.30	3.79E+21
24	7.39	6.54	8.18	185.68	5013.2	50.63	437.0	2647.82	54.88	2.90E+21
25	6.88	6.07	7.64	94.87	5013.2	50.63	437.0	2647.82	47.61	1.28E+21
26	6.35	5.59	7.06	52.42	5013.2	50.63	437.0	2647.82	40.53	6.04E+20
27	5.79	5.08	6.46	65.50	5013.2	50.63	437.0	2647.82	33.70	6.28E+20
28	5.20	4.55	5.82	36.06	6547.8	50.63	437.0	2647.82	27.20	3.64E+20
29	4.90	4.27	5.48	0.20	8287.1	50.63	437.0	2647.82	24.10	2.31E+18
29a	7.39	6.54	8.18	0.23	255774.2	50.63	437.0	2647.82	54.88	1.85E+20
30	7.88	6.99	8.69	11.52	23019.7	50.63	437.0	2647.82	62.30	9.37E+20
31	7.39	6.54	8.18	31.62	23019.7	50.63	437.0	2647.82	54.88	2.27E+21
32	6.88	6.07	7.64	19.70	23019.7	50.63	437.0	2647.82	47.61	1.22E+21
33	6.35	5.59	7.06	25.01	23019.7	50.63	437.0	2647.82	40.53	1.32E+21
34	5.79	5.08	6.46	21.62	23019.7	50.63	437.0	2647.82	33.70	9.52E+20
35	5.20	4.55	5.82	155.29	23019.7	50.63	437.0	2647.82	27.20	5.52E+21
36	4.58	3.99	5.14	75.10	20052.7	50.63	437.0	2647.82	21.10	1.80E+21
38	7.88	6.99	8.69	1.15	63943.5	50.63	437.0	2647.82	62.30	2.61E+20
39	7.39	6.54	8.18	11.52	63943.5	50.63	437.0	2647.82	54.88	2.29E+21
40	6.88	6.07	7.64	19.70	63943.5	50.63	437.0	2647.82	47.61	3.40E+21
41	6.35	5.59	7.06	20.97	63943.5	50.63	437.0	2647.82	40.53	3.08E+21
42	5.79	5.08	6.46	8.54	63943.5	50.63	437.0	2647.82	33.70	1.04E+21
43	5.20	4.55	5.82	59.78	63943.5	50.63	437.0	2647.82	27.20	5.90E+21
44	7.39	6.54	8.18	5.52	125329.3	50.63	437.0	2647.82	54.88	2.15E+21
44a	7.64	6.77	8.44	0.08	104765.1	50.63	437.0	2647.82	58.58	2.75E+19

Table 20

45	6.88	6.07	7.64	10.26	125329.3	50.63	437.0	2647.82	47.61	3.47E+21
46	6.35	5.59	7.06	14.87	125329.3	50.63	437.0	2647.82	40.53	4.29E+21
47	5.79	5.08	6.46	16.38	125329.3	50.63	437.0	2647.82	33.70	3.92E+21
48	5.20	4.55	5.82	269.22	118270.0	50.63	437.0	2647.82	27.20	4.91E+22
49	7.39	6.54	8.18	0.58	207177.1	50.63	437.0	2647.82	54.88	3.76E+20
50	6.88	6.07	7.64	0.89	207177.1	50.63	437.0	2647.82	47.61	4.99E+20
51	6.35	5.59	7.06	0.95	207177.1	50.63	437.0	2647.82	40.53	4.52E+20
52	5.79	5.08	6.46	0.85	207177.1	50.63	437.0	2647.82	33.70	3.38E+20
53	5.20	4.55	5.82	1.13	207177.1	50.63	437.0	2647.82	27.20	3.62E+20
54	7.64	6.77	8.44	0.17	281991.0	50.63	437.0	2647.82	58.58	1.59E+20
55	6.88	6.07	7.64	3.41	281991.0	50.63	437.0	2647.82	47.61	2.60E+21
56	6.35	5.59	7.06	5.86	281991.0	50.63	437.0	2647.82	40.53	3.80E+21
57	5.79	5.08	6.46	4.45	281991.0	50.63	437.0	2647.82	33.70	2.40E+21
58	5.20	4.55	5.82	5.91	281991.0	50.63	437.0	2647.82	27.20	2.57E+21
58a	4.90	4.27	5.48	0.15	49517.9	50.63	437.0	2647.82	24.10	1.04E+19
59	6.88	6.07	7.64	0.00	198071.5	50.63	437.0	2647.82	47.61	2.16E+17
60	6.35	5.59	7.06	0.52	198071.5	50.63	437.0	2647.82	40.53	2.38E+20
61	5.79	5.08	6.46	4.40	198071.5	50.63	437.0	2647.82	33.70	1.67E+21
62	5.20	4.55	5.82	20.15	198071.5	50.63	437.0	2647.82	27.20	6.16E+21
63	4.58	3.99	5.14	3.30	198071.5	50.63	437.0	2647.82	21.10	7.84E+20
67	5.20	4.55	5.82	0.76	2557.7	50.63	437.0	2647.82	27.20	3.01E+18
68	4.58	3.99	5.14	1.29	2557.7	50.63	437.0	2647.82	21.10	3.94E+18

Table 20: List of subplays in the marginal marine interval of the Mesaverde Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code on the spreadsheet is kmv3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Marine Kmv 1.1-.73								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	4.03E+10	3.86E+20	1.97E+10	24.312	0.46228	1.69E+10	2.65E+10	3.62E+10	4.94E+10	7.74E+10
2	1.46E+11	5.06E+21	7.11E+10	25.598	0.46237	6.12E+10	9.58E+10	1.31E+11	1.79E+11	2.80E+11
3	1.06E+11	2.66E+21	5.16E+10	25.276	0.46258	4.43E+10	6.94E+10	9.49E+10	1.30E+11	2.03E+11
4	1.59E+11	6.01E+21	7.75E+10	25.682	0.46279	6.65E+10	1.04E+11	1.42E+11	1.95E+11	3.05E+11
5	1.53E+11	5.59E+21	7.47E+10	25.646	0.46303	6.41E+10	1.01E+11	1.37E+11	1.88E+11	2.94E+11
6	3.17E+10	2.41E+20	1.55E+10	24.073	0.46328	1.33E+10	2.09E+10	2.85E+10	3.89E+10	6.11E+10
7	1.88E+10	8.44E+19	9.19E+09	23.548	0.46354	7.86E+09	1.23E+10	1.69E+10	2.30E+10	3.61E+10
8	5.77E+09	7.99E+18	2.83E+09	22.368	0.46383	2.42E+09	3.79E+09	5.18E+09	7.08E+09	1.11E+10
9	1.32E+11	4.18E+21	6.47E+10	25.503	0.46237	5.56E+10	8.72E+10	1.19E+11	1.63E+11	2.55E+11
10	1.86E+11	8.24E+21	9.08E+10	25.841	0.46258	7.80E+10	1.22E+11	1.67E+11	2.28E+11	3.57E+11
10a	2.11E+10	1.07E+20	1.03E+10	23.668	0.46268	8.88E+09	1.39E+10	1.90E+10	2.60E+10	4.07E+10
11	8.94E+10	1.91E+21	4.37E+10	25.109	0.46279	3.75E+10	5.88E+10	8.03E+10	1.10E+11	1.72E+11
12	6.70E+10	1.07E+21	3.28E+10	24.82	0.46303	2.81E+10	4.40E+10	6.02E+10	8.22E+10	1.29E+11
13	1.98E+10	9.32E+19	9.65E+09	23.601	0.46218	8.31E+09	1.30E+10	1.78E+10	2.43E+10	3.80E+10
14	5.09E+10	6.18E+20	2.49E+10	24.547	0.46237	2.14E+10	3.35E+10	4.58E+10	6.25E+10	9.79E+10
15	2.45E+10	1.43E+20	1.20E+10	23.815	0.46258	1.03E+10	1.61E+10	2.20E+10	3.01E+10	4.71E+10
16	2.20E+10	1.16E+20	1.08E+10	23.707	0.46279	9.23E+09	1.45E+10	1.98E+10	2.70E+10	4.23E+10
17	1.29E+10	3.96E+19	6.30E+09	23.171	0.46303	5.40E+09	8.47E+09	1.16E+10	1.58E+10	2.48E+10
18	1.21E+10	3.53E+19	5.94E+09	23.113	0.46328	5.09E+09	7.98E+09	1.09E+10	1.49E+10	2.34E+10
19	1.80E+10	7.76E+19	8.81E+09	23.507	0.46328	7.55E+09	1.18E+10	1.62E+10	2.21E+10	3.47E+10
20	3.81E+09	3.47E+18	1.86E+09	21.953	0.46341	1.60E+09	2.50E+09	3.42E+09	4.67E+09	7.33E+09
21	1.40E+10	4.69E+19	6.85E+09	23.258	0.46218	5.90E+09	9.24E+09	1.26E+10	1.72E+10	2.70E+10
22	4.54E+10	4.91E+20	2.21E+10	24.431	0.46237	1.91E+10	2.98E+10	4.08E+10	5.57E+10	8.72E+10
23	5.53E+10	7.30E+20	2.70E+10	24.629	0.46258	2.32E+10	3.64E+10	4.97E+10	6.79E+10	1.06E+11
24	4.84E+10	5.59E+20	2.36E+10	24.495	0.46279	2.03E+10	3.18E+10	4.35E+10	5.94E+10	9.30E+10
25	3.22E+10	2.48E+20	1.57E+10	24.088	0.46303	1.35E+10	2.12E+10	2.89E+10	3.95E+10	6.20E+10
26	2.21E+10	1.17E+20	1.08E+10	23.711	0.46328	9.26E+09	1.45E+10	1.98E+10	2.71E+10	4.25E+10
27	2.25E+10	1.21E+20	1.10E+10	23.73	0.46354	9.43E+09	1.48E+10	2.02E+10	2.76E+10	4.33E+10
28	1.71E+10	7.05E+19	8.40E+09	23.457	0.46383	7.18E+09	1.13E+10	1.54E+10	2.10E+10	3.30E+10
29	1.37E+09	4.48E+17	6.69E+08	20.927	0.46398	5.72E+08	8.97E+08	1.23E+09	1.68E+09	2.63E+09
29a	1.22E+10	3.57E+19	5.97E+09	23.119	0.46279	5.13E+09	8.04E+09	1.10E+10	1.50E+10	2.35E+10
30	2.75E+10	1.81E+20	1.34E+10	23.931	0.46258	1.15E+10	1.81E+10	2.47E+10	3.38E+10	5.29E+10
31	4.28E+10	4.37E+20	2.09E+10	24.372	0.46279	1.79E+10	2.81E+10	3.84E+10	5.25E+10	8.23E+10
32	3.14E+10	2.36E+20	1.54E+10	24.064	0.46303	1.32E+10	2.07E+10	2.82E+10	3.86E+10	6.05E+10
33	3.27E+10	2.56E+20	1.60E+10	24.103	0.46328	1.37E+10	2.15E+10	2.94E+10	4.01E+10	6.29E+10
34	2.77E+10	1.84E+20	1.36E+10	23.937	0.46354	1.16E+10	1.82E+10	2.49E+10	3.40E+10	5.33E+10
35	6.67E+10	1.07E+21	3.27E+10	24.816	0.46383	2.79E+10	4.38E+10	5.99E+10	8.19E+10	1.28E+11
36	3.81E+10	3.49E+20	1.87E+10	24.257	0.46413	1.60E+10	2.50E+10	3.42E+10	4.68E+10	7.35E+10
38	1.45E+10	5.03E+19	7.09E+09	23.291	0.46258	6.09E+09	9.55E+09	1.30E+10	1.78E+10	2.79E+10
39	4.30E+10	4.42E+20	2.10E+10	24.378	0.46279	1.81E+10	2.83E+10	3.87E+10	5.28E+10	8.28E+10
40	5.24E+10	6.57E+20	2.56E+10	24.575	0.46303	2.20E+10	3.45E+10	4.71E+10	6.43E+10	1.01E+11
41	4.99E+10	5.95E+20	2.44E+10	24.525	0.46328	2.09E+10	3.28E+10	4.48E+10	6.12E+10	9.60E+10
42	2.90E+10	2.02E+20	1.42E+10	23.984	0.46354	1.22E+10	1.91E+10	2.61E+10	3.56E+10	5.59E+10
43	6.90E+10	1.14E+21	3.38E+10	24.849	0.46383	2.89E+10	4.53E+10	6.19E+10	8.47E+10	1.33E+11
44	4.17E+10	4.15E+20	2.04E+10	24.347	0.46279	1.75E+10	2.74E+10	3.75E+10	5.12E+10	8.02E+10
44a	4.71E+09	5.30E+18	2.30E+09	22.167	0.46268	1.98E+09	3.10E+09	4.24E+09	5.79E+09	9.07E+09

Table 21

45	5.29E+10	6.70E+20	2.59E+10	24.585	0.46303	2.22E+10	3.48E+10	4.76E+10	6.50E+10	1.02E+11
46	5.88E+10	8.28E+20	2.88E+10	24.69	0.46328	2.46E+10	3.87E+10	5.28E+10	7.22E+10	1.13E+11
47	5.63E+10	7.59E+20	2.75E+10	24.646	0.46354	2.36E+10	3.70E+10	5.05E+10	6.91E+10	1.08E+11
48	1.99E+11	9.51E+21	9.75E+10	25.909	0.46383	8.34E+10	1.31E+11	1.79E+11	2.44E+11	3.83E+11
49	1.74E+10	7.24E+19	8.51E+09	23.474	0.46279	7.31E+09	1.15E+10	1.56E+10	2.14E+10	3.35E+10
50	2.01E+10	9.62E+19	9.81E+09	23.615	0.46303	8.41E+09	1.32E+10	1.80E+10	2.46E+10	3.86E+10
51	1.91E+10	8.73E+19	9.34E+09	23.565	0.46328	8.01E+09	1.26E+10	1.72E+10	2.34E+10	3.68E+10
52	1.65E+10	6.54E+19	8.09E+09	23.42	0.46354	6.92E+09	1.09E+10	1.48E+10	2.03E+10	3.18E+10
53	1.71E+10	7.01E+19	8.37E+09	23.454	0.46383	7.16E+09	1.12E+10	1.53E+10	2.10E+10	3.29E+10
54	1.13E+10	3.06E+19	5.53E+09	23.043	0.46268	4.75E+09	7.45E+09	1.02E+10	1.39E+10	2.18E+10
55	4.58E+10	5.02E+20	2.24E+10	24.441	0.46303	1.92E+10	3.01E+10	4.12E+10	5.62E+10	8.81E+10
56	5.54E+10	7.34E+20	2.71E+10	24.63	0.46328	2.32E+10	3.64E+10	4.97E+10	6.79E+10	1.07E+11
57	4.40E+10	4.64E+20	2.15E+10	24.4	0.46354	1.84E+10	2.89E+10	3.95E+10	5.40E+10	8.47E+10
58	4.55E+10	4.97E+20	2.23E+10	24.434	0.46383	1.91E+10	2.99E+10	4.09E+10	5.59E+10	8.77E+10
58a	2.89E+09	2.01E+18	1.42E+09	21.678	0.46398	1.21E+09	1.90E+09	2.60E+09	3.55E+09	5.57E+09
59	4.17E+08	4.16E+16	2.04E+08	19.742	0.46303	1.75E+08	2.74E+08	3.75E+08	5.12E+08	8.03E+08
60	1.39E+10	4.60E+19	6.78E+09	23.245	0.46328	5.81E+09	9.11E+09	1.24E+10	1.70E+10	2.67E+10
61	3.67E+10	3.23E+20	1.80E+10	24.218	0.46354	1.54E+10	2.41E+10	3.29E+10	4.50E+10	7.06E+10
62	7.05E+10	1.19E+21	3.45E+10	24.871	0.46383	2.95E+10	4.63E+10	6.33E+10	8.65E+10	1.36E+11
63	2.51E+10	1.52E+20	1.23E+10	23.84	0.46413	1.05E+10	1.65E+10	2.26E+10	3.09E+10	4.84E+10
67	1.56E+09	5.83E+17	7.64E+08	21.06	0.46383	6.53E+08	1.02E+09	1.40E+09	1.91E+09	3.00E+09
68	1.78E+09	7.64E+17	8.74E+08	21.194	0.46413	7.46E+08	1.17E+09	1.60E+09	2.19E+09	3.44E+09
P.P.C.	2.97E+12	2.11E+24	1.45E+12			1.25E+12	1.95E+12	2.67E+12	3.65E+12	5.72E+12

Table 21: List of subplays in the marginal marine interval of the Mesaverde Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is kmv3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Nonmarine Kmv > 300					a =	0.727	0.016	0.00008	(Panel 1)
						b =	14.7	505	0	
	MEAN									
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	2.13	410	6	100	50	19,500	14191.2	817	1.56	2.87E+11
2	9.7	415	6	100	50	19,000	13827.7	809	1.52	1.34E+12
3	36.92	370	6	100	50	20,000	14554.7	825	1.6	4.45E+12
4	29.4	350	6	100	50	19,000	13827.7	809	1.52	3.42E+12
5	33.28	340	6	100	50	18,000	13100.7	793	1.44	3.83E+12
6	9.26	320	6	100	50	17,000	12373.7	777	1.36	1.02E+12
*15a	5.02	200	6	100	50	18,500	13464.2	801	1.48	3.37E+11
*16a	5.51	200	6	100	50	18,500	13464.2	801	1.48	3.70E+11
*17a	28.26	225	6	100	50	19,000	13827.7	809	1.52	2.11E+12
*22a	2.86	250	6	100	50	17,500	12737.2	785	1.4	2.45E+11
*22b	8.68	225	6	100	50	18,000	13100.7	793	1.44	6.62E+11
*23a	2.38	250	6	100	50	17,000	12373.7	777	1.36	2.06E+11
*27a	1.72	450	6	100	50	17,000	12373.7	777	1.36	2.68E+11
28	4.74	300	6	100	50	17,000	12373.7	777	1.36	4.92E+11
*31a	1.84	200	6	100	50	17,000	12373.7	777	1.36	1.27E+11
*32a	7.86	175	6	100	50	18,000	13100.7	793	1.44	4.66E+11
*33a	1.2	150	6	100	50	17,000	12373.7	777	1.36	6.22E+10
*36a	2.68	150	6	100	50	17,000	12373.7	777	1.36	1.39E+11
*37a	14.4	150	6	100	50	16,000	11646.7	761	1.28	7.63E+11
*38a	3.88	150	6	100	50	16,000	11646.7	761	1.28	2.05E+11
									Total =	2.08E+13

Table 22: List of subplays in the nonmarine interval of the Mesavede Formation play highly overpressured play (T>300°F), Wind River Indian Reservation. The play code for the spreadsheet is kmv4. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Subplays which are split between two different plays are marked with an asterix. Half of the sandstone volume in these subplays has been assigned to each of the two plays. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Nonmarine Kmv > 300								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	11.13	11.81	10.53	4.57	171982.5	36.30	10037.0	2536.95	124.13	8.74E+22
2	11.24	11.92	10.64	94.87	176202.8	36.30	10037.0	2536.95	126.60	1.89E+24
3	11.03	11.71	10.42	1374.42	140061.9	36.30	10037.0	2536.95	121.73	2.10E+25
4	11.24	11.92	10.64	871.55	125329.3	36.30	10037.0	2536.95	126.60	1.24E+25
5	11.47	12.14	10.88	1116.77	118270.0	36.30	10037.0	2536.95	131.76	1.56E+25
6	11.71	12.36	11.12	86.46	104765.1	36.30	10037.0	2536.95	137.25	1.11E+24
*15a	11.36	12.03	10.76	25.41	40923.9	36.30	10037.0	2536.95	129.14	1.20E+23
*16a	11.36	12.03	10.76	30.61	40923.9	36.30	10037.0	2536.95	129.14	1.45E+23
*17a	11.24	11.92	10.64	805.27	51794.3	36.30	10037.0	2536.95	126.60	4.73E+24
*22a	11.59	12.25	11.00	8.25	63943.5	36.30	10037.0	2536.95	134.47	6.35E+22
*22b	11.47	12.14	10.88	75.97	51794.3	36.30	10037.0	2536.95	131.76	4.64E+23
*23a	11.71	12.36	11.12	5.71	63943.5	36.30	10037.0	2536.95	137.25	4.49E+22
*27a	11.71	12.36	11.12	2.98	207177.1	36.30	10037.0	2536.95	137.25	7.59E+22
28	11.71	12.36	11.12	22.65	92078.7	36.30	10037.0	2536.95	137.25	2.56E+23
*31a	11.71	12.36	11.12	3.41	40923.9	36.30	10037.0	2536.95	137.25	1.72E+22
*32a	11.47	12.14	10.88	62.29	31332.3	36.30	10037.0	2536.95	131.76	2.30E+23
*33a	11.71	12.36	11.12	1.45	23019.7	36.30	10037.0	2536.95	137.25	4.11E+21
*36a	11.71	12.36	11.12	7.24	23019.7	36.30	10037.0	2536.95	137.25	2.05E+22
*37a	11.96	12.59	11.38	209.08	23019.7	36.30	10037.0	2536.95	143.10	6.17E+23
*38a	11.96	12.59	11.38	15.18	23019.7	36.30	10037.0	2536.95	143.10	4.48E+22

Table 23: List of subplays in the nonmarine interval of the Mesaverde Formation highly overpressured play (T>300°F), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is kmv4. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Nonmarine Kmv > 300								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	2.87E+11	5.01E+21	7.08E+10	26.354	0.24287	1.87E+11	2.37E+11	2.79E+11	3.28E+11	4.16E+11
2	1.34E+12	1.08E+23	3.29E+11	27.892	0.24279	8.70E+11	1.10E+12	1.30E+12	1.53E+12	1.93E+12
3	4.45E+12	1.20E+24	1.10E+12	29.094	0.24295	2.90E+12	3.67E+12	4.32E+12	5.09E+12	6.44E+12
4	3.42E+12	7.09E+23	8.42E+11	28.83	0.24279	2.22E+12	2.82E+12	3.32E+12	3.91E+12	4.95E+12
5	3.83E+12	8.91E+23	9.44E+11	28.945	0.24262	2.50E+12	3.16E+12	3.72E+12	4.38E+12	5.55E+12
6	1.02E+12	6.36E+22	2.52E+11	27.626	0.24246	6.68E+11	8.45E+11	9.95E+11	1.17E+12	1.48E+12
*15a	3.37E+11	6.88E+21	8.29E+10	26.513	0.24271	2.19E+11	2.78E+11	3.27E+11	3.85E+11	4.87E+11
*16a	3.70E+11	8.29E+21	9.10E+10	26.606	0.24271	2.41E+11	3.05E+11	3.59E+11	4.23E+11	5.35E+11
*17a	2.11E+12	2.71E+23	5.20E+11	28.349	0.24279	1.37E+12	1.74E+12	2.05E+12	2.41E+12	3.06E+12
*22a	2.45E+11	3.63E+21	6.02E+10	26.194	0.24254	1.59E+11	2.02E+11	2.38E+11	2.80E+11	3.54E+11
*22b	6.62E+11	2.65E+22	1.63E+11	27.188	0.24262	4.31E+11	5.45E+11	6.42E+11	7.56E+11	9.57E+11
*23a	2.06E+11	2.56E+21	5.06E+10	26.02	0.24246	1.34E+11	1.70E+11	2.00E+11	2.35E+11	2.98E+11
*27a	2.68E+11	4.34E+21	6.58E+10	26.283	0.24246	1.74E+11	2.21E+11	2.60E+11	3.06E+11	3.87E+11
28	4.92E+11	1.46E+22	1.21E+11	26.892	0.24246	3.20E+11	4.05E+11	4.77E+11	5.62E+11	7.11E+11
*31a	1.27E+11	9.80E+20	3.13E+10	25.54	0.24246	8.29E+10	1.05E+11	1.24E+11	1.45E+11	1.84E+11
*32a	4.66E+11	1.32E+22	1.15E+11	26.838	0.24262	3.04E+11	3.84E+11	4.52E+11	5.33E+11	6.74E+11
*33a	6.22E+10	2.35E+20	1.53E+10	24.825	0.24246	4.06E+10	5.13E+10	6.04E+10	7.12E+10	9.00E+10
*36a	1.39E+11	1.17E+21	3.42E+10	25.628	0.24246	9.06E+10	1.15E+11	1.35E+11	1.59E+11	2.01E+11
*37a	7.63E+11	3.52E+22	1.88E+11	27.331	0.2423	4.97E+11	6.29E+11	7.40E+11	8.72E+11	1.10E+12
*38a	2.05E+11	2.55E+21	5.05E+10	26.019	0.2423	1.34E+11	1.69E+11	2.00E+11	2.35E+11	2.97E+11
P.P.C.	2.08E+13	2.62E+25	5.12E+12			1.35E+13	1.71E+13	2.02E+13	2.38E+13	3.01E+13

Table 24: List of subplays in the nonmarine interval of the Mesaverde Formation highly overpressured play (T>300°F), with calculated fractiles for in-place gas. The play code for the spreadsheet is kmv4. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Nonmarine Kmv > 1.1								(Panel 1)
* Half thickness wedge shape area					a =	0.52	0.016	0	
					b =	14.7	505	1.24	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	2.11	320	7	100	50	14,000	7294.7	729	1.24	1.88E+11
10	6.61	510	7	100	50	18,500	9634.7	801	1.24	1.13E+12
11	5.56	520	7	100	50	18,000	9374.7	793	1.24	9.49E+11
12	3.92	510	7	100	50	17,000	8854.7	777	1.24	6.33E+11
13	1.45	510	7	100	50	16,000	8334.7	761	1.24	2.25E+11
14	0.26	510	7	100	50	15,500	8074.7	753	1.24	3.95E+10
17	8.05	475	7	100	50	18,500	9634.7	801	1.24	1.28E+12
18	3.96	480	7	100	50	18,000	9374.7	793	1.24	6.24E+11
19	3.23	480	7	100	50	17,000	8854.7	777	1.24	4.91E+11
20	3.06	480	7	100	50	16,000	8334.7	761	1.24	4.47E+11
21	0.53	480	7	100	50	15,500	8074.7	753	1.24	7.58E+10
23	2.88	515	7	100	50	17,000	8854.7	777	1.24	4.70E+11
24	4.95	520	7	100	50	16,000	8334.7	761	1.24	7.83E+11
25	3.83	550	7	100	50	15,000	7814.7	745	1.24	6.14E+11
26	0.93	520	7	100	50	14,500	7554.7	737	1.24	1.38E+11
27	2.86	450	7	100	50	17,000	8854.7	777	1.24	4.07E+11
28	3.41	450	7	100	50	16,000	8334.7	761	1.24	4.67E+11
29	4.64	450	7	100	50	15,000	7814.7	745	1.24	6.08E+11
30	2.28	450	7	100	50	14,000	7294.7	729	1.24	2.85E+11
32	0.83	400	7	100	50	17,000	8854.7	777	1.24	1.05E+11
33	9.42	350	7	100	50	16,000	8334.7	761	1.24	1.00E+12
34	10.62	350	7	100	50	15,000	7814.7	745	1.24	1.08E+12
35	2.69	350	7	100	50	14,500	7554.7	737	1.24	2.68E+11
37	2.29	290	7	100	50	16,000	8334.7	761	1.24	2.02E+11
38	10.53	270	7	100	50	15,000	7814.7	745	1.24	8.28E+11
39	15.06	270	7	100	50	14,000	7294.7	729	1.24	1.13E+12
40	7.64	250	7	100	50	13,000	6774.7	713	1.24	5.04E+11
41	2.03	230	7	100	50	12,000	6254.7	697	1.24	1.16E+11
42	0.14	190	7	100	50	11,000	5734.7	681	1.24	6.22E+09
*75	0.83	250	7	100	50	15,000	7814.7	745	1.24	6.05E+10
*76	0.92	250	7	100	50	14,000	7294.7	729	1.24	6.39E+10
*77	0.42	250	7	100	50	13,000	6774.7	713	1.24	2.77E+10
*78	2.27	240	7	100	50	15,000	7814.7	745	1.24	1.59E+11
*79	2.63	240	7	100	50	14,000	7294.7	729	1.24	1.75E+11
*80	1	240	7	100	50	13,000	6774.7	713	1.24	6.33E+10
*81	1.5	265	7	100	50	15,000	7814.7	745	1.24	1.16E+11
*82	5.39	280	7	100	50	14,000	7294.7	729	1.24	4.20E+11
*83	4.51	285	7	100	50	13,000	6774.7	713	1.24	3.39E+11
*84	1.18	240	7	100	50	13,500	7034.7	721	1.24	7.68E+10
*85	4.11	225	7	100	50	13,000	6774.7	713	1.24	2.44E+11
*86	2.42	175	7	100	50	13,500	7034.7	721	1.24	1.15E+11
*87	5.24	175	7	100	50	14,000	7294.7	729	1.24	2.55E+11
*88	2.25	145	7	100	50	14,000	7294.7	729	1.24	9.07E+10
*89	11.55	140	7	100	50	13,000	6774.7	713	1.24	4.27E+11
*90	15.92	130	7	100	50	12,000	6254.7	697	1.24	5.16E+11
*91	5.7	175	7	100	50	12,000	6254.7	697	1.24	2.49E+11

Table 25

*92	0.29	200	7	100	50	11,500	5994.7	689	1.24	1.40E+10
*93	0.62	175	7	100	50	11,500	5994.7	689	1.24	2.62E+10
*94	5.26	120	7	100	50	11,500	5994.7	689	1.24	1.53E+11
*95	0.87	90	7	100	50	11,500	5994.7	689	1.24	1.89E+10
*96	0.36	90	7	100	50	11,500	5994.7	689	1.24	7.83E+09
*15a	5.02	200	7	100	50	18,500	9634.7	801	1.24	3.35E+11
*16a	5.51	200	7	100	50	18,500	9634.7	801	1.24	3.68E+11
*17a	28.26	225	7	100	50	19,000	9894.7	809	1.24	2.16E+12
*22a	2.86	250	7	100	50	17,500	9114.7	785	1.24	2.31E+11
*22b	8.68	225	7	100	50	18,000	9374.7	793	1.24	6.41E+11
*23a	2.38	250	7	100	50	17,000	8854.7	777	1.24	1.88E+11
*27a	1.72	220	7	100	50	17,000	8854.7	777	1.24	1.20E+11
*31a	1.84	200	7	100	50	17,000	8854.7	777	1.24	1.17E+11
*32a	7.86	175	7	100	50	18,000	9374.7	793	1.24	4.52E+11
*33a	1.2	150	7	100	50	17,000	8854.7	777	1.24	5.70E+10
*36a	2.68	150	7	100	50	17,000	8854.7	777	1.24	1.27E+11
*37a	14.4	150	7	100	50	16,000	8334.7	761	1.24	6.57E+11
*38a	3.88	150	7	100	50	16,000	8334.7	761	1.24	1.77E+11
									Total =	2.43E+13

Table 25: List of subplays in the nonmarine interval of the Mesaverde Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation. The play code for the spreadsheet is kmv5. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Nonmarine Kmv > 1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	8.07	7.19	8.87	4.49	104765.1	49.41	10037.0	2536.95	65.38	3.75E+22
10	9.70	8.73	10.57	44.06	266107.4	49.41	10037.0	2536.95	94.41	1.35E+24
11	9.53	8.57	10.40	31.17	276645.3	49.41	10037.0	2536.95	91.20	9.58E+23
12	9.19	8.25	10.04	15.49	266107.4	49.41	10037.0	2536.95	84.76	4.26E+23
13	8.83	7.91	9.67	2.12	266107.4	49.41	10037.0	2536.95	78.30	5.38E+22
14	8.65	7.74	9.47	0.07	266107.4	49.41	10037.0	2536.95	75.07	1.66E+21
17	9.70	8.73	10.57	65.34	230836.2	49.41	10037.0	2536.95	94.41	1.74E+24
18	9.53	8.57	10.40	15.81	235721.5	49.41	10037.0	2536.95	91.20	4.14E+23
19	9.19	8.25	10.04	10.52	235721.5	49.41	10037.0	2536.95	84.76	2.56E+23
20	8.83	7.91	9.67	9.44	235721.5	49.41	10037.0	2536.95	78.30	2.12E+23
21	8.65	7.74	9.47	0.28	235721.5	49.41	10037.0	2536.95	75.07	6.11E+21
23	9.19	8.25	10.04	8.36	271350.8	49.41	10037.0	2536.95	84.76	2.34E+23
24	8.83	7.91	9.67	24.71	276645.3	49.41	10037.0	2536.95	78.30	6.52E+23
25	8.46	7.56	9.28	14.79	309486.7	49.41	10037.0	2536.95	71.83	4.01E+23
26	8.27	7.38	9.08	0.87	276645.3	49.41	10037.0	2536.95	68.60	2.02E+22
27	9.19	8.25	10.04	8.25	207177.1	49.41	10037.0	2536.95	84.76	1.76E+23
28	8.83	7.91	9.67	11.72	207177.1	49.41	10037.0	2536.95	78.30	2.32E+23
29	8.46	7.56	9.28	21.71	207177.1	49.41	10037.0	2536.95	71.83	3.94E+23
30	8.07	7.19	8.87	5.24	207177.1	49.41	10037.0	2536.95	65.38	8.65E+22
32	9.19	8.25	10.04	0.69	163695.5	49.41	10037.0	2536.95	84.76	1.17E+22
33	8.83	7.91	9.67	89.47	125329.3	49.41	10037.0	2536.95	78.30	1.07E+24
34	8.46	7.56	9.28	113.72	125329.3	49.41	10037.0	2536.95	71.83	1.25E+24
35	8.27	7.38	9.08	7.30	125329.3	49.41	10037.0	2536.95	68.60	7.64E+22
37	8.83	7.91	9.67	5.29	86042.4	49.41	10037.0	2536.95	78.30	4.34E+22
38	8.46	7.56	9.28	111.80	74583.7	49.41	10037.0	2536.95	71.83	7.30E+23
39	8.07	7.19	8.87	228.69	74583.7	49.41	10037.0	2536.95	65.38	1.36E+24
40	7.66	6.81	8.44	58.85	63943.5	49.41	10037.0	2536.95	58.96	2.70E+23
41	7.24	6.42	7.99	4.16	54121.8	49.41	10037.0	2536.95	52.60	1.44E+22
42	6.79	6.01	7.52	0.02	36933.8	49.41	10037.0	2536.95	46.33	4.12E+19
*75	8.46	7.56	9.28	0.69	63943.5	49.41	10037.0	2536.95	71.83	3.89E+21
*76	8.07	7.19	8.87	0.85	63943.5	49.41	10037.0	2536.95	65.38	4.35E+21
*77	7.66	6.81	8.44	0.18	63943.5	49.41	10037.0	2536.95	58.96	8.17E+20
*78	8.46	7.56	9.28	5.20	58930.4	49.41	10037.0	2536.95	71.83	2.68E+22
*79	8.07	7.19	8.87	6.97	58930.4	49.41	10037.0	2536.95	65.38	3.27E+22
*80	7.66	6.81	8.44	1.01	58930.4	49.41	10037.0	2536.95	58.96	4.27E+21
*81	8.46	7.56	9.28	2.27	71847.0	49.41	10037.0	2536.95	71.83	1.43E+22
*82	8.07	7.19	8.87	29.29	80210.8	49.41	10037.0	2536.95	65.38	1.87E+23
*83	7.66	6.81	8.44	20.51	83101.0	49.41	10037.0	2536.95	58.96	1.22E+23
*84	7.87	7.01	8.66	1.40	58930.4	49.41	10037.0	2536.95	62.16	6.27E+21
*85	7.66	6.81	8.44	17.03	51794.3	49.41	10037.0	2536.95	58.96	6.34E+22
*86	7.87	7.01	8.66	5.91	31332.3	49.41	10037.0	2536.95	62.16	1.40E+22
*87	8.07	7.19	8.87	27.69	31332.3	49.41	10037.0	2536.95	65.38	6.91E+22
*88	8.07	7.19	8.87	5.10	21510.6	49.41	10037.0	2536.95	65.38	8.75E+21
*89	7.66	6.81	8.44	134.51	20052.7	49.41	10037.0	2536.95	58.96	1.94E+23
*90	7.24	6.42	7.99	255.55	17290.3	49.41	10037.0	2536.95	52.60	2.83E+23
*91	7.24	6.42	7.99	32.76	31332.3	49.41	10037.0	2536.95	52.60	6.58E+22

Table 26

*92	7.02	6.22	7.76	0.08	40923.9	49.41	10037.0	2536.95	49.45	2.09E+20
*93	7.02	6.22	7.76	0.39	31332.3	49.41	10037.0	2536.95	49.45	7.32E+20
*94	7.02	6.22	7.76	27.90	14732.6	49.41	10037.0	2536.95	49.45	2.48E+22
*95	7.02	6.22	7.76	0.76	8287.1	49.41	10037.0	2536.95	49.45	3.81E+20
*96	7.02	6.22	7.76	0.13	8287.1	49.41	10037.0	2536.95	49.45	6.53E+19
*15a	9.70	8.73	10.57	25.41	40923.9	49.41	10037.0	2536.95	94.41	1.20E+23
*16a	9.70	8.73	10.57	30.61	40923.9	49.41	10037.0	2536.95	94.41	1.44E+23
*17a	9.86	8.89	10.74	805.27	51794.3	49.41	10037.0	2536.95	97.60	4.96E+24
*22a	9.36	8.41	10.22	8.25	63943.5	49.41	10037.0	2536.95	87.98	5.65E+22
*22b	9.53	8.57	10.40	75.97	51794.3	49.41	10037.0	2536.95	91.20	4.37E+23
*23a	9.19	8.25	10.04	5.71	63943.5	49.41	10037.0	2536.95	84.76	3.77E+22
*27a	9.19	8.25	10.04	2.98	49517.9	49.41	10037.0	2536.95	84.76	1.53E+22
*31a	9.19	8.25	10.04	3.41	40923.9	49.41	10037.0	2536.95	84.76	1.44E+22
*32a	9.53	8.57	10.40	62.29	31332.3	49.41	10037.0	2536.95	91.20	2.17E+23
*33a	9.19	8.25	10.04	1.45	23019.7	49.41	10037.0	2536.95	84.76	3.45E+21
*36a	9.19	8.25	10.04	7.24	23019.7	49.41	10037.0	2536.95	84.76	1.72E+22
*37a	8.83	7.91	9.67	209.08	23019.7	49.41	10037.0	2536.95	78.30	4.59E+23
*38a	8.83	7.91	9.67	15.18	23019.7	49.41	10037.0	2536.95	78.30	3.33E+22

Table 26: List of subplays in the nonmarine interval of the Mesaverde Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is kmv5. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Nonmarine Kmv > 1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	1.88E+11	2.24E+21	4.74E+10	25.927	0.24846	1.21E+11	1.54E+11	1.82E+11	2.15E+11	2.74E+11
10	1.13E+12	7.99E+22	2.83E+11	27.72	0.2471	7.28E+11	9.25E+11	1.09E+12	1.29E+12	1.64E+12
11	9.49E+11	5.68E+22	2.38E+11	27.549	0.24724	6.13E+11	7.80E+11	9.21E+11	1.09E+12	1.38E+12
12	6.33E+11	2.53E+22	1.59E+11	27.143	0.24752	4.09E+11	5.19E+11	6.14E+11	7.25E+11	9.22E+11
13	2.25E+11	3.21E+21	5.66E+10	26.109	0.24781	1.45E+11	1.85E+11	2.18E+11	2.58E+11	3.28E+11
14	3.95E+10	9.89E+19	9.95E+09	24.369	0.24797	2.55E+10	3.24E+10	3.83E+10	4.53E+10	5.76E+10
17	1.28E+12	1.03E+23	3.21E+11	27.846	0.2471	8.25E+11	1.05E+12	1.24E+12	1.46E+12	1.86E+12
18	6.24E+11	2.46E+22	1.57E+11	27.129	0.24724	4.03E+11	5.13E+11	6.05E+11	7.15E+11	9.09E+11
19	4.91E+11	1.52E+22	1.23E+11	26.889	0.24752	3.17E+11	4.03E+11	4.76E+11	5.62E+11	7.15E+11
20	4.47E+11	1.26E+22	1.12E+11	26.795	0.24781	2.88E+11	3.67E+11	4.33E+11	5.12E+11	6.51E+11
21	7.58E+10	3.64E+20	1.91E+10	25.02	0.24797	4.89E+10	6.22E+10	7.35E+10	8.69E+10	1.11E+11
23	4.70E+11	1.39E+22	1.18E+11	26.844	0.24752	3.03E+11	3.85E+11	4.55E+11	5.38E+11	6.84E+11
24	7.83E+11	3.88E+22	1.97E+11	27.356	0.24781	5.05E+11	6.43E+11	7.59E+11	8.98E+11	1.14E+12
25	6.14E+11	2.39E+22	1.55E+11	27.112	0.24813	3.96E+11	5.04E+11	5.95E+11	7.04E+11	8.95E+11
26	1.38E+11	1.21E+21	3.47E+10	25.618	0.24829	8.88E+10	1.13E+11	1.34E+11	1.58E+11	2.01E+11
27	4.07E+11	1.05E+22	1.02E+11	26.703	0.24752	2.63E+11	3.34E+11	3.95E+11	4.67E+11	5.94E+11
28	4.67E+11	1.38E+22	1.17E+11	26.839	0.24781	3.01E+11	3.83E+11	4.53E+11	5.35E+11	6.81E+11
29	6.08E+11	2.35E+22	1.53E+11	27.103	0.24813	3.92E+11	4.99E+11	5.90E+11	6.97E+11	8.87E+11
30	2.85E+11	5.18E+21	7.20E+10	26.346	0.24846	1.84E+11	2.34E+11	2.77E+11	3.27E+11	4.16E+11
32	1.05E+11	6.98E+20	2.64E+10	25.348	0.24752	6.78E+10	8.63E+10	1.02E+11	1.20E+11	1.53E+11
33	1.00E+12	6.37E+22	2.52E+11	27.603	0.24781	6.47E+11	8.23E+11	9.73E+11	1.15E+12	1.46E+12
34	1.08E+12	7.45E+22	2.73E+11	27.68	0.24813	6.98E+11	8.89E+11	1.05E+12	1.24E+12	1.58E+12
35	2.68E+11	4.57E+21	6.76E+10	26.284	0.24829	1.73E+11	2.20E+11	2.60E+11	3.07E+11	3.91E+11
37	2.02E+11	2.59E+21	5.08E+10	26.001	0.24781	1.30E+11	1.66E+11	1.96E+11	2.32E+11	2.95E+11
38	8.28E+11	4.36E+22	2.09E+11	27.412	0.24813	5.34E+11	6.80E+11	8.03E+11	9.50E+11	1.21E+12
39	1.13E+12	8.14E+22	2.85E+11	27.723	0.24846	7.28E+11	9.27E+11	1.10E+12	1.30E+12	1.65E+12
40	5.04E+11	1.62E+22	1.27E+11	26.915	0.24882	3.25E+11	4.13E+11	4.89E+11	5.78E+11	7.36E+11
41	1.16E+11	8.68E+20	2.95E+10	25.449	0.2492	7.49E+10	9.54E+10	1.13E+11	1.33E+11	1.70E+11
42	6.22E+09	2.49E+18	1.58E+09	22.52	0.2496	4.00E+09	5.10E+09	6.03E+09	7.14E+09	9.09E+09
*75	6.05E+10	2.32E+20	1.52E+10	24.795	0.24813	3.90E+10	4.96E+10	5.86E+10	6.93E+10	8.82E+10
*76	6.39E+10	2.60E+20	1.61E+10	24.85	0.24846	4.12E+10	5.24E+10	6.20E+10	7.33E+10	9.33E+10
*77	2.77E+10	4.91E+19	7.00E+09	24.014	0.24882	1.78E+10	2.27E+10	2.69E+10	3.18E+10	4.05E+10
*78	1.59E+11	1.60E+21	4.00E+10	25.76	0.24813	1.02E+11	1.30E+11	1.54E+11	1.82E+11	2.32E+11
*79	1.75E+11	1.96E+21	4.43E+10	25.86	0.24846	1.13E+11	1.44E+11	1.70E+11	2.01E+11	2.56E+11
*80	6.33E+10	2.56E+20	1.60E+10	24.841	0.24882	4.08E+10	5.19E+10	6.14E+10	7.26E+10	9.25E+10
*81	1.16E+11	8.52E+20	2.92E+10	25.445	0.24813	7.47E+10	9.50E+10	1.12E+11	1.33E+11	1.69E+11
*82	4.20E+11	1.12E+22	1.06E+11	26.732	0.24846	2.70E+11	3.44E+11	4.07E+11	4.81E+11	6.12E+11
*83	3.39E+11	7.35E+21	8.57E+10	26.519	0.24882	2.18E+11	2.78E+11	3.29E+11	3.89E+11	4.95E+11
*84	7.68E+10	3.76E+20	1.94E+10	25.033	0.24864	4.94E+10	6.29E+10	7.44E+10	8.80E+10	1.12E+11
*85	2.44E+11	3.81E+21	6.17E+10	26.19	0.24882	1.57E+11	2.00E+11	2.37E+11	2.80E+11	3.56E+11
*86	1.15E+11	8.40E+20	2.90E+10	25.435	0.24864	7.39E+10	9.41E+10	1.11E+11	1.32E+11	1.68E+11
*87	2.55E+11	4.14E+21	6.43E+10	26.233	0.24846	1.64E+11	2.09E+11	2.47E+11	2.92E+11	3.72E+11
*88	9.07E+10	5.24E+20	2.29E+10	25.2	0.24846	5.84E+10	7.44E+10	8.79E+10	1.04E+11	1.32E+11
*89	4.27E+11	1.16E+22	1.08E+11	26.749	0.24882	2.75E+11	3.50E+11	4.14E+11	4.89E+11	6.23E+11
*90	5.16E+11	1.71E+22	1.31E+11	26.938	0.2492	3.32E+11	4.23E+11	5.00E+11	5.92E+11	7.54E+11
*91	2.49E+11	3.96E+21	6.29E+10	26.208	0.2492	1.60E+11	2.04E+11	2.41E+11	2.85E+11	3.63E+11

Table 27

*92	1.40E+10	1.26E+19	3.55E+09	23.333	0.2494	9.02E+09	1.15E+10	1.36E+10	1.61E+10	2.05E+10
*93	2.62E+10	4.41E+19	6.64E+09	23.959	0.2494	1.69E+10	2.15E+10	2.54E+10	3.01E+10	3.83E+10
*94	1.53E+11	1.49E+21	3.86E+10	25.72	0.2494	9.81E+10	1.25E+11	1.48E+11	1.75E+11	2.23E+11
*95	1.89E+10	2.30E+19	4.79E+09	23.633	0.2494	1.22E+10	1.55E+10	1.83E+10	2.17E+10	2.77E+10
*96	7.83E+09	3.94E+18	1.98E+09	22.75	0.2494	5.04E+09	6.42E+09	7.59E+09	8.98E+09	1.14E+10
*15a	3.35E+11	7.09E+21	8.42E+10	26.508	0.2471	2.17E+11	2.75E+11	3.25E+11	3.84E+11	4.89E+11
*16a	3.68E+11	8.54E+21	9.24E+10	26.601	0.2471	2.38E+11	3.02E+11	3.57E+11	4.22E+11	5.36E+11
*17a	2.16E+12	2.94E+23	5.42E+11	28.371	0.24698	1.40E+12	1.77E+12	2.10E+12	2.48E+12	3.15E+12
*22a	2.31E+11	3.36E+21	5.79E+10	26.133	0.24738	1.49E+11	1.89E+11	2.24E+11	2.64E+11	3.36E+11
*22b	6.41E+11	2.59E+22	1.61E+11	27.156	0.24724	4.14E+11	5.27E+11	6.22E+11	7.35E+11	9.34E+11
*23a	1.88E+11	2.24E+21	4.73E+10	25.931	0.24752	1.22E+11	1.55E+11	1.83E+11	2.16E+11	2.74E+11
*27a	1.20E+11	9.07E+20	3.01E+10	25.478	0.24752	7.73E+10	9.83E+10	1.16E+11	1.37E+11	1.75E+11
*31a	1.17E+11	8.58E+20	2.93E+10	25.451	0.24752	7.52E+10	9.56E+10	1.13E+11	1.33E+11	1.70E+11
*32a	4.52E+11	1.29E+22	1.13E+11	26.806	0.24724	2.92E+11	3.71E+11	4.38E+11	5.18E+11	6.58E+11
*33a	5.70E+10	2.05E+20	1.43E+10	24.735	0.24752	3.68E+10	4.68E+10	5.53E+10	6.53E+10	8.30E+10
*36a	1.27E+11	1.02E+21	3.20E+10	25.539	0.24752	8.21E+10	1.04E+11	1.23E+11	1.46E+11	1.85E+11
*37a	6.57E+11	2.74E+22	1.65E+11	27.181	0.24781	4.24E+11	5.39E+11	6.37E+11	7.53E+11	9.58E+11
*38a	1.77E+11	1.99E+21	4.46E+10	25.869	0.24781	1.14E+11	1.45E+11	1.72E+11	2.03E+11	2.58E+11
P.P.C.	2.43E+13	3.75E+25	6.13E+12			1.57E+13	2.00E+13	2.36E+13	2.79E+13	3.55E+13

Table 27: List of subplays in the nonmarine interval of the Mesaverde Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is kmv5. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Nonmarine Kmv 1.1-.73									(Panel 1)
* Wedge shaped area half thick						a =	0.41	0.016	0	
						b =	14.7	505	0.9328	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	0.52	520	7	50	50	12,500	5139.7	705	0.9328	3.64E+10
2	0.98	520	7	50	50	12,000	4934.7	697	0.9328	6.66E+10
3	1.13	520	7	50	50	11,000	4524.7	681	0.9328	7.21E+10
4	2	520	7	50	50	10,000	4114.7	665	0.9328	1.19E+11
5	0.83	520	7	50	50	9,000	3704.7	649	0.9328	4.55E+10
6	0.27	520	7	50	50	8,500	3499.7	641	0.9328	1.42E+10
7	1.62	480	7	50	50	12,500	5139.7	705	0.9328	1.05E+11
8	3.41	480	7	50	50	12,000	4934.7	697	0.9328	2.14E+11
9	2.21	490	7	50	50	11,000	4524.7	681	0.9328	1.33E+11
10	0.57	490	7	50	50	10,500	4319.7	673	0.9328	3.31E+10
11	2.96	550	7	50	50	12,500	5139.7	705	0.9328	2.19E+11
12	10.29	550	7	50	50	12,000	4934.7	697	0.9328	7.40E+11
13	3.93	550	7	50	50	11,000	4524.7	681	0.9328	2.65E+11
14	0.11	510	7	50	50	10,000	4114.7	665	0.9328	6.41E+09
15	2.84	620	7	50	50	12,000	4934.7	697	0.9328	2.30E+11
16	2.62	620	7	50	50	11,000	4524.7	681	0.9328	1.99E+11
17	0.43	560	7	50	50	11,500	4729.7	689	0.9328	3.05E+10
18	20.59	440	7	50	50	12,000	4934.7	697	0.9328	1.18E+12
18a	0.11	480	7	50	50	12,500	5139.7	705	0.9328	7.11E+09
19	6.09	350	7	50	50	13,000	5344.7	713	0.9328	2.95E+11
19a	1.12	410	7	50	50	12,500	5139.7	705	0.9328	6.18E+10
20	13.29	350	7	50	50	12,000	4934.7	697	0.9328	6.08E+11
21	1.59	400	7	50	50	11,500	4729.7	689	0.9328	8.06E+10
22	21.21	430	7	50	50	11,000	4524.7	681	0.9328	1.12E+12
23	16.17	430	7	50	50	10,000	4114.7	665	0.9328	7.94E+11
23a	22.5	470	7	50	50	10,000	4114.7	665	0.9328	1.21E+12
24	7.87	430	7	50	50	9,000	3704.7	649	0.9328	3.57E+11
25	1.66	350	7	50	50	11,000	4524.7	681	0.9328	7.13E+10
26	3.83	350	7	50	50	10,000	4114.7	665	0.9328	1.53E+11
27	1.58	350	7	50	50	9,000	3704.7	649	0.9328	5.83E+10
28	2	350	7	50	50	8,000	3294.7	633	0.9328	6.73E+10
28a	1.2	410	7	50	50	8,500	3499.7	641	0.9328	4.96E+10
29	5.29	250	7	50	50	11,000	4524.7	681	0.9328	1.62E+11
30	6.99	250	7	50	50	10,000	4114.7	665	0.9328	2.00E+11
31	4.19	250	7	50	50	9,000	3704.7	649	0.9328	1.10E+11
32	1.61	250	7	50	50	8,000	3294.7	633	0.9328	3.87E+10
33	3.55	180	7	50	50	10,000	4114.7	665	0.9328	7.30E+10
34	4.95	180	7	50	50	9,000	3704.7	649	0.9328	9.39E+10
35	3.87	190	7	50	50	8,000	3294.7	633	0.9328	7.07E+10
35a	0.47	200	7	50	50	7,500	3089.7	625	0.9328	8.58E+09
36	1.46	220	7	50	50	8,000	3294.7	633	0.9328	3.09E+10
37	3.93	220	7	50	50	7,000	2884.7	617	0.9328	7.46E+10
*38	0.4	275	7	50	50	5,500	2269.7	593	0.9328	7.77E+09
*39	1.7	270	7	50	50	6,000	2474.7	601	0.9328	3.49E+10
*40	3.79	270	7	50	50	7,000	2884.7	617	0.9328	8.83E+10
*41	4.36	275	7	50	50	8,000	3294.7	633	0.9328	1.15E+11

Table 28

*42	6.08	275	7	50	50	9,000	3704.7	649	0.9328	1.76E+11
*43	4.8	280	7	50	50	10,000	4114.7	665	0.9328	1.54E+11
*44	0.56	310	7	50	50	10,500	4319.7	673	0.9328	2.06E+10
*44a	0.77	290	7	50	50	10,500	4319.7	673	0.9328	2.65E+10
*45	1.75	310	7	50	50	10,000	4114.7	665	0.9328	6.20E+10
*46	3.97	310	7	50	50	9,000	3704.7	649	0.9328	1.30E+11
*47	1.04	300	7	50	50	8,500	3499.7	641	0.9328	3.15E+10
*48	1.09	275	7	50	50	11,000	4524.7	681	0.9328	3.68E+10
*49	3.63	275	7	50	50	10,000	4114.7	665	0.9328	1.14E+11
*50	4.44	275	7	50	50	9,000	3704.7	649	0.9328	1.29E+11
*51	13.63	225	7	50	50	11,000	4524.7	681	0.9328	3.76E+11
*52	14.99	225	7	50	50	9,000	3704.7	649	0.9328	3.55E+11
*53	16.33	225	7	50	50	8,000	3294.7	633	0.9328	3.53E+11
*54	16.3	225	7	50	50	7,000	2884.7	617	0.9328	3.17E+11
*55	21	220	7	50	50	6,000	2474.7	601	0.9328	3.51E+11
*56	7.03	210	7	50	50	5,000	2064.7	585	0.9328	9.62E+10
*57	0.66	190	7	50	50	7,500	3089.7	625	0.9328	1.14E+10
*58	6.39	175	7	50	50	7,000	2884.7	617	0.9328	9.65E+10
*59	20.45	175	7	50	50	6,000	2474.7	601	0.9328	2.72E+11
*60	2	180	7	50	50	5,500	2269.7	593	0.9328	2.54E+10
*61	3.76	130	7	50	50	6,500	2679.7	609	0.9328	3.97E+10
*62	3.83	130	7	50	50	6,000	2474.7	601	0.9328	3.79E+10
*75	0.83	250	7	50	50	15,000	6164.7	745	0.9328	3.17E+10
*76	0.92	250	7	50	50	14,000	5754.7	729	0.9328	3.35E+10
*77	0.42	250	7	50	50	13,000	5344.7	713	0.9328	1.45E+10
*78	2.27	240	7	50	50	15,000	6164.7	745	0.9328	8.32E+10
*79	2.63	240	7	50	50	14,000	5754.7	729	0.9328	9.20E+10
*80	1	240	7	50	50	13,000	5344.7	713	0.9328	3.32E+10
*81	1.5	265	7	50	50	15,000	6164.7	745	0.9328	6.07E+10
*82	5.39	280	7	50	50	14,000	5754.7	729	0.9328	2.20E+11
*83	4.51	285	7	50	50	13,000	5344.7	713	0.9328	1.78E+11
*84	1.18	240	7	50	50	13,500	5549.7	721	0.9328	4.02E+10
*85	4.11	225	7	50	50	13,000	5344.7	713	0.9328	1.28E+11
*86	2.42	175	7	50	50	13,500	5549.7	721	0.9328	6.02E+10
*87	5.24	175	7	50	50	14,000	5754.7	729	0.9328	1.34E+11
*88	2.25	145	7	50	50	14,000	5754.7	729	0.9328	4.76E+10
*89	11.55	140	7	50	50	13,000	5344.7	713	0.9328	2.24E+11
*90	15.92	130	7	50	50	12,000	4934.7	697	0.9328	2.71E+11
*91	5.7	175	7	50	50	12,000	4934.7	697	0.9328	1.30E+11
*92	0.29	200	7	50	50	11,500	4729.7	689	0.9328	7.35E+09
*93	0.62	175	7	50	50	11,500	4729.7	689	0.9328	1.38E+10
*94	5.26	120	7	50	50	11,500	4729.7	689	0.9328	8.00E+10
*95	0.87	90	7	50	50	11,500	4729.7	689	0.9328	9.92E+09
*96	0.36	90	7	50	50	11,500	4729.7	689	0.9328	4.11E+09
98	0.43	230	7	50	50	7,000	2884.7	617	0.9328	8.54E+09
99	1.5	250	7	50	50	6,000	2474.7	601	0.9328	2.85E+10
									Total =	1.49E+13

Table 28 (cont.)

Table 28: List of subplays in the nonmarine interval of the Mesaverde Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation. The play code for the spreadsheet is kmv6. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Nonmarine Kmv 1.1-.73								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	60	100	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	7.82	6.94	8.62	0.27	276645.3	50.63	2731.0	2647.82	61.34	1.64E+21
2	7.59	6.73	8.38	0.97	276645.3	50.63	2731.0	2647.82	57.86	5.50E+21
3	7.12	6.30	7.88	1.29	276645.3	50.63	2731.0	2647.82	50.97	6.44E+21
4	6.63	5.85	7.36	4.03	276645.3	50.63	2731.0	2647.82	44.21	1.75E+22
5	6.12	5.38	6.81	0.69	276645.3	50.63	2731.0	2647.82	37.64	2.56E+21
6	5.85	5.14	6.52	0.07	276645.3	50.63	2731.0	2647.82	34.43	2.48E+20
7	7.82	6.94	8.62	2.65	235721.5	50.63	2731.0	2647.82	61.34	1.36E+22
8	7.59	6.73	8.38	11.72	235721.5	50.63	2731.0	2647.82	57.86	5.67E+22
9	7.12	6.30	7.88	4.92	245645.5	50.63	2731.0	2647.82	50.97	2.19E+22
10	6.88	6.08	7.62	0.33	245645.5	50.63	2731.0	2647.82	47.57	1.36E+21
11	7.82	6.94	8.62	8.83	309486.7	50.63	2731.0	2647.82	61.34	5.95E+22
12	7.59	6.73	8.38	106.76	309486.7	50.63	2731.0	2647.82	57.86	6.78E+23
13	7.12	6.30	7.88	15.57	309486.7	50.63	2731.0	2647.82	50.97	8.71E+22
14	6.63	5.85	7.36	0.01	266107.4	50.63	2731.0	2647.82	44.21	5.09E+19
15	7.59	6.73	8.38	8.13	393278.3	50.63	2731.0	2647.82	57.86	6.56E+22
16	7.12	6.30	7.88	6.92	393278.3	50.63	2731.0	2647.82	50.97	4.92E+22
17	7.36	6.52	8.13	0.19	320843.1	50.63	2731.0	2647.82	54.40	1.15E+21
18	7.59	6.73	8.38	427.47	198071.5	50.63	2731.0	2647.82	57.86	1.74E+24
18a	7.82	6.94	8.62	0.01	235721.5	50.63	2731.0	2647.82	61.34	6.26E+19
19	8.04	7.15	8.85	37.40	125329.3	50.63	2731.0	2647.82	64.85	1.08E+23
19a	7.82	6.94	8.62	1.26	171982.5	50.63	2731.0	2647.82	61.34	4.73E+21
20	7.59	6.73	8.38	178.09	125329.3	50.63	2731.0	2647.82	57.86	4.58E+23
21	7.36	6.52	8.13	2.55	163695.5	50.63	2731.0	2647.82	54.40	8.05E+21
22	7.12	6.30	7.88	453.60	189170.6	50.63	2731.0	2647.82	50.97	1.55E+24
23	6.63	5.85	7.36	263.64	189170.6	50.63	2731.0	2647.82	44.21	7.82E+23
23a	6.63	5.85	7.36	510.46	226002.0	50.63	2731.0	2647.82	44.21	1.81E+24
24	6.12	5.38	6.81	62.45	189170.6	50.63	2731.0	2647.82	37.64	1.58E+23
25	7.12	6.30	7.88	2.78	125329.3	50.63	2731.0	2647.82	50.97	6.29E+21
26	6.63	5.85	7.36	14.79	125329.3	50.63	2731.0	2647.82	44.21	2.91E+22
27	6.12	5.38	6.81	2.52	125329.3	50.63	2731.0	2647.82	37.64	4.21E+21
28	5.58	4.90	6.22	4.03	125329.3	50.63	2731.0	2647.82	31.30	5.61E+21
28a	5.85	5.14	6.52	1.45	171982.5	50.63	2731.0	2647.82	34.43	3.05E+21
29	7.12	6.30	7.88	28.22	63943.5	50.63	2731.0	2647.82	50.97	3.26E+22
30	6.63	5.85	7.36	49.27	63943.5	50.63	2731.0	2647.82	44.21	4.94E+22
31	6.12	5.38	6.81	17.70	63943.5	50.63	2731.0	2647.82	37.64	1.51E+22
32	5.58	4.90	6.22	2.61	63943.5	50.63	2731.0	2647.82	31.30	1.85E+21
33	6.63	5.85	7.36	12.71	33148.3	50.63	2731.0	2647.82	44.21	6.60E+21
34	6.12	5.38	6.81	24.71	33148.3	50.63	2731.0	2647.82	37.64	1.09E+22
35	5.58	4.90	6.22	15.10	36933.8	50.63	2731.0	2647.82	31.30	6.19E+21
35a	5.30	4.64	5.92	0.22	40923.9	50.63	2731.0	2647.82	28.24	9.13E+19
36	5.58	4.90	6.22	2.15	49517.9	50.63	2731.0	2647.82	31.30	1.18E+21
37	5.01	4.38	5.61	15.57	49517.9	50.63	2731.0	2647.82	25.26	6.91E+21
*38	4.10	3.57	4.61	0.16	77371.7	50.63	2731.0	2647.82	16.94	7.50E+19
*39	4.41	3.85	4.95	2.91	74583.7	50.63	2731.0	2647.82	19.60	1.51E+21
*40	5.01	4.38	5.61	14.48	74583.7	50.63	2731.0	2647.82	25.26	9.68E+21
*41	5.58	4.90	6.22	19.17	77371.7	50.63	2731.0	2647.82	31.30	1.65E+22

Table 29

*42	6.12	5.38	6.81	37.27	77371.7	50.63	2731.0	2647.82	37.64	3.85E+22
*43	6.63	5.85	7.36	23.23	80210.8	50.63	2731.0	2647.82	44.21	2.92E+22
*44	6.88	6.08	7.62	0.32	98319.6	50.63	2731.0	2647.82	47.57	5.24E+20
*44a	6.88	6.08	7.62	0.60	86042.4	50.63	2731.0	2647.82	47.57	8.68E+20
*45	6.63	5.85	7.36	3.09	98319.6	50.63	2731.0	2647.82	44.21	4.76E+21
*46	6.12	5.38	6.81	15.89	98319.6	50.63	2731.0	2647.82	37.64	2.09E+22
*47	5.85	5.14	6.52	1.09	92078.7	50.63	2731.0	2647.82	34.43	1.23E+21
*48	7.12	6.30	7.88	1.20	77371.7	50.63	2731.0	2647.82	50.97	1.68E+21
*49	6.63	5.85	7.36	13.29	77371.7	50.63	2731.0	2647.82	44.21	1.61E+22
*50	6.12	5.38	6.81	19.88	77371.7	50.63	2731.0	2647.82	37.64	2.05E+22
*51	7.12	6.30	7.88	187.32	51794.3	50.63	2731.0	2647.82	50.97	1.75E+23
*52	6.12	5.38	6.81	226.57	51794.3	50.63	2731.0	2647.82	37.64	1.57E+23
*53	5.58	4.90	6.22	268.89	51794.3	50.63	2731.0	2647.82	31.30	1.55E+23
*54	5.01	4.38	5.61	267.90	51794.3	50.63	2731.0	2647.82	25.26	1.24E+23
*55	4.41	3.85	4.95	444.67	49517.9	50.63	2731.0	2647.82	19.60	1.53E+23
*56	3.78	3.29	4.26	49.83	45118.6	50.63	2731.0	2647.82	14.40	1.15E+22
*57	5.30	4.64	5.92	0.44	36933.8	50.63	2731.0	2647.82	28.24	1.62E+20
*58	5.01	4.38	5.61	41.17	31332.3	50.63	2731.0	2647.82	25.26	1.16E+22
*59	4.41	3.85	4.95	421.68	31332.3	50.63	2731.0	2647.82	19.60	9.18E+22
*60	4.10	3.57	4.61	4.03	33148.3	50.63	2731.0	2647.82	16.94	8.03E+20
*61	4.72	4.12	5.29	14.26	17290.3	50.63	2731.0	2647.82	22.38	1.96E+21
*62	4.41	3.85	4.95	14.79	17290.3	50.63	2731.0	2647.82	19.60	1.78E+21
*75	8.87	7.93	9.73	0.69	63943.5	50.63	2731.0	2647.82	78.99	1.24E+21
*76	8.46	7.54	9.30	0.85	63943.5	50.63	2731.0	2647.82	71.90	1.39E+21
*77	8.04	7.15	8.85	0.18	63943.5	50.63	2731.0	2647.82	64.85	2.62E+20
*78	8.87	7.93	9.73	5.20	58930.4	50.63	2731.0	2647.82	78.99	8.58E+21
*79	8.46	7.54	9.30	6.97	58930.4	50.63	2731.0	2647.82	71.90	1.05E+22
*80	8.04	7.15	8.85	1.01	58930.4	50.63	2731.0	2647.82	64.85	1.37E+21
*81	8.87	7.93	9.73	2.27	71847.0	50.63	2731.0	2647.82	78.99	4.57E+21
*82	8.46	7.54	9.30	29.29	80210.8	50.63	2731.0	2647.82	71.90	5.99E+22
*83	8.04	7.15	8.85	20.51	83101.0	50.63	2731.0	2647.82	64.85	3.92E+22
*84	8.25	7.35	9.08	1.40	58930.4	50.63	2731.0	2647.82	68.37	2.01E+21
*85	8.04	7.15	8.85	17.03	51794.3	50.63	2731.0	2647.82	64.85	2.03E+22
*86	8.25	7.35	9.08	5.91	31332.3	50.63	2731.0	2647.82	68.37	4.49E+21
*87	8.46	7.54	9.30	27.69	31332.3	50.63	2731.0	2647.82	71.90	2.21E+22
*88	8.46	7.54	9.30	5.10	21510.6	50.63	2731.0	2647.82	71.90	2.80E+21
*89	8.04	7.15	8.85	134.51	20052.7	50.63	2731.0	2647.82	64.85	6.20E+22
*90	7.59	6.73	8.38	255.55	17290.3	50.63	2731.0	2647.82	57.86	9.07E+22
*91	7.59	6.73	8.38	32.76	31332.3	50.63	2731.0	2647.82	57.86	2.11E+22
*92	7.36	6.52	8.13	0.08	40923.9	50.63	2731.0	2647.82	54.40	6.69E+19
*93	7.36	6.52	8.13	0.39	31332.3	50.63	2731.0	2647.82	54.40	2.34E+20
*94	7.36	6.52	8.13	27.90	14732.6	50.63	2731.0	2647.82	54.40	7.93E+21
*95	7.36	6.52	8.13	0.76	8287.1	50.63	2731.0	2647.82	54.40	1.22E+20
*96	7.36	6.52	8.13	0.13	8287.1	50.63	2731.0	2647.82	54.40	2.09E+19
98	5.01	4.38	5.61	0.19	54121.8	50.63	2731.0	2647.82	25.26	9.04E+19
99	4.41	3.85	4.95	2.27	63943.5	50.63	2731.0	2647.82	19.60	1.01E+21

Table 29 (cont.)

Table 29: List of subplays in the nonmarine interval of the Mesaverde Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is kmv6. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Nonmarine Kmv 1.1-.73								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	3.64E+10	3.16E+20	1.78E+10	24.211	0.46247	1.53E+10	2.39E+10	3.27E+10	4.47E+10	7.00E+10
2	6.66E+10	1.06E+21	3.25E+10	24.815	0.46258	2.80E+10	4.38E+10	5.99E+10	8.18E+10	1.28E+11
3	7.21E+10	1.24E+21	3.52E+10	24.894	0.46279	3.02E+10	4.74E+10	6.48E+10	8.85E+10	1.39E+11
4	1.19E+11	3.38E+21	5.81E+10	25.394	0.46303	4.98E+10	7.81E+10	1.07E+11	1.46E+11	2.29E+11
5	4.55E+10	4.95E+20	2.23E+10	24.433	0.46328	1.91E+10	2.99E+10	4.09E+10	5.58E+10	8.76E+10
6	1.42E+10	4.80E+19	6.93E+09	23.266	0.46341	5.93E+09	9.30E+09	1.27E+10	1.74E+10	2.72E+10
7	1.05E+11	2.61E+21	5.11E+10	25.267	0.46247	4.40E+10	6.89E+10	9.41E+10	1.28E+11	2.01E+11
8	2.14E+11	1.09E+22	1.05E+11	25.982	0.46258	8.98E+10	1.41E+11	1.92E+11	2.63E+11	4.11E+11
9	1.33E+11	4.22E+21	6.49E+10	25.505	0.46279	5.57E+10	8.74E+10	1.19E+11	1.63E+11	2.56E+11
10	3.31E+10	2.62E+20	1.62E+10	24.116	0.46291	1.39E+10	2.18E+10	2.97E+10	4.06E+10	6.37E+10
11	2.19E+11	1.15E+22	1.07E+11	26.006	0.46247	9.20E+10	1.44E+11	1.97E+11	2.69E+11	4.21E+11
12	7.40E+11	1.31E+23	3.61E+11	27.223	0.46258	3.11E+11	4.87E+11	6.65E+11	9.08E+11	1.42E+12
13	2.65E+11	1.68E+22	1.30E+11	26.197	0.46279	1.11E+11	1.74E+11	2.38E+11	3.25E+11	5.10E+11
14	6.41E+09	9.82E+18	3.13E+09	22.474	0.46303	2.69E+09	4.21E+09	5.76E+09	7.87E+09	1.23E+10
15	2.30E+11	1.26E+22	1.12E+11	26.055	0.46258	9.66E+10	1.51E+11	2.07E+11	2.82E+11	4.43E+11
16	1.99E+11	9.49E+21	9.74E+10	25.911	0.46279	8.36E+10	1.31E+11	1.79E+11	2.45E+11	3.83E+11
17	3.05E+10	2.22E+20	1.49E+10	24.035	0.46268	1.28E+10	2.01E+10	2.74E+10	3.75E+10	5.87E+10
18	1.18E+12	3.35E+23	5.78E+11	27.693	0.46258	4.97E+11	7.79E+11	1.06E+12	1.45E+12	2.28E+12
18a	7.11E+09	1.20E+19	3.47E+09	22.577	0.46247	2.98E+09	4.68E+09	6.39E+09	8.72E+09	1.37E+10
19	2.95E+11	2.07E+22	1.44E+11	26.303	0.46237	1.24E+11	1.94E+11	2.65E+11	3.62E+11	5.67E+11
19a	6.18E+10	9.11E+20	3.02E+10	24.74	0.46247	2.60E+10	4.07E+10	5.55E+10	7.59E+10	1.19E+11
20	6.08E+11	8.82E+22	2.97E+11	27.027	0.46258	2.55E+11	4.00E+11	5.46E+11	7.46E+11	1.17E+12
21	8.06E+10	1.55E+21	3.94E+10	25.006	0.46268	3.38E+10	5.30E+10	7.24E+10	9.89E+10	1.55E+11
22	1.12E+12	2.99E+23	5.47E+11	27.636	0.46279	4.70E+11	7.36E+11	1.01E+12	1.37E+12	2.15E+12
23	7.94E+11	1.51E+23	3.88E+11	27.294	0.46303	3.33E+11	5.22E+11	7.14E+11	9.75E+11	1.53E+12
23a	1.21E+12	3.49E+23	5.91E+11	27.713	0.46303	5.07E+11	7.94E+11	1.09E+12	1.48E+12	2.32E+12
24	3.57E+11	3.05E+22	1.75E+11	26.493	0.46328	1.50E+11	2.34E+11	3.20E+11	4.38E+11	6.87E+11
25	7.13E+10	1.21E+21	3.48E+10	24.883	0.46279	2.99E+10	4.69E+10	6.40E+10	8.75E+10	1.37E+11
26	1.53E+11	5.61E+21	7.49E+10	25.647	0.46303	6.42E+10	1.01E+11	1.38E+11	1.88E+11	2.95E+11
27	5.83E+10	8.13E+20	2.85E+10	24.681	0.46328	2.44E+10	3.83E+10	5.24E+10	7.15E+10	1.12E+11
28	6.73E+10	1.08E+21	3.29E+10	24.825	0.46354	2.82E+10	4.42E+10	6.04E+10	8.26E+10	1.30E+11
28a	4.96E+10	5.89E+20	2.43E+10	24.52	0.46341	2.08E+10	3.26E+10	4.45E+10	6.09E+10	9.55E+10
29	1.62E+11	6.29E+21	7.93E+10	25.705	0.46279	6.81E+10	1.07E+11	1.46E+11	1.99E+11	3.12E+11
30	2.00E+11	9.53E+21	9.76E+10	25.913	0.46303	8.37E+10	1.31E+11	1.79E+11	2.45E+11	3.84E+11
31	1.10E+11	2.92E+21	5.40E+10	25.32	0.46328	4.63E+10	7.26E+10	9.92E+10	1.36E+11	2.12E+11
32	3.87E+10	3.59E+20	1.89E+10	24.271	0.46354	1.62E+10	2.54E+10	3.47E+10	4.75E+10	7.45E+10
33	7.30E+10	1.27E+21	3.57E+10	24.907	0.46303	3.06E+10	4.80E+10	6.56E+10	8.96E+10	1.40E+11
34	9.39E+10	2.11E+21	4.59E+10	25.158	0.46328	3.94E+10	6.17E+10	8.44E+10	1.15E+11	1.81E+11
35	7.07E+10	1.20E+21	3.46E+10	24.874	0.46354	2.96E+10	4.64E+10	6.35E+10	8.67E+10	1.36E+11
35a	8.58E+09	1.77E+19	4.20E+09	22.765	0.46368	3.59E+09	5.64E+09	7.71E+09	1.05E+10	1.65E+10
36	3.09E+10	2.28E+20	1.51E+10	24.046	0.46354	1.29E+10	2.03E+10	2.77E+10	3.79E+10	5.94E+10
37	7.46E+10	1.34E+21	3.66E+10	24.928	0.46383	3.13E+10	4.90E+10	6.70E+10	9.16E+10	1.44E+11
*38	7.77E+09	1.45E+19	3.81E+09	22.666	0.46429	3.25E+09	5.10E+09	6.98E+09	9.54E+09	1.50E+10
*39	3.49E+10	2.93E+20	1.71E+10	24.168	0.46413	1.46E+10	2.29E+10	3.13E+10	4.28E+10	6.72E+10
*40	8.83E+10	1.87E+21	4.33E+10	25.097	0.46383	3.70E+10	5.80E+10	7.93E+10	1.08E+11	1.70E+11
*41	1.15E+11	3.18E+21	5.64E+10	25.363	0.46354	4.83E+10	7.57E+10	1.03E+11	1.41E+11	2.22E+11

Table 30

*42	1.76E+11	7.43E+21	8.62E+10	25.788	0.46328	7.39E+10	1.16E+11	1.58E+11	2.16E+11	3.39E+11
*43	1.54E+11	5.64E+21	7.51E+10	25.65	0.46303	6.44E+10	1.01E+11	1.38E+11	1.88E+11	2.95E+11
*44	2.06E+10	1.01E+20	1.01E+10	23.64	0.46291	8.63E+09	1.35E+10	1.85E+10	2.53E+10	3.96E+10
*44a	2.65E+10	1.67E+20	1.29E+10	23.892	0.46291	1.11E+10	1.74E+10	2.38E+10	3.25E+10	5.09E+10
*45	6.20E+10	9.19E+20	3.03E+10	24.743	0.46303	2.60E+10	4.08E+10	5.57E+10	7.61E+10	1.19E+11
*46	1.30E+11	4.03E+21	6.35E+10	25.481	0.46328	5.44E+10	8.53E+10	1.17E+11	1.59E+11	2.50E+11
*47	3.15E+10	2.37E+20	1.54E+10	24.064	0.46341	1.32E+10	2.07E+10	2.83E+10	3.86E+10	6.05E+10
*48	3.68E+10	3.23E+20	1.80E+10	24.221	0.46279	1.54E+10	2.42E+10	3.30E+10	4.51E+10	7.07E+10
*49	1.14E+11	3.11E+21	5.58E+10	25.353	0.46303	4.78E+10	7.50E+10	1.02E+11	1.40E+11	2.19E+11
*50	1.29E+11	3.96E+21	6.30E+10	25.473	0.46328	5.39E+10	8.46E+10	1.16E+11	1.58E+11	2.48E+11
*51	3.76E+11	3.38E+22	1.84E+11	26.546	0.46279	1.58E+11	2.47E+11	3.38E+11	4.62E+11	7.24E+11
*52	3.55E+11	3.03E+22	1.74E+11	26.489	0.46328	1.49E+11	2.34E+11	3.19E+11	4.36E+11	6.84E+11
*53	3.53E+11	2.99E+22	1.73E+11	26.483	0.46354	1.48E+11	2.32E+11	3.17E+11	4.33E+11	6.80E+11
*54	3.17E+11	2.41E+22	1.55E+11	26.373	0.46383	1.33E+11	2.08E+11	2.84E+11	3.89E+11	6.10E+11
*55	3.51E+11	2.97E+22	1.72E+11	26.477	0.46413	1.47E+11	2.31E+11	3.15E+11	4.31E+11	6.77E+11
*56	9.62E+10	2.23E+21	4.72E+10	25.182	0.46446	4.02E+10	6.32E+10	8.64E+10	1.18E+11	1.85E+11
*57	1.14E+10	3.14E+19	5.61E+09	23.053	0.46368	4.79E+09	7.52E+09	1.03E+10	1.41E+10	2.20E+10
*58	9.65E+10	2.24E+21	4.73E+10	25.186	0.46383	4.04E+10	6.34E+10	8.67E+10	1.19E+11	1.86E+11
*59	2.72E+11	1.78E+22	1.33E+11	26.222	0.46413	1.14E+11	1.79E+11	2.44E+11	3.34E+11	5.24E+11
*60	2.54E+10	1.56E+20	1.25E+10	23.852	0.46429	1.06E+10	1.67E+10	2.28E+10	3.12E+10	4.90E+10
*61	3.97E+10	3.79E+20	1.95E+10	24.297	0.46398	1.66E+10	2.61E+10	3.57E+10	4.88E+10	7.65E+10
*62	3.79E+10	3.44E+20	1.86E+10	24.249	0.46413	1.58E+10	2.49E+10	3.40E+10	4.65E+10	7.29E+10
*75	3.17E+10	2.39E+20	1.55E+10	24.073	0.462	1.33E+10	2.09E+10	2.85E+10	3.89E+10	6.09E+10
*76	3.35E+10	2.68E+20	1.64E+10	24.129	0.46218	1.41E+10	2.21E+10	3.01E+10	4.11E+10	6.44E+10
*77	1.45E+10	5.03E+19	7.10E+09	23.293	0.46237	6.10E+09	9.56E+09	1.31E+10	1.78E+10	2.79E+10
*78	8.32E+10	1.65E+21	4.06E+10	25.038	0.462	3.50E+10	5.48E+10	7.48E+10	1.02E+11	1.60E+11
*79	9.20E+10	2.02E+21	4.49E+10	25.138	0.46218	3.87E+10	6.06E+10	8.27E+10	1.13E+11	1.77E+11
*80	3.32E+10	2.63E+20	1.62E+10	24.119	0.46237	1.40E+10	2.19E+10	2.99E+10	4.08E+10	6.39E+10
*81	6.07E+10	8.78E+20	2.96E+10	24.723	0.462	2.55E+10	4.00E+10	5.46E+10	7.45E+10	1.17E+11
*82	2.20E+11	1.15E+22	1.07E+11	26.01	0.46218	9.24E+10	1.45E+11	1.98E+11	2.70E+11	4.23E+11
*83	1.78E+11	7.54E+21	8.69E+10	25.798	0.46237	7.47E+10	1.17E+11	1.60E+11	2.18E+11	3.42E+11
*84	4.02E+10	3.86E+20	1.96E+10	24.312	0.46228	1.69E+10	2.65E+10	3.62E+10	4.94E+10	7.74E+10
*85	1.28E+11	3.90E+21	6.25E+10	25.468	0.46237	5.38E+10	8.42E+10	1.15E+11	1.57E+11	2.46E+11
*86	6.02E+10	8.63E+20	2.94E+10	24.714	0.46228	2.53E+10	3.96E+10	5.41E+10	7.39E+10	1.16E+11
*87	1.34E+11	4.25E+21	6.52E+10	25.512	0.46218	5.62E+10	8.80E+10	1.20E+11	1.64E+11	2.57E+11
*88	4.76E+10	5.39E+20	2.32E+10	24.478	0.46218	2.00E+10	3.13E+10	4.27E+10	5.84E+10	9.14E+10
*89	2.24E+11	1.19E+22	1.09E+11	26.027	0.46237	9.40E+10	1.47E+11	2.01E+11	2.75E+11	4.30E+11
*90	2.71E+11	1.75E+22	1.32E+11	26.217	0.46258	1.14E+11	1.78E+11	2.43E+11	3.32E+11	5.20E+11
*91	1.30E+11	4.06E+21	6.37E+10	25.487	0.46258	5.47E+10	8.58E+10	1.17E+11	1.60E+11	2.51E+11
*92	7.35E+09	1.29E+19	3.59E+09	22.611	0.46268	3.09E+09	4.84E+09	6.61E+09	9.02E+09	1.41E+10
*93	1.38E+10	4.51E+19	6.72E+09	23.237	0.46268	5.77E+09	9.05E+09	1.24E+10	1.69E+10	2.65E+10
*94	8.00E+10	1.53E+21	3.91E+10	24.998	0.46268	3.36E+10	5.26E+10	7.19E+10	9.82E+10	1.54E+11
*95	9.92E+09	2.35E+19	4.85E+09	22.911	0.46268	4.17E+09	6.53E+09	8.92E+09	1.22E+10	1.91E+10
*96	4.11E+09	4.03E+18	2.01E+09	22.029	0.46268	1.72E+09	2.70E+09	3.69E+09	5.04E+09	7.90E+09
98	8.54E+09	1.75E+19	4.18E+09	22.76	0.46383	3.57E+09	5.61E+09	7.67E+09	1.05E+10	1.64E+10
99	2.85E+10	1.95E+20	1.40E+10	23.966	0.46413	1.19E+10	1.87E+10	2.56E+10	3.50E+10	5.49E+10
P.P.C.	1.49E+13	5.30E+25	7.28E+12			6.25E+12	9.80E+12	1.34E+13	1.83E+13	2.87E+13

Table 30: List of subplays in the nonmarine interval of the Mesaverde Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is kmv6. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Meeteetse > 300									(Panel 1)
						a =	0.727	0.016	0.00008	
						b =	14.7	505	0	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
12	48.92	375	6	100	50	19,000	13827.7	809	1.52	6.09E+12
13	41.27	350	6	100	50	18,000	13100.7	793	1.44	4.89E+12
14	13.75	320	6	100	50	17,000	12373.7	777	1.36	1.52E+12
15	1.71	310	6	100	50	16,500	12010.2	769	1.32	1.85E+11
16	14.97	275	6	100	50	17,000	12373.7	777	1.36	1.42E+12
17	5.79	260	6	100	50	16,000	11646.7	761	1.28	5.31E+11
18	0.19	350	6	100	50	17,000	12373.7	777	1.36	2.30E+10
									Total =	1.47E+13

Table 31: List of subplays in the Meeteetse Formation highly overpressured play (T>300°F), Wind River Indian Reservation. The play code for the spreadsheet is meet1. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Meeteetse > 300								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
12	11.24	11.92	10.64	2413.07	143873.0	36.30	10037.0	2536.95	126.60	3.94E+25
13	11.47	12.14	10.88	1717.37	125329.3	36.30	10037.0	2536.95	131.76	2.54E+25
14	11.71	12.36	11.12	190.63	104765.1	36.30	10037.0	2536.95	137.25	2.45E+24
15	11.83	12.48	11.25	2.95	98319.6	36.30	10037.0	2536.95	140.13	3.64E+22
16	11.71	12.36	11.12	225.96	77371.7	36.30	10037.0	2536.95	137.25	2.15E+24
17	11.96	12.59	11.38	33.80	69161.3	36.30	10037.0	2536.95	143.10	3.00E+23
18	11.71	12.36	11.12	0.04	125329.3	36.30	10037.0	2536.95	137.25	5.61E+20

Table 32: List of subplays in the Meeteetse Formation highly overpressured play (T>300°F), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is meet1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Meeteetse > 300								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
12	6.09E+12	2.25E+24	1.50E+12	29.408	0.24279	3.97E+12	5.02E+12	5.91E+12	6.97E+12	8.82E+12
13	4.89E+12	1.45E+24	1.20E+12	29.189	0.24262	3.19E+12	4.03E+12	4.75E+12	5.59E+12	7.08E+12
14	1.52E+12	1.40E+23	3.74E+11	28.021	0.24246	9.91E+11	1.25E+12	1.48E+12	1.74E+12	2.20E+12
15	1.85E+11	2.08E+21	4.56E+10	25.915	0.24238	1.21E+11	1.53E+11	1.80E+11	2.12E+11	2.68E+11
16	1.42E+12	1.23E+23	3.50E+11	27.955	0.24246	9.27E+11	1.17E+12	1.38E+12	1.63E+12	2.06E+12
17	5.31E+11	1.71E+22	1.31E+11	26.97	0.2423	3.46E+11	4.38E+11	5.16E+11	6.08E+11	7.69E+11
18	2.30E+10	3.20E+19	5.66E+09	23.829	0.24246	1.50E+10	1.90E+10	2.23E+10	2.63E+10	3.33E+10
P.P.C.	1.47E+13	1.30E+25	3.61E+12			9.56E+12	1.21E+13	1.42E+13	1.68E+13	2.12E+13

Table 33: List of subplays in the Meeteetse Formation highly overpressured play (T>300°F), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is meet1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Meeteetse > 1.1									(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.24	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	10.87	366	7	100	50	18,500	9634.7	801	1.24	1.33E+12
2	43.44	370	7	100	50	18,000	9374.7	793	1.24	5.28E+12
3	20.11	370	7	100	50	17,000	8854.7	777	1.24	2.36E+12
4	2.05	370	7	100	50	14,500	7554.7	737	1.24	2.16E+11
5	0.7	400	7	100	50	14,500	7554.7	737	1.24	7.97E+10
6	6.15	410	7	100	50	14,000	7294.7	729	1.24	7.01E+11
7	5.62	415	7	100	50	13,500	7034.7	721	1.24	6.32E+11
8	26.89	350	7	100	50	16,000	8334.7	761	1.24	2.86E+12
9	25.54	350	7	100	50	15,000	7814.7	745	1.24	2.60E+12
10	16.8	350	7	100	50	14,000	7294.7	729	1.24	1.63E+12
11	3.46	350	7	100	50	13,500	7034.7	721	1.24	3.28E+11
12	5.91	250	7	100	50	15,500	8074.7	753	1.24	4.40E+11
13	10.99	250	7	100	50	15,000	7814.7	745	1.24	8.01E+11
14	9.23	250	7	100	50	14,000	7294.7	729	1.24	6.41E+11
15	5.97	250	7	100	50	13,000	6774.7	713	1.24	3.94E+11
16	0.5	230	7	100	50	12,500	6514.7	705	1.24	2.95E+10
17	1.2	200	7	100	50	14,500	7554.7	737	1.24	6.83E+10
18	4.4	190	7	100	50	14,000	7294.7	729	1.24	2.32E+11
19	5.9	185	7	100	50	13,000	6774.7	713	1.24	2.88E+11
20	4.64	180	7	100	50	12,000	6254.7	697	1.24	2.08E+11
21	0.66	170	7	100	50	11,000	5734.7	681	1.24	2.62E+10
50	2.71	380	7	100	50	13,000	6774.7	713	1.24	2.72E+11
									Total =	2.14E+13

Table 34: List of subplays in the Meeteetse Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation. The play code for the spreadsheet is meet2. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Meeteetse > 1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	9.70	8.73	10.57	119.14	137049.9	49.41	10037.0	2536.95	94.41	1.88E+24
2	9.53	8.57	10.40	1902.72	140061.9	49.41	10037.0	2536.95	91.20	2.96E+25
3	9.19	8.25	10.04	407.77	140061.9	49.41	10037.0	2536.95	84.76	5.90E+24
4	8.27	7.38	9.08	4.24	140061.9	49.41	10037.0	2536.95	68.60	4.96E+22
5	8.27	7.38	9.08	0.49	163695.5	49.41	10037.0	2536.95	68.60	6.76E+21
6	8.07	7.19	8.87	38.14	171982.5	49.41	10037.0	2536.95	65.38	5.23E+23
7	7.87	7.01	8.66	31.85	176202.8	49.41	10037.0	2536.95	62.16	4.25E+23
8	8.83	7.91	9.67	729.08	125329.3	49.41	10037.0	2536.95	78.30	8.72E+24
9	8.46	7.56	9.28	657.72	125329.3	49.41	10037.0	2536.95	71.83	7.22E+24
10	8.07	7.19	8.87	284.59	125329.3	49.41	10037.0	2536.95	65.38	2.84E+24
11	7.87	7.01	8.66	12.07	125329.3	49.41	10037.0	2536.95	62.16	1.15E+23
12	8.65	7.74	9.47	35.22	63943.5	49.41	10037.0	2536.95	75.07	2.06E+23
13	8.46	7.56	9.28	121.78	63943.5	49.41	10037.0	2536.95	71.83	6.82E+23
14	8.07	7.19	8.87	85.90	63943.5	49.41	10037.0	2536.95	65.38	4.38E+23
15	7.66	6.81	8.44	35.94	63943.5	49.41	10037.0	2536.95	58.96	1.65E+23
16	7.45	6.62	8.22	0.25	54121.8	49.41	10037.0	2536.95	55.77	9.27E+20
17	8.27	7.38	9.08	1.45	40923.9	49.41	10037.0	2536.95	68.60	4.97E+21
18	8.07	7.19	8.87	19.52	36933.8	49.41	10037.0	2536.95	65.38	5.74E+22
19	7.66	6.81	8.44	35.10	35015.5	49.41	10037.0	2536.95	58.96	8.83E+22
20	7.24	6.42	7.99	21.71	33148.3	49.41	10037.0	2536.95	52.60	4.61E+22
21	6.79	6.01	7.52	0.44	29567.5	49.41	10037.0	2536.95	46.33	7.33E+20
50	7.66	6.81	8.44	7.41	147735.2	49.41	10037.0	2536.95	58.96	7.86E+22

Table 35: List of subplays in the Meeteetse Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is meet2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Meeteetse > 1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	1.33E+12	1.11E+23	3.34E+11	27.885	0.2471	8.59E+11	1.09E+12	1.29E+12	1.52E+12	1.94E+12
2	5.28E+12	1.76E+24	1.33E+12	29.264	0.24724	3.41E+12	4.33E+12	5.12E+12	6.05E+12	7.69E+12
3	2.36E+12	3.51E+23	5.92E+11	28.457	0.24752	1.52E+12	1.93E+12	2.28E+12	2.70E+12	3.43E+12
4	2.16E+11	2.97E+21	5.45E+10	26.068	0.24829	1.39E+11	1.77E+11	2.09E+11	2.48E+11	3.15E+11
5	7.97E+10	4.04E+20	2.01E+10	25.071	0.24829	5.14E+10	6.54E+10	7.73E+10	9.14E+10	1.16E+11
6	7.01E+11	3.13E+22	1.77E+11	27.245	0.24846	4.52E+11	5.75E+11	6.80E+11	8.04E+11	1.02E+12
7	6.32E+11	2.55E+22	1.60E+11	27.141	0.24864	4.07E+11	5.18E+11	6.13E+11	7.25E+11	9.23E+11
8	2.86E+12	5.19E+23	7.21E+11	28.652	0.24781	1.85E+12	2.35E+12	2.78E+12	3.28E+12	4.17E+12
9	2.60E+12	4.31E+23	6.56E+11	28.558	0.24813	1.68E+12	2.14E+12	2.53E+12	2.99E+12	3.80E+12
10	1.63E+12	1.70E+23	4.12E+11	28.091	0.24846	1.05E+12	1.34E+12	1.58E+12	1.87E+12	2.38E+12
11	3.28E+11	6.87E+21	8.29E+10	26.486	0.24864	2.11E+11	2.69E+11	3.18E+11	3.76E+11	4.79E+11
12	4.40E+11	1.23E+22	1.11E+11	26.78	0.24797	2.84E+11	3.61E+11	4.27E+11	5.04E+11	6.42E+11
13	8.01E+11	4.07E+22	2.02E+11	27.378	0.24813	5.16E+11	6.57E+11	7.76E+11	9.18E+11	1.17E+12
14	6.41E+11	2.62E+22	1.62E+11	27.156	0.24846	4.13E+11	5.26E+11	6.22E+11	7.35E+11	9.36E+11
15	3.94E+11	9.91E+21	9.96E+10	26.669	0.24882	2.54E+11	3.23E+11	3.82E+11	4.52E+11	5.75E+11
16	2.95E+10	5.57E+19	7.47E+09	24.077	0.249	1.90E+10	2.42E+10	2.86E+10	3.38E+10	4.31E+10
17	6.83E+10	2.97E+20	1.72E+10	24.917	0.24829	4.40E+10	5.61E+10	6.63E+10	7.83E+10	9.97E+10
18	2.32E+11	3.44E+21	5.86E+10	26.141	0.24846	1.50E+11	1.91E+11	2.25E+11	2.66E+11	3.39E+11
19	2.88E+11	5.30E+21	7.28E+10	26.356	0.24882	1.86E+11	2.36E+11	2.79E+11	3.30E+11	4.21E+11
20	2.08E+11	2.78E+21	5.27E+10	26.031	0.2492	1.34E+11	1.71E+11	2.02E+11	2.39E+11	3.04E+11
21	2.62E+10	4.43E+19	6.65E+09	23.96	0.2496	1.69E+10	2.15E+10	2.54E+10	3.01E+10	3.84E+10
50	2.72E+11	4.72E+21	6.87E+10	26.297	0.24882	1.75E+11	2.23E+11	2.64E+11	3.12E+11	3.97E+11
P.P.C.	2.14E+13	2.91E+25	5.39E+12			1.38E+13	1.76E+13	2.08E+13	2.46E+13	3.12E+13

Table 36: List of subplays in the Meeteetse Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is meet2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Meeteetse .73-1.1									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.97	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	0.66	290	7	50	50	11,000	4524.7	681	0.97	2.26E+10
2	1.63	280	7	50	50	10,000	4114.7	665	0.97	5.01E+10
3	2.28	280	7	50	50	9,000	3704.7	649	0.97	6.47E+10
4	1.4	270	7	50	50	8,000	3294.7	633	0.97	3.49E+10
5	0.48	260	7	50	50	7,500	3089.7	625	0.97	1.10E+10
6	2.73	350	7	50	50	14,000	5754.7	729	0.97	1.34E+11
7	4.97	350	7	50	50	13,000	5344.7	713	0.97	2.32E+11
8	4.51	350	7	50	50	12,000	4934.7	697	0.97	1.98E+11
9	5.18	350	7	50	50	11,000	4524.7	681	0.97	2.14E+11
10	3.67	350	7	50	50	10,000	4114.7	665	0.97	1.41E+11
11	1.06	310	7	50	50	9,500	3909.7	657	0.97	3.47E+10
12	0.67	400	7	50	50	13,500	5549.7	721	0.97	3.66E+10
13	6.67	420	7	50	50	13,000	5344.7	713	0.97	3.73E+11
14	17.3	430	7	50	50	12,000	4934.7	697	0.97	9.35E+11
15	28.63	460	7	50	50	11,000	4524.7	681	0.97	1.55E+12
16	4.67	440	7	50	50	10,000	4114.7	665	0.97	2.26E+11
17	2.79	520	7	50	50	10,500	4319.7	673	0.97	1.65E+11
18	0.32	510	7	50	50	10,500	4319.7	673	0.97	1.86E+10
19	2.17	500	7	50	50	10,500	4319.7	673	0.97	1.24E+11
20	0.47	500	7	50	50	10,500	4319.7	673	0.97	2.68E+10
21	0.64	500	7	50	50	10,500	4319.7	673	0.97	3.65E+10
22	3.82	440	7	50	50	10,500	4319.7	673	0.97	1.92E+11
23	5.94	350	7	50	50	13,000	5344.7	713	0.97	2.77E+11
24	10.19	350	7	50	50	12,000	4934.7	697	0.97	4.48E+11
25	14.55	350	7	50	50	11,000	4524.7	681	0.97	6.01E+11
26	11.06	350	7	50	50	10,000	4114.7	665	0.97	4.25E+11
27	6.77	350	7	50	50	9,000	3704.7	649	0.97	2.40E+11
28	0.89	320	7	50	50	8,500	3499.7	641	0.97	2.76E+10
29	0.69	300	7	50	50	12,500	5139.7	705	0.97	2.68E+10
30	7.14	250	7	50	50	12,000	4934.7	697	0.97	2.24E+11
31	13.38	250	7	50	50	11,000	4524.7	681	0.97	3.95E+11
32	10.09	250	7	50	50	10,000	4114.7	665	0.97	2.77E+11
33	7.64	250	7	50	50	9,000	3704.7	649	0.97	1.94E+11
34	4.68	250	7	50	50	8,000	3294.7	633	0.97	1.08E+11
35	2.41	180	7	50	50	11,500	4729.7	689	0.97	5.29E+10
36	7.73	175	7	50	50	11,000	4524.7	681	0.97	1.60E+11
37	11.34	165	7	50	50	10,000	4114.7	665	0.97	2.06E+11
38	13.13	155	7	50	50	9,000	3704.7	649	0.97	2.06E+11
39	13.19	140	7	50	50	8,000	3294.7	633	0.97	1.71E+11
40	8.4	135	7	50	50	7,000	2884.7	617	0.97	9.41E+10
41	0.47	100	7	50	50	6,500	2679.7	609	0.97	3.67E+09
42	1.14	100	7	50	50	6,500	2679.7	609	0.97	8.91E+09
									Total =	8.97E+12

Table 37

Table 37: List of subplays in the Meeteetse Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation. The play code for the spreadsheet is meet3. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Meeteetse .73-1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	60	100	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	6.85	6.06	7.58	0.44	86042.4	50.63	2731.0	2647.82	47.13	6.32E+20
2	6.38	5.63	7.08	2.68	80210.8	50.63	2731.0	2647.82	40.88	3.12E+21
3	5.88	5.18	6.55	5.24	80210.8	50.63	2731.0	2647.82	34.80	5.19E+21
4	5.37	4.71	5.99	1.98	74583.7	50.63	2731.0	2647.82	28.94	1.51E+21
5	5.10	4.46	5.69	0.23	69161.3	50.63	2731.0	2647.82	26.11	1.49E+20
6	8.14	7.25	8.94	7.51	125329.3	50.63	2731.0	2647.82	66.49	2.22E+22
7	7.73	6.87	8.51	24.91	125329.3	50.63	2731.0	2647.82	59.97	6.64E+22
8	7.30	6.47	8.06	20.51	125329.3	50.63	2731.0	2647.82	53.51	4.88E+22
9	6.85	6.06	7.58	27.06	125329.3	50.63	2731.0	2647.82	47.13	5.67E+22
10	6.38	5.63	7.08	13.58	125329.3	50.63	2731.0	2647.82	40.88	2.47E+22
11	6.13	5.41	6.82	1.13	98319.6	50.63	2731.0	2647.82	37.82	1.49E+21
12	7.94	7.07	8.73	0.45	163695.5	50.63	2731.0	2647.82	63.22	1.66E+21
13	7.73	6.87	8.51	44.86	180474.2	50.63	2731.0	2647.82	59.97	1.72E+23
14	7.30	6.47	8.06	301.78	189170.6	50.63	2731.0	2647.82	53.51	1.08E+24
15	6.85	6.06	7.58	826.49	216487.2	50.63	2731.0	2647.82	47.13	2.99E+24
16	6.38	5.63	7.08	21.99	198071.5	50.63	2731.0	2647.82	40.88	6.32E+22
17	6.62	5.85	7.33	7.85	276645.3	50.63	2731.0	2647.82	43.99	3.39E+22
18	6.62	5.85	7.33	0.10	266107.4	50.63	2731.0	2647.82	43.99	4.29E+20
19	6.62	5.85	7.33	4.75	255774.2	50.63	2731.0	2647.82	43.99	1.89E+22
20	6.62	5.85	7.33	0.22	255774.2	50.63	2731.0	2647.82	43.99	8.89E+20
21	6.62	5.85	7.33	0.41	255774.2	50.63	2731.0	2647.82	43.99	1.65E+21
22	6.62	5.85	7.33	14.71	198071.5	50.63	2731.0	2647.82	43.99	4.55E+22
23	7.73	6.87	8.51	35.58	125329.3	50.63	2731.0	2647.82	59.97	9.48E+22
24	7.30	6.47	8.06	104.70	125329.3	50.63	2731.0	2647.82	53.51	2.49E+23
25	6.85	6.06	7.58	213.46	125329.3	50.63	2731.0	2647.82	47.13	4.47E+23
26	6.38	5.63	7.08	123.34	125329.3	50.63	2731.0	2647.82	40.88	2.24E+23
27	5.88	5.18	6.55	46.21	125329.3	50.63	2731.0	2647.82	34.80	7.15E+22
28	5.63	4.95	6.27	0.80	104765.1	50.63	2731.0	2647.82	31.84	9.45E+20
29	7.52	6.68	8.29	0.48	92078.7	50.63	2731.0	2647.82	56.73	8.89E+20
30	7.30	6.47	8.06	51.40	63943.5	50.63	2731.0	2647.82	53.51	6.24E+22
31	6.85	6.06	7.58	180.51	63943.5	50.63	2731.0	2647.82	47.13	1.93E+23
32	6.38	5.63	7.08	102.65	63943.5	50.63	2731.0	2647.82	40.88	9.52E+22
33	5.88	5.18	6.55	58.85	63943.5	50.63	2731.0	2647.82	34.80	4.65E+22
34	5.37	4.71	5.99	22.08	63943.5	50.63	2731.0	2647.82	28.94	1.45E+22
35	7.08	6.27	7.82	5.86	33148.3	50.63	2731.0	2647.82	50.30	3.46E+21
36	6.85	6.06	7.58	60.25	31332.3	50.63	2731.0	2647.82	47.13	3.16E+22
37	6.38	5.63	7.08	129.66	27853.8	50.63	2731.0	2647.82	40.88	5.24E+22
38	5.88	5.18	6.55	173.83	24579.9	50.63	2731.0	2647.82	34.80	5.27E+22
39	5.37	4.71	5.99	175.42	20052.7	50.63	2731.0	2647.82	28.94	3.61E+22
40	4.82	4.22	5.39	71.15	18645.9	50.63	2731.0	2647.82	23.36	1.10E+22
41	4.54	3.96	5.08	0.22	10231.0	50.63	2731.0	2647.82	20.69	1.67E+19
42	4.54	3.96	5.08	1.31	10231.0	50.63	2731.0	2647.82	20.69	9.84E+19

Table 38: List of subplays in the Meeteetse Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is meet3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Meeteetse .73-1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	2.26E+10	1.22E+20	1.10E+10	23.733	0.46279	9.48E+09	1.49E+10	2.03E+10	2.77E+10	4.34E+10
2	5.01E+10	6.01E+20	2.45E+10	24.531	0.46303	2.10E+10	3.30E+10	4.50E+10	6.15E+10	9.65E+10
3	6.47E+10	1.00E+21	3.17E+10	24.786	0.46328	2.71E+10	4.25E+10	5.81E+10	7.94E+10	1.25E+11
4	3.49E+10	2.93E+20	1.71E+10	24.169	0.46354	1.46E+10	2.30E+10	3.14E+10	4.29E+10	6.73E+10
5	1.10E+10	2.88E+19	5.37E+09	23.01	0.46368	4.59E+09	7.20E+09	9.84E+09	1.34E+10	2.11E+10
6	1.34E+11	4.27E+21	6.54E+10	25.514	0.46218	5.63E+10	8.81E+10	1.20E+11	1.64E+11	2.57E+11
7	2.32E+11	1.28E+22	1.13E+11	26.061	0.46237	9.72E+10	1.52E+11	2.08E+11	2.84E+11	4.45E+11
8	1.98E+11	9.39E+21	9.69E+10	25.907	0.46258	8.33E+10	1.31E+11	1.78E+11	2.44E+11	3.82E+11
9	2.14E+11	1.09E+22	1.05E+11	25.982	0.46279	8.98E+10	1.41E+11	1.92E+11	2.63E+11	4.11E+11
10	1.41E+11	4.76E+21	6.90E+10	25.566	0.46303	5.92E+10	9.28E+10	1.27E+11	1.73E+11	2.72E+11
11	3.47E+10	2.88E+20	1.70E+10	24.163	0.46315	1.46E+10	2.28E+10	3.12E+10	4.26E+10	6.68E+10
12	3.66E+10	3.20E+20	1.79E+10	24.217	0.46228	1.54E+10	2.41E+10	3.29E+10	4.49E+10	7.04E+10
13	3.73E+11	3.31E+22	1.82E+11	26.538	0.46237	1.57E+11	2.45E+11	3.35E+11	4.58E+11	7.17E+11
14	9.35E+11	2.09E+23	4.57E+11	27.457	0.46258	3.93E+11	6.15E+11	8.40E+11	1.15E+12	1.80E+12
15	1.55E+12	5.77E+23	7.59E+11	27.965	0.46279	6.52E+11	1.02E+12	1.40E+12	1.91E+12	2.99E+12
16	2.26E+11	1.22E+22	1.10E+11	26.036	0.46303	9.47E+10	1.48E+11	2.03E+11	2.77E+11	4.34E+11
17	1.65E+11	6.53E+21	8.08E+10	25.724	0.46291	6.94E+10	1.09E+11	1.49E+11	2.03E+11	3.18E+11
18	1.86E+10	8.27E+19	9.09E+09	23.539	0.46291	7.80E+09	1.22E+10	1.67E+10	2.28E+10	3.58E+10
19	1.24E+11	3.65E+21	6.04E+10	25.434	0.46291	5.19E+10	8.13E+10	1.11E+11	1.52E+11	2.38E+11
20	2.68E+10	1.71E+20	1.31E+10	23.904	0.46291	1.12E+10	1.76E+10	2.41E+10	3.29E+10	5.15E+10
21	3.65E+10	3.18E+20	1.78E+10	24.213	0.46291	1.53E+10	2.40E+10	3.28E+10	4.48E+10	7.02E+10
22	1.92E+11	8.77E+21	9.36E+10	25.871	0.46291	8.04E+10	1.26E+11	1.72E+11	2.35E+11	3.69E+11
23	2.77E+11	1.83E+22	1.35E+11	26.239	0.46237	1.16E+11	1.82E+11	2.49E+11	3.40E+11	5.32E+11
24	4.48E+11	4.80E+22	2.19E+11	26.722	0.46258	1.88E+11	2.95E+11	4.03E+11	5.50E+11	8.62E+11
25	6.01E+11	8.62E+22	2.94E+11	27.014	0.46279	2.52E+11	3.95E+11	5.40E+11	7.37E+11	1.16E+12
26	4.25E+11	4.32E+22	2.08E+11	26.669	0.46303	1.78E+11	2.80E+11	3.82E+11	5.22E+11	8.18E+11
27	2.40E+11	1.38E+22	1.18E+11	26.097	0.46328	1.01E+11	1.58E+11	2.16E+11	2.95E+11	4.62E+11
28	2.76E+10	1.83E+20	1.35E+10	23.934	0.46341	1.16E+10	1.81E+10	2.48E+10	3.39E+10	5.31E+10
29	2.68E+10	1.71E+20	1.31E+10	23.905	0.46247	1.13E+10	1.76E+10	2.41E+10	3.29E+10	5.15E+10
30	2.24E+11	1.20E+22	1.10E+11	26.03	0.46258	9.42E+10	1.48E+11	2.02E+11	2.75E+11	4.32E+11
31	3.95E+11	3.72E+22	1.93E+11	26.594	0.46279	1.66E+11	2.60E+11	3.55E+11	4.84E+11	7.59E+11
32	2.77E+11	1.84E+22	1.36E+11	26.241	0.46303	1.16E+11	1.82E+11	2.49E+11	3.40E+11	5.33E+11
33	1.94E+11	8.97E+21	9.47E+10	25.882	0.46328	8.12E+10	1.27E+11	1.74E+11	2.38E+11	3.73E+11
34	1.08E+11	2.80E+21	5.29E+10	25.299	0.46354	4.53E+10	7.11E+10	9.71E+10	1.33E+11	2.08E+11
35	5.29E+10	6.67E+20	2.58E+10	24.584	0.46268	2.22E+10	3.48E+10	4.75E+10	6.49E+10	1.02E+11
36	1.60E+11	6.08E+21	7.80E+10	25.689	0.46279	6.70E+10	1.05E+11	1.43E+11	1.96E+11	3.07E+11
37	2.06E+11	1.01E+22	1.01E+11	25.942	0.46303	8.62E+10	1.35E+11	1.85E+11	2.52E+11	3.96E+11
38	2.06E+11	1.02E+22	1.01E+11	25.945	0.46328	8.65E+10	1.36E+11	1.85E+11	2.53E+11	3.97E+11
39	1.71E+11	6.98E+21	8.36E+10	25.756	0.46354	7.15E+10	1.12E+11	1.53E+11	2.09E+11	3.29E+11
40	9.41E+10	2.13E+21	4.61E+10	25.16	0.46383	3.94E+10	6.18E+10	8.45E+10	1.16E+11	1.81E+11
41	3.67E+09	3.24E+18	1.80E+09	21.916	0.46398	1.54E+09	2.41E+09	3.30E+09	4.51E+09	7.07E+09
42	8.91E+09	1.91E+19	4.37E+09	22.802	0.46398	3.73E+09	5.85E+09	8.00E+09	1.09E+10	1.72E+10
P.P.C.	8.97E+12	1.92E+25	4.38E+12			3.76E+12	5.90E+12	8.06E+12	1.10E+13	1.73E+13

Table 39: List of subplays in the Meeteetse Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is meet3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :		Lance > 1.1								(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.15	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	3.31	1,200	7	100	50	10,000	5214.7	665	1.15	9.33E+11
17	5.39	1,200	7	100	50	14,000	7294.7	729	1.15	1.94E+12
18	46.83	1,200	7	100	50	15,000	7814.7	745	1.15	1.77E+13
19	49.98	1,200	7	100	50	16,000	8334.7	761	1.15	1.97E+13
20	3.39	1,000	7	100	50	14,000	7294.7	729	1.15	1.02E+12
21	28.66	900	7	100	50	16,000	8334.7	761	1.15	8.46E+12
22	35.62	800	7	100	50	15,000	7814.7	745	1.15	8.95E+12
23	31.16	800	7	100	50	14,000	7294.7	729	1.15	7.47E+12
24	16.49	750	7	100	50	13,000	6774.7	713	1.15	3.52E+12
25	1.79	750	7	100	50	12,500	6514.7	705	1.15	3.72E+11
*49	9.85	600	7	100	50	14,500	7554.7	737	1.15	1.81E+12
*50	23.86	600	7	100	50	14,000	7294.7	729	1.15	4.29E+12
*51	13.84	600	7	100	50	13,000	6774.7	713	1.15	2.36E+12
*52	14.43	400	7	100	50	13,000	6774.7	713	1.15	1.64E+12
*53	0.05	425	7	100	50	13,000	6774.7	713	1.15	6.05E+09
*54	20.27	400	7	100	50	12,000	6254.7	697	1.15	2.18E+12
*55	7.34	400	7	100	50	11,000	5734.7	681	1.15	7.41E+11
									Total =	8.30E+13

Table 40: List of subplays in the Lance Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation. The play code for the spreadsheet is lance1. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Subplays which are split between two different plays are marked with an asterix. Half of the sandstone volume in these subplays has been assigned to each of the two plays. The Lance Formation in some of the subplays along the south flank of the Casper Arch is partly cut off by the Casper Arch thrust creating roughly wedge-shaped subplay volumes. These subplays contain approximately one-half the sandstone volume indicated from the sandstone isopach map. these subplays are also marked with an asterix in the table. point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Lance > 1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	30	20	40		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	6.82	6.02	7.57	11.05	1473259.1	49.41	10037.0	2536.95	46.72	9.27E+23
17	8.70	7.76	9.56	29.29	1473259.1	49.41	10037.0	2536.95	76.01	4.00E+24
18	9.12	8.15	10.00	2211.28	1473259.1	49.41	10037.0	2536.95	83.52	3.32E+26
19	9.52	8.53	10.42	2518.77	1473259.1	49.41	10037.0	2536.95	91.03	4.12E+26
20	8.70	7.76	9.56	11.59	1023096.6	49.41	10037.0	2536.95	76.01	1.10E+24
21	9.52	8.53	10.42	828.23	828708.3	49.41	10037.0	2536.95	91.03	7.61E+25
22	9.12	8.15	10.00	1279.33	654781.8	49.41	10037.0	2536.95	83.52	8.53E+25
23	8.70	7.76	9.56	979.02	654781.8	49.41	10037.0	2536.95	76.01	5.94E+25
24	8.26	7.35	9.10	274.18	575491.8	49.41	10037.0	2536.95	68.55	1.32E+25
25	8.04	7.14	8.86	3.23	575491.8	49.41	10037.0	2536.95	64.84	1.47E+23
*49	8.91	7.95	9.79	97.83	368314.8	49.41	10037.0	2536.95	79.76	3.50E+24
*50	8.70	7.76	9.56	574.03	368314.8	49.41	10037.0	2536.95	76.01	1.96E+25
*51	8.26	7.35	9.10	193.14	368314.8	49.41	10037.0	2536.95	68.55	5.94E+24
*52	8.26	7.35	9.10	209.96	163695.5	49.41	10037.0	2536.95	68.55	2.87E+24
*53	8.26	7.35	9.10	0.00	184796.8	49.41	10037.0	2536.95	68.55	3.89E+19
*54	7.80	6.92	8.62	414.29	163695.5	49.41	10037.0	2536.95	61.16	5.05E+24
*55	7.32	6.48	8.10	54.32	163695.5	49.41	10037.0	2536.95	53.86	5.84E+23

Table 41: List of subplays in the Lance Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is lance1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Lance > 1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	9.33E+11	5.62E+22	2.37E+11	27.53	0.25004	5.99E+11	7.64E+11	9.04E+11	1.07E+12	1.36E+12
17	1.94E+12	2.39E+23	4.89E+11	28.262	0.24846	1.25E+12	1.59E+12	1.88E+12	2.22E+12	2.83E+12
18	1.77E+13	1.98E+25	4.45E+12	30.471	0.24813	1.14E+13	1.45E+13	1.71E+13	2.02E+13	2.58E+13
19	1.97E+13	2.45E+25	4.95E+12	30.58	0.24781	1.27E+13	1.61E+13	1.91E+13	2.25E+13	2.87E+13
20	1.02E+12	6.57E+22	2.56E+11	27.616	0.24846	6.55E+11	8.33E+11	9.85E+11	1.16E+12	1.48E+12
21	8.46E+12	4.54E+24	2.13E+12	29.736	0.24781	5.46E+12	6.94E+12	8.21E+12	9.70E+12	1.23E+13
22	8.95E+12	5.09E+24	2.26E+12	29.792	0.24813	5.77E+12	7.34E+12	8.68E+12	1.03E+13	1.31E+13
23	7.47E+12	3.55E+24	1.89E+12	29.611	0.24846	4.81E+12	6.13E+12	7.24E+12	8.57E+12	1.09E+13
24	3.52E+12	7.91E+23	8.90E+11	28.859	0.24882	2.27E+12	2.89E+12	3.41E+12	4.04E+12	5.14E+12
25	3.72E+11	8.83E+21	9.40E+10	26.61	0.249	2.39E+11	3.05E+11	3.60E+11	4.26E+11	5.43E+11
*49	1.81E+12	2.09E+23	4.58E+11	28.196	0.24829	1.17E+12	1.49E+12	1.76E+12	2.08E+12	2.65E+12
*50	4.29E+12	1.17E+24	1.08E+12	29.057	0.24846	2.76E+12	3.52E+12	4.16E+12	4.92E+12	6.26E+12
*51	2.36E+12	3.57E+23	5.97E+11	28.46	0.24882	1.52E+12	1.94E+12	2.29E+12	2.71E+12	3.45E+12
*52	1.64E+12	1.72E+23	4.15E+11	28.096	0.24882	1.06E+12	1.35E+12	1.59E+12	1.88E+12	2.40E+12
*53	6.05E+09	2.34E+18	1.53E+09	22.492	0.24882	3.89E+09	4.96E+09	5.86E+09	6.93E+09	8.83E+09
*54	2.18E+12	3.04E+23	5.52E+11	28.379	0.2492	1.40E+12	1.79E+12	2.11E+12	2.50E+12	3.18E+12
*55	7.41E+11	3.53E+22	1.88E+11	27.3	0.2496	4.76E+11	6.07E+11	7.18E+11	8.49E+11	1.08E+12
P.P.C.	8.30E+13	4.38E+26	2.09E+13			5.35E+13	6.81E+13	8.05E+13	9.52E+13	1.21E+14

Table 42: List of subplays in the Lance Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is lance1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :	Lance .73-1.1									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.93	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	2.63	1,100	7	50	50	12,500	5139.7	705	0.93	3.91E+11
2	7.9	1,050	7	50	50	12,000	4934.7	697	0.93	1.09E+12
3	2.74	1,050	7	50	50	11,000	4524.7	681	0.93	3.54E+11
4	0.99	1,000	7	50	50	10,000	4114.7	665	0.93	1.13E+11
5	2.13	1,000	7	50	50	11,000	4524.7	681	0.93	2.62E+11
6	2.23	1,000	7	50	50	10,000	4114.7	665	0.93	2.56E+11
7	0.86	1,000	7	50	50	9,000	3704.7	649	0.93	9.09E+10
8	9.9	650	7	50	50	12,000	4934.7	697	0.93	8.44E+11
9	1.08	500	7	50	50	11,500	4729.7	689	0.93	6.87E+10
10	0.24	500	7	50	50	11,500	4729.7	689	0.93	1.53E+10
11	13.09	700	7	50	50	11,000	4524.7	681	0.93	1.13E+12
12	10.15	600	7	50	50	10,000	4114.7	665	0.93	6.98E+11
13	6.99	550	7	50	50	9,000	3704.7	649	0.93	4.06E+11
14	0.1	500	7	50	50	8,500	3499.7	641	0.93	5.06E+09
15	1.26	500	7	50	50	8,500	3499.7	641	0.93	6.37E+10
18	2.27	400	7	50	50	8,000	3294.7	633	0.93	8.75E+10
19	0.16	300	7	50	50	7,000	2884.7	617	0.93	4.16E+09
*25	2.99	375	7	50	50	11,500	4729.7	689	0.93	1.43E+11
*26	9.9	375	7	50	50	11,000	4524.7	681	0.93	4.57E+11
*27	2.5	450	7	50	50	10,000	4114.7	665	0.93	1.29E+11
*28	2.66	450	7	50	50	9,000	3704.7	649	0.93	1.27E+11
*29	1.06	475	7	50	50	8,000	3294.7	633	0.93	4.85E+10
*30	0.85	300	7	50	50	10,500	4319.7	673	0.93	3.03E+10
*31	0.24	250	7	50	50	10,500	4319.7	673	0.93	7.13E+09
*32	4.44	225	7	50	50	11,000	4524.7	681	0.93	1.23E+11
*33	0.47	250	7	50	50	10,500	4319.7	673	0.93	1.40E+10
*34	7.54	300	7	50	50	10,500	4319.7	673	0.93	2.69E+11
*35	21.2	325	7	50	50	10,500	4319.7	673	0.93	8.19E+11
*36	21.74	300	7	50	50	9,000	3704.7	649	0.93	6.89E+11
*37	13.24	275	7	50	50	8,000	3294.7	633	0.93	3.51E+11
*38	1.4	250	7	50	50	7,500	3089.7	625	0.93	3.20E+10
*39	0.79	250	7	50	50	7,500	3089.7	625	0.93	1.81E+10
*40	4.94	200	7	50	50	7,000	2884.7	617	0.93	8.55E+10
*41	3.7	200	7	50	50	6,000	2474.7	601	0.93	5.64E+10
*49	9.85	600	7	50	50	14,500	5959.7	737	0.93	8.85E+11
*50	23.86	600	7	50	50	14,000	5754.7	729	0.93	2.09E+12
*51	13.84	600	7	50	50	13,000	5344.7	713	0.93	1.15E+12
*52	14.43	400	7	50	50	13,000	5344.7	713	0.93	8.01E+11
*53	0.05	425	7	50	50	13,000	5344.7	713	0.93	2.95E+09
*54	20.27	400	7	50	50	12,000	4934.7	697	0.93	1.06E+12
*55	7.34	400	7	50	50	11,000	4524.7	681	0.93	3.61E+11
									Total =	1.56E+13

Table 43

Table 43: List of subplays in the Lance Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation. The play code for the spreadsheet is lance2. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Subplays which are split between two different plays are marked with an asterix. Half of the sandstone volume in these subplays has been assigned to each of the two plays. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Lance .73-1.1								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	60	100	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	7.84	6.96	8.64	6.97	1237946.9	50.63	2731.0	2647.82	61.71	1.89E+23
2	7.61	6.75	8.40	62.93	1127964.0	50.63	2731.0	2647.82	58.21	1.47E+24
3	7.14	6.32	7.91	7.57	1127964.0	50.63	2731.0	2647.82	51.27	1.55E+23
4	6.65	5.87	7.38	0.99	1023096.6	50.63	2731.0	2647.82	44.48	1.59E+22
5	7.14	6.32	7.91	4.57	1023096.6	50.63	2731.0	2647.82	51.27	8.51E+22
6	6.65	5.87	7.38	5.01	1023096.6	50.63	2731.0	2647.82	44.48	8.09E+22
7	6.14	5.40	6.83	0.75	1023096.6	50.63	2731.0	2647.82	37.86	1.02E+22
8	7.61	6.75	8.40	98.82	432258.3	50.63	2731.0	2647.82	58.21	8.82E+23
9	7.38	6.54	8.16	1.18	255774.2	50.63	2731.0	2647.82	54.73	5.84E+21
10	7.38	6.54	8.16	0.06	255774.2	50.63	2731.0	2647.82	54.73	2.88E+20
11	7.14	6.32	7.91	172.77	501317.3	50.63	2731.0	2647.82	51.27	1.57E+24
12	6.65	5.87	7.38	103.88	368314.8	50.63	2731.0	2647.82	44.48	6.03E+23
13	6.14	5.40	6.83	49.27	309486.7	50.63	2731.0	2647.82	37.86	2.05E+23
14	5.87	5.16	6.54	0.01	255774.2	50.63	2731.0	2647.82	34.64	3.17E+19
15	5.87	5.16	6.54	1.60	255774.2	50.63	2731.0	2647.82	34.64	5.03E+21
18	5.60	4.91	6.24	5.20	163695.5	50.63	2731.0	2647.82	31.49	9.50E+21
19	5.03	4.40	5.62	0.03	92078.7	50.63	2731.0	2647.82	25.41	2.14E+19
*25	7.38	6.54	8.16	9.01	143873.0	50.63	2731.0	2647.82	54.73	2.52E+22
*26	7.14	6.32	7.91	98.82	143873.0	50.63	2731.0	2647.82	51.27	2.59E+23
*27	6.65	5.87	7.38	6.30	207177.1	50.63	2731.0	2647.82	44.48	2.06E+22
*28	6.14	5.40	6.83	7.13	207177.1	50.63	2731.0	2647.82	37.86	1.98E+22
*29	5.60	4.91	6.24	1.13	230836.2	50.63	2731.0	2647.82	31.49	2.92E+21
*30	6.90	6.10	7.65	0.73	92078.7	50.63	2731.0	2647.82	47.85	1.14E+21
*31	6.90	6.10	7.65	0.06	63943.5	50.63	2731.0	2647.82	47.85	6.30E+19
*32	7.14	6.32	7.91	19.88	51794.3	50.63	2731.0	2647.82	51.27	1.87E+22
*33	6.90	6.10	7.65	0.22	63943.5	50.63	2731.0	2647.82	47.85	2.42E+20
*34	6.90	6.10	7.65	57.32	92078.7	50.63	2731.0	2647.82	47.85	8.96E+22
*35	6.90	6.10	7.65	453.18	108064.6	50.63	2731.0	2647.82	47.85	8.31E+23
*36	6.14	5.40	6.83	476.56	92078.7	50.63	2731.0	2647.82	37.86	5.89E+23
*37	5.60	4.91	6.24	176.76	77371.7	50.63	2731.0	2647.82	31.49	1.53E+23
*38	5.32	4.66	5.94	1.98	63943.5	50.63	2731.0	2647.82	28.41	1.27E+21
*39	5.32	4.66	5.94	0.63	63943.5	50.63	2731.0	2647.82	28.41	4.05E+20
*40	5.03	4.40	5.62	24.61	40923.9	50.63	2731.0	2647.82	25.41	9.08E+21
*41	4.43	3.86	4.97	13.80	40923.9	50.63	2731.0	2647.82	19.72	3.95E+21
*49	8.70	7.76	9.55	97.83	368314.8	50.63	2731.0	2647.82	75.90	9.70E+23
*50	8.49	7.57	9.33	574.03	368314.8	50.63	2731.0	2647.82	72.33	5.42E+24
*51	8.06	7.17	8.88	193.14	368314.8	50.63	2731.0	2647.82	65.24	1.65E+24
*52	8.06	7.17	8.88	209.96	163695.5	50.63	2731.0	2647.82	65.24	7.95E+23
*53	8.06	7.17	8.88	0.00	184796.8	50.63	2731.0	2647.82	65.24	1.08E+19
*54	7.61	6.75	8.40	414.29	163695.5	50.63	2731.0	2647.82	58.21	1.40E+24
*55	7.14	6.32	7.91	54.32	163695.5	50.63	2731.0	2647.82	51.27	1.62E+23

Table 44: List of subplays in the Lance Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is lance2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Lance .73-1.1								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	3.91E+11	3.64E+22	1.91E+11	26.584	0.46247	1.64E+11	2.57E+11	3.51E+11	4.79E+11	7.51E+11
2	1.09E+12	2.82E+23	5.31E+11	27.608	0.46258	4.57E+11	7.16E+11	9.77E+11	1.33E+12	2.09E+12
3	3.54E+11	2.99E+22	1.73E+11	26.486	0.46279	1.49E+11	2.33E+11	3.18E+11	4.34E+11	6.81E+11
4	1.13E+11	3.08E+21	5.55E+10	25.347	0.46303	4.76E+10	7.46E+10	1.02E+11	1.39E+11	2.18E+11
5	2.62E+11	1.64E+22	1.28E+11	26.185	0.46279	1.10E+11	1.72E+11	2.35E+11	3.22E+11	5.04E+11
6	2.56E+11	1.56E+22	1.25E+11	26.159	0.46303	1.07E+11	1.68E+11	2.30E+11	3.14E+11	4.92E+11
7	9.09E+10	1.98E+21	4.45E+10	25.126	0.46328	3.81E+10	5.98E+10	8.17E+10	1.12E+11	1.75E+11
8	8.44E+11	1.70E+23	4.12E+11	27.354	0.46258	3.54E+11	5.55E+11	7.58E+11	1.04E+12	1.62E+12
9	6.87E+10	1.13E+21	3.35E+10	24.845	0.46268	2.88E+10	4.52E+10	6.17E+10	8.43E+10	1.32E+11
10	1.53E+10	5.56E+19	7.45E+09	23.341	0.46268	6.40E+09	1.00E+10	1.37E+10	1.87E+10	2.93E+10
11	1.13E+12	3.04E+23	5.51E+11	27.644	0.46279	4.73E+11	7.42E+11	1.01E+12	1.38E+12	2.17E+12
12	6.98E+11	1.16E+23	3.41E+11	27.164	0.46303	2.93E+11	4.59E+11	6.27E+11	8.57E+11	1.34E+12
13	4.06E+11	3.95E+22	1.99E+11	26.623	0.46328	1.70E+11	2.67E+11	3.65E+11	4.99E+11	7.82E+11
14	5.06E+09	6.12E+18	2.47E+09	22.236	0.46341	2.12E+09	3.32E+09	4.54E+09	6.21E+09	9.73E+09
15	6.37E+10	9.72E+20	3.12E+10	24.77	0.46341	2.67E+10	4.19E+10	5.72E+10	7.82E+10	1.23E+11
18	8.75E+10	1.84E+21	4.29E+10	25.088	0.46354	3.67E+10	5.75E+10	7.86E+10	1.07E+11	1.69E+11
19	4.16E+09	4.15E+18	2.04E+09	22.04	0.46383	1.74E+09	2.73E+09	3.73E+09	5.10E+09	8.00E+09
*25	1.43E+11	4.85E+21	6.96E+10	25.576	0.46268	5.98E+10	9.38E+10	1.28E+11	1.75E+11	2.74E+11
*26	4.57E+11	4.98E+22	2.23E+11	26.74	0.46279	1.92E+11	3.00E+11	4.10E+11	5.61E+11	8.79E+11
*27	1.29E+11	3.97E+21	6.30E+10	25.475	0.46303	5.41E+10	8.48E+10	1.16E+11	1.58E+11	2.48E+11
*28	1.27E+11	3.83E+21	6.19E+10	25.457	0.46328	5.30E+10	8.32E+10	1.14E+11	1.55E+11	2.44E+11
*29	4.85E+10	5.65E+20	2.38E+10	24.498	0.46354	2.03E+10	3.19E+10	4.36E+10	5.96E+10	9.34E+10
*30	3.03E+10	2.20E+20	1.48E+10	24.028	0.46291	1.27E+10	1.99E+10	2.72E+10	3.72E+10	5.83E+10
*31	7.13E+09	1.22E+19	3.49E+09	22.581	0.46291	2.99E+09	4.69E+09	6.41E+09	8.75E+09	1.37E+10
*32	1.23E+11	3.61E+21	6.01E+10	25.428	0.46279	5.16E+10	8.08E+10	1.10E+11	1.51E+11	2.36E+11
*33	1.40E+10	4.66E+19	6.83E+09	23.253	0.46291	5.86E+09	9.19E+09	1.25E+10	1.71E+10	2.69E+10
*34	2.69E+11	1.73E+22	1.31E+11	26.21	0.46291	1.13E+11	1.77E+11	2.42E+11	3.30E+11	5.17E+11
*35	8.19E+11	1.60E+23	4.00E+11	27.324	0.46291	3.44E+11	5.39E+11	7.36E+11	1.01E+12	1.58E+12
*36	6.89E+11	1.14E+23	3.37E+11	27.152	0.46328	2.89E+11	4.53E+11	6.19E+11	8.46E+11	1.33E+12
*37	3.51E+11	2.95E+22	1.72E+11	26.477	0.46354	1.47E+11	2.31E+11	3.15E+11	4.31E+11	6.76E+11
*38	3.20E+10	2.46E+20	1.57E+10	24.083	0.46368	1.34E+10	2.11E+10	2.88E+10	3.93E+10	6.17E+10
*39	1.81E+10	7.84E+19	8.86E+09	23.511	0.46368	7.57E+09	1.19E+10	1.62E+10	2.22E+10	3.48E+10
*40	8.55E+10	1.76E+21	4.19E+10	25.065	0.46383	3.58E+10	5.62E+10	7.68E+10	1.05E+11	1.65E+11
*41	5.64E+10	7.65E+20	2.77E+10	24.649	0.46413	2.36E+10	3.71E+10	5.07E+10	6.93E+10	1.09E+11
*49	8.85E+11	1.86E+23	4.32E+11	27.402	0.46209	3.72E+11	5.83E+11	7.95E+11	1.09E+12	1.70E+12
*50	2.09E+12	1.04E+24	1.02E+12	28.263	0.46218	8.79E+11	1.38E+12	1.88E+12	2.57E+12	4.02E+12
*51	1.15E+12	3.17E+23	5.63E+11	27.666	0.46237	4.84E+11	7.59E+11	1.04E+12	1.41E+12	2.22E+12
*52	8.01E+11	1.53E+23	3.91E+11	27.303	0.46237	3.37E+11	5.27E+11	7.20E+11	9.83E+11	1.54E+12
*53	2.95E+09	2.07E+18	1.44E+09	21.698	0.46237	1.24E+09	1.94E+09	2.65E+09	3.62E+09	5.67E+09
*54	1.06E+12	2.70E+23	5.19E+11	27.585	0.46258	4.46E+11	6.99E+11	9.55E+11	1.30E+12	2.04E+12
*55	3.61E+11	3.12E+22	1.77E+11	26.506	0.46279	1.52E+11	2.38E+11	3.25E+11	4.43E+11	6.95E+11
P.P.C.	1.56E+13	5.83E+25	7.64E+12			6.56E+12	1.03E+13	1.40E+13	1.92E+13	3.01E+13

Table 45: List of subplays in the Lance Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation with calculated fractiles for in-place gas. The play code for the spreadsheet is lance2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. Mean in-place gas is listed in column 2 for comparison.

Play Name :		Tful, Waltman present								(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.909	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	6.22	450	7	70	50	11,500	4729.7	689	0.909	5.10E+11
2	4.82	450	7	70	50	12,000	4934.7	697	0.909	4.07E+11
3	6.45	470	7	70	50	13,000	5344.7	713	0.909	6.03E+11
4	2.99	650	7	70	50	13,500	5549.7	721	0.909	3.97E+11
5	2.15	780	7	70	50	13,500	5549.7	721	0.909	3.42E+11
6	11.69	875	7	70	50	13,000	5344.7	713	0.909	2.03E+12
7	2.83	1,050	7	70	50	12,500	5139.7	705	0.909	5.75E+11
8	0.97	900	7	70	50	12,500	5139.7	705	0.909	1.69E+11
9	14.01	875	7	70	50	12,000	4934.7	697	0.909	2.30E+12
10	4.38	1,175	7	70	50	11,000	4524.7	681	0.909	9.07E+11
11	3.35	1,300	7	70	50	11,000	4524.7	681	0.909	7.68E+11
12	2.49	1,300	7	70	50	10,000	4114.7	665	0.909	5.31E+11
12a	2.54	1,125	7	70	50	10,000	4114.7	665	0.909	4.69E+11
13	5.23	1,125	7	70	50	9,000	3704.7	649	0.909	8.91E+11
14	1.38	1,050	7	70	50	8,500	3499.7	641	0.909	2.10E+11
15	0.83	875	7	70	50	12,000	4934.7	697	0.909	1.36E+11
16	1.58	875	7	70	50	11,000	4524.7	681	0.909	2.44E+11
17	0.95	875	7	70	50	10,000	4114.7	665	0.909	1.36E+11
18	0.81	875	7	70	50	9,000	3704.7	649	0.909	1.07E+11
19	4.32	875	7	70	50	8,000	3294.7	633	0.909	5.22E+11
20	2.05	800	7	70	50	7,500	3089.7	625	0.909	2.15E+11
21	0.45	625	7	70	50	10,500	4319.7	673	0.909	4.79E+10
22	4.84	625	7	70	50	11,000	4524.7	681	0.909	5.33E+11
23	18.41	650	7	70	50	13,000	5344.7	713	0.909	2.38E+12
24	2.87	650	7	70	50	12,000	4934.7	697	0.909	3.50E+11
30	3.11	675	7	70	50	7,000	2884.7	617	0.909	2.60E+11
31	2.94	625	7	70	50	6,000	2474.7	601	0.909	2.01E+11
42	0.35	600	7	70	50	7,000	2884.7	617	0.909	2.60E+10
									Total =	1.63E+13

Table 46: List of subplays in the lower unnamed member of the Fort Union Formation, Wind River Indian Reservation where the Waltman seal is present play. The play code for the spreadsheet is tful. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subtly to subtly within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Tful, Waltman present								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	60	80	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	7.55	6.69	8.35	39.01	207177.1	50.63	5189.7	2647.82	57.28	3.12E+23
2	7.79	6.91	8.60	23.43	207177.1	50.63	5189.7	2647.82	60.93	1.99E+23
3	8.25	7.33	9.08	41.95	226002.0	50.63	5189.7	2647.82	68.29	4.36E+23
4	8.47	7.54	9.32	9.01	432258.3	50.63	5189.7	2647.82	72.00	1.89E+23
5	8.47	7.54	9.32	4.66	622452.0	50.63	5189.7	2647.82	72.00	1.41E+23
6	8.25	7.33	9.08	137.79	783308.3	50.63	5189.7	2647.82	68.29	4.97E+24
7	8.02	7.12	8.84	8.08	1127964.0	50.63	5189.7	2647.82	64.60	3.97E+23
8	8.02	7.12	8.84	0.95	828708.3	50.63	5189.7	2647.82	64.60	3.42E+22
9	7.79	6.91	8.60	197.91	783308.3	50.63	5189.7	2647.82	60.93	6.37E+24
10	7.31	6.47	8.09	19.34	1412512.8	50.63	5189.7	2647.82	53.67	9.88E+23
11	7.31	6.47	8.09	11.32	1729033.3	50.63	5189.7	2647.82	53.67	7.08E+23
12	6.81	6.01	7.55	6.25	1729033.3	50.63	5189.7	2647.82	46.56	3.39E+23
12a	6.81	6.01	7.55	6.51	1294856.6	50.63	5189.7	2647.82	46.56	2.64E+23
13	6.28	5.53	6.99	27.58	1294856.6	50.63	5189.7	2647.82	39.63	9.54E+23
14	6.01	5.28	6.69	1.92	1127964.0	50.63	5189.7	2647.82	36.26	5.29E+22
15	7.79	6.91	8.60	0.69	783308.3	50.63	5189.7	2647.82	60.93	2.23E+22
16	7.31	6.47	8.09	2.52	783308.3	50.63	5189.7	2647.82	53.67	7.13E+22
17	6.81	6.01	7.55	0.91	783308.3	50.63	5189.7	2647.82	46.56	2.24E+22
18	6.28	5.53	6.99	0.66	783308.3	50.63	5189.7	2647.82	39.63	1.38E+22
19	5.73	5.02	6.39	18.82	783308.3	50.63	5189.7	2647.82	32.96	3.27E+23
20	5.44	4.76	6.08	4.24	654781.8	50.63	5189.7	2647.82	29.74	5.56E+22
21	7.06	6.24	7.82	0.20	399647.1	50.63	5189.7	2647.82	50.09	2.75E+21
22	7.31	6.47	8.09	23.62	399647.1	50.63	5189.7	2647.82	53.67	3.41E+23
23	8.25	7.33	9.08	341.75	432258.3	50.63	5189.7	2647.82	68.29	6.80E+24
24	7.79	6.91	8.60	8.31	432258.3	50.63	5189.7	2647.82	60.93	1.47E+23
30	5.14	4.50	5.75	9.75	466148.4	50.63	5189.7	2647.82	26.60	8.15E+22
31	4.53	3.95	5.08	8.72	399647.1	50.63	5189.7	2647.82	20.64	4.84E+22
42	5.14	4.50	5.75	0.12	368314.8	50.63	5189.7	2647.82	26.60	8.16E+20

Table 47: List of subplays in the lower unnamed member of the Fort Union Formation, Wind River Indian Reservation where the Waltman seal is present play with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is tful. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Tful, Waltman present								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	5.10E+11	5.22E+22	2.29E+11	26.865	0.42797	2.30E+11	3.49E+11	4.65E+11	6.21E+11	9.40E+11
2	4.07E+11	3.33E+22	1.83E+11	26.641	0.42785	1.84E+11	2.79E+11	3.72E+11	4.96E+11	7.51E+11
3	6.03E+11	7.29E+22	2.70E+11	27.033	0.42763	2.72E+11	4.12E+11	5.50E+11	7.34E+11	1.11E+12
4	3.97E+11	3.16E+22	1.78E+11	26.615	0.42753	1.79E+11	2.71E+11	3.62E+11	4.83E+11	7.32E+11
5	3.42E+11	2.35E+22	1.53E+11	26.468	0.42753	1.55E+11	2.34E+11	3.13E+11	4.17E+11	6.31E+11
6	2.03E+12	8.30E+23	9.11E+11	28.25	0.42763	9.19E+11	1.39E+12	1.86E+12	2.48E+12	3.75E+12
7	5.75E+11	6.63E+22	2.57E+11	26.986	0.42774	2.59E+11	3.93E+11	5.24E+11	7.00E+11	1.06E+12
8	1.69E+11	5.72E+21	7.56E+10	25.761	0.42774	7.62E+10	1.15E+11	1.54E+11	2.06E+11	3.11E+11
9	2.30E+12	1.06E+24	1.03E+12	28.373	0.42785	1.04E+12	1.57E+12	2.10E+12	2.80E+12	4.25E+12
10	9.07E+11	1.65E+23	4.07E+11	27.442	0.42809	4.09E+11	6.20E+11	8.28E+11	1.10E+12	1.67E+12
11	7.68E+11	1.18E+23	3.44E+11	27.275	0.42809	3.46E+11	5.25E+11	7.00E+11	9.35E+11	1.42E+12
12	5.31E+11	5.68E+22	2.38E+11	26.907	0.42834	2.40E+11	3.63E+11	4.85E+11	6.47E+11	9.81E+11
12a	4.69E+11	4.43E+22	2.10E+11	26.782	0.42834	2.12E+11	3.21E+11	4.28E+11	5.71E+11	8.66E+11
13	8.91E+11	1.60E+23	4.00E+11	27.424	0.42861	4.02E+11	6.09E+11	8.13E+11	1.08E+12	1.64E+12
14	2.10E+11	8.89E+21	9.43E+10	25.978	0.42875	9.46E+10	1.43E+11	1.91E+11	2.56E+11	3.88E+11
15	1.36E+11	3.74E+21	6.11E+10	25.547	0.42785	6.16E+10	9.33E+10	1.24E+11	1.66E+11	2.52E+11
16	2.44E+11	1.19E+22	1.09E+11	26.127	0.42809	1.10E+11	1.67E+11	2.22E+11	2.97E+11	4.50E+11
17	1.36E+11	3.75E+21	6.12E+10	25.547	0.42834	6.15E+10	9.33E+10	1.24E+11	1.66E+11	2.52E+11
18	1.07E+11	2.32E+21	4.82E+10	25.307	0.42861	4.84E+10	7.33E+10	9.79E+10	1.31E+11	1.98E+11
19	5.22E+11	5.50E+22	2.35E+11	26.889	0.4289	2.35E+11	3.57E+11	4.76E+11	6.36E+11	9.64E+11
20	2.15E+11	9.35E+21	9.67E+10	26.002	0.42905	9.68E+10	1.47E+11	1.96E+11	2.62E+11	3.97E+11
21	4.79E+10	4.61E+20	2.15E+10	24.5	0.42821	2.16E+10	3.27E+10	4.37E+10	5.83E+10	8.84E+10
22	5.33E+11	5.72E+22	2.39E+11	26.91	0.42809	2.41E+11	3.65E+11	4.86E+11	6.49E+11	9.84E+11
23	2.38E+12	1.14E+24	1.07E+12	28.406	0.42763	1.07E+12	1.63E+12	2.17E+12	2.90E+12	4.39E+12
24	3.50E+11	2.47E+22	1.57E+11	26.491	0.42785	1.58E+11	2.40E+11	3.20E+11	4.27E+11	6.46E+11
30	2.60E+11	1.37E+22	1.17E+11	26.193	0.4292	1.17E+11	1.78E+11	2.37E+11	3.17E+11	4.81E+11
31	2.01E+11	8.16E+21	9.03E+10	25.933	0.42954	9.03E+10	1.37E+11	1.83E+11	2.44E+11	3.71E+11
42	2.60E+10	1.37E+20	1.17E+10	23.891	0.4292	1.17E+10	1.78E+10	2.38E+10	3.17E+10	4.81E+10
P.P.C.	1.63E+13	5.32E+25	7.30E+12			7.34E+12	1.11E+13	1.48E+13	1.98E+13	3.00E+13

Table 48: List of subplays in the lower unnamed member of the Fort Union Formation, Wind River Indian Reservation where the Waltman seal is present play with calculated fractiles for in-place gas. Mean in-place gas is listed in column 2 for comparison. The play code for the spreadsheet is tful. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Tful, no Waltman									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.909	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	3.03	450	8	30	50	11,000	4524.7	681	0.909	1.18E+11
2	2.47	450	8	30	50	12,000	4934.7	697	0.909	1.02E+11
3	0.87	500	8	30	50	12,500	5139.7	705	0.909	4.12E+10
4	4.61	625	8	30	50	12,500	5139.7	705	0.909	2.73E+11
5	27.18	625	8	30	50	12,000	4934.7	697	0.909	1.56E+12
6	16.34	675	8	30	50	11,000	4524.7	681	0.909	9.52E+11
7	3.02	725	8	30	50	10,000	4114.7	665	0.909	1.76E+11
8	1.03	750	8	30	50	9,000	3704.7	649	0.909	5.73E+10
9	10.09	875	8	30	50	12,000	4934.7	697	0.909	8.12E+11
10	7.49	875	8	30	50	11,000	4524.7	681	0.909	5.66E+11
11	3.43	875	8	30	50	10,000	4114.7	665	0.909	2.41E+11
12	3.93	875	8	30	50	9,000	3704.7	649	0.909	2.55E+11
13	10.75	1,100	8	30	50	12,000	4934.7	697	0.909	1.09E+12
14	10.4	1,125	8	30	50	11,000	4524.7	681	0.909	1.01E+12
15	3.6	1,125	8	30	50	10,000	4114.7	665	0.909	3.26E+11
16	4.46	1,125	8	30	50	9,000	3704.7	649	0.909	3.72E+11
17	0.74	1,200	8	30	50	8,500	3499.7	641	0.909	6.30E+10
18	11.98	1,300	8	30	50	11,000	4524.7	681	0.909	1.34E+12
19	16.03	1,300	8	30	50	10,000	4114.7	665	0.909	1.68E+12
20	8	1,300	8	30	50	9,000	3704.7	649	0.909	7.72E+11
21	0.4	1,250	8	30	50	8,500	3499.7	641	0.909	3.55E+10
22	21.35	1,125	8	30	50	9,000	3704.7	649	0.909	1.78E+12
23	5.08	1,200	8	30	50	9,500	3909.7	657	0.909	4.71E+11
24	1.47	1,100	8	30	50	8,500	3499.7	641	0.909	1.15E+11
25	0.62	1,000	8	30	50	8,500	3499.7	641	0.909	4.40E+10
26	10.82	900	8	30	50	9,000	3704.7	649	0.909	7.22E+11
27	16.17	875	8	30	50	8,000	3294.7	633	0.909	9.57E+11
28	0.79	750	8	30	50	7,500	3089.7	625	0.909	3.81E+10
29	9.17	700	8	30	50	7,000	2884.7	617	0.909	3.90E+11
30	18.81	675	8	30	50	7,000	2884.7	617	0.909	7.71E+11
31	14.23	600	8	30	50	6,000	2474.7	601	0.909	4.57E+11
32	9.55	550	8	30	50	5,000	2064.7	585	0.909	2.41E+11
33	12.49	450	8	30	50	5,000	2064.7	585	0.909	2.58E+11
34	0.18	500	8	30	50	5,500	2269.7	593	0.909	4.48E+09
35	20.76	350	8	10	50	4,000	1654.7	569	0.909	9.15E+10
36	2.74	350	8	10	50	3,000	1244.7	553	0.909	9.35E+09
37	1.37	250	8	20	50	4,000	1654.7	569	0.909	8.63E+09
38	1.38	200	8	10	50	3,000	1244.7	553	0.909	2.69E+09
									Total =	1.82E+13

Table 49

Table 49: List of subplays in the lower unnamed member, Wind River Indian Reservation where the Waltman seal is absent play. The play code for the spreadsheet is tfu2. To obtain a point estimate of the in-place gas of a subplay, point estimates were made of the six attributes listed in columns 2 through 7. These may vary from subplay to subplay within a play. An estimate of the Z factor or gas compressibility factor is listed in column 10. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report. The point estimate of in-place gas of a subplay listed in the last column is taken as a mean estimate.

Play Name :		Tful, no Waltman								(Panel 2)
		Depth		Closure	Thickness	Porosity	Trap Fill	HC Sat.	*Pe/TZ*	
	Range (%) =	30		30	50	60	100	80		
Subplay	Expect	F95 D.	F5 D.	Expect	Expect	Expect	Expect	Expect	Expect	Expect
No.	*Pe/TZ*	*Pe/TZ*	*Pe/TZ*	(Clo.)^2	(Thick.)^2	(Por.)^2	(Trap)^2	(HC S)^2	(*Pe/TZ*)^2	(Gas)^2
1	7.31	6.47	8.09	9.26	207177.1	66.13	983.1	2647.82	53.67	1.72E+22
2	7.79	6.91	8.60	6.15	207177.1	66.13	983.1	2647.82	60.93	1.29E+22
3	8.02	7.12	8.84	0.76	255774.2	66.13	983.1	2647.82	64.60	2.10E+21
4	8.02	7.12	8.84	21.43	399647.1	66.13	983.1	2647.82	64.60	9.22E+22
5	7.79	6.91	8.60	744.89	399647.1	66.13	983.1	2647.82	60.93	3.02E+24
6	7.31	6.47	8.09	269.22	466148.4	66.13	983.1	2647.82	53.67	1.12E+24
7	6.81	6.01	7.55	9.20	537765.2	66.13	983.1	2647.82	46.56	3.84E+22
8	6.28	5.53	6.99	1.07	575491.8	66.13	983.1	2647.82	39.63	4.07E+21
9	7.79	6.91	8.60	102.65	783308.3	66.13	983.1	2647.82	60.93	8.17E+23
10	7.31	6.47	8.09	56.57	783308.3	66.13	983.1	2647.82	53.67	3.97E+23
11	6.81	6.01	7.55	11.86	783308.3	66.13	983.1	2647.82	46.56	7.21E+22
12	6.28	5.53	6.99	15.57	783308.3	66.13	983.1	2647.82	39.63	8.06E+22
13	7.79	6.91	8.60	116.52	1237946.9	66.13	983.1	2647.82	60.93	1.47E+24
14	7.31	6.47	8.09	109.06	1294856.6	66.13	983.1	2647.82	53.67	1.26E+24
15	6.81	6.01	7.55	13.07	1294856.6	66.13	983.1	2647.82	46.56	1.31E+23
16	6.28	5.53	6.99	20.06	1294856.6	66.13	983.1	2647.82	39.63	1.72E+23
17	6.01	5.28	6.69	0.55	1473259.1	66.13	983.1	2647.82	36.26	4.92E+21
18	7.31	6.47	8.09	144.71	1729033.3	66.13	983.1	2647.82	53.67	2.24E+24
19	6.81	6.01	7.55	259.10	1729033.3	66.13	983.1	2647.82	46.56	3.48E+24
20	6.28	5.53	6.99	64.69	1729033.3	66.13	983.1	2647.82	39.63	7.39E+23
21	6.01	5.28	6.69	0.16	1598588.5	66.13	983.1	2647.82	36.26	1.56E+21
22	6.28	5.53	6.99	459.61	1294856.6	66.13	983.1	2647.82	39.63	3.93E+24
23	6.55	5.77	7.27	26.02	1473259.1	66.13	983.1	2647.82	43.07	2.75E+23
24	6.01	5.28	6.69	2.18	1237946.9	66.13	983.1	2647.82	36.26	1.63E+22
25	6.01	5.28	6.69	0.39	1023096.6	66.13	983.1	2647.82	36.26	2.40E+21
26	6.28	5.53	6.99	118.05	828708.3	66.13	983.1	2647.82	39.63	6.46E+23
27	5.73	5.02	6.39	263.64	783308.3	66.13	983.1	2647.82	32.96	1.13E+24
28	5.44	4.76	6.08	0.63	575491.8	66.13	983.1	2647.82	29.74	1.80E+21
29	5.14	4.50	5.75	84.79	501317.3	66.13	983.1	2647.82	26.60	1.89E+23
30	5.14	4.50	5.75	356.76	466148.4	66.13	983.1	2647.82	26.60	7.38E+23
31	4.53	3.95	5.08	204.18	368314.8	66.13	983.1	2647.82	20.64	2.59E+23
32	3.88	3.37	4.37	91.96	309486.7	66.13	983.1	2647.82	15.17	7.20E+22
33	3.88	3.37	4.37	157.30	207177.1	66.13	983.1	2647.82	15.17	8.24E+22
34	4.21	3.66	4.73	0.03	255774.2	66.13	983.1	2647.82	17.84	2.49E+19
35	3.20	2.77	3.61	434.56	125329.3	66.13	109.2	2647.82	10.30	1.04E+22
36	2.48	2.14	2.81	7.57	125329.3	66.13	109.2	2647.82	6.17	1.09E+20
37	3.20	2.77	3.61	1.89	63943.5	66.13	437.0	2647.82	10.30	9.24E+19
38	2.48	2.14	2.81	1.92	40923.9	66.13	109.2	2647.82	6.17	8.99E+18

Table 50: List of subplays in the lower unnamed member, Wind River Indian Reservation where the Waltman seal is absent play with estimates of ranges in percent for the six play attributes. The play code for the spreadsheet is tfu2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :		Tful, no Waltman								(Panel 3)
	In-place	In-place	In-place			In-place Fractiles				
Subplay	Mean gas	Var. gas	S.D. gas			F95	F75	F50	F25	F5
No.	(CF)	(CF)^2	(CF)	Mu	Sigma	(CF)	(CF)	(CF)	(CF)	(CF)
1	1.18E+11	3.31E+21	5.75E+10	25.384	0.46279	4.94E+10	7.74E+10	1.06E+11	1.44E+11	2.26E+11
2	1.02E+11	2.49E+21	4.99E+10	25.244	0.46258	4.29E+10	6.73E+10	9.19E+10	1.25E+11	1.97E+11
3	4.12E+10	4.05E+20	2.01E+10	24.335	0.46247	1.73E+10	2.71E+10	3.70E+10	5.06E+10	7.92E+10
4	2.73E+11	1.78E+22	1.33E+11	26.225	0.46247	1.15E+11	1.80E+11	2.45E+11	3.35E+11	5.25E+11
5	1.56E+12	5.83E+23	7.63E+11	27.97	0.46258	6.56E+11	1.03E+12	1.40E+12	1.92E+12	3.01E+12
6	9.52E+11	2.17E+23	4.65E+11	27.475	0.46279	4.00E+11	6.26E+11	8.55E+11	1.17E+12	1.83E+12
7	1.76E+11	7.41E+21	8.61E+10	25.787	0.46303	7.38E+10	1.16E+11	1.58E+11	2.16E+11	3.39E+11
8	5.73E+10	7.86E+20	2.80E+10	24.664	0.46328	2.40E+10	3.77E+10	5.15E+10	7.03E+10	1.10E+11
9	8.12E+11	1.57E+23	3.97E+11	27.316	0.46258	3.41E+11	5.34E+11	7.30E+11	9.97E+11	1.56E+12
10	5.66E+11	7.64E+22	2.76E+11	26.954	0.46279	2.37E+11	3.72E+11	5.08E+11	6.94E+11	1.09E+12
11	2.41E+11	1.39E+22	1.18E+11	26.102	0.46303	1.01E+11	1.59E+11	2.17E+11	2.96E+11	4.64E+11
12	2.55E+11	1.56E+22	1.25E+11	26.157	0.46328	1.07E+11	1.68E+11	2.29E+11	3.13E+11	4.91E+11
13	1.09E+12	2.82E+23	5.31E+11	27.608	0.46258	4.57E+11	7.16E+11	9.77E+11	1.33E+12	2.09E+12
14	1.01E+12	2.44E+23	4.94E+11	27.534	0.46279	4.24E+11	6.64E+11	9.07E+11	1.24E+12	1.94E+12
15	3.26E+11	2.53E+22	1.59E+11	26.402	0.46303	1.37E+11	2.14E+11	2.92E+11	4.00E+11	6.26E+11
16	3.72E+11	3.32E+22	1.82E+11	26.535	0.46328	1.56E+11	2.45E+11	3.34E+11	4.57E+11	7.16E+11
17	6.30E+10	9.51E+20	3.08E+10	24.759	0.46341	2.64E+10	4.14E+10	5.66E+10	7.73E+10	1.21E+11
18	1.34E+12	4.32E+23	6.57E+11	27.82	0.46279	5.64E+11	8.84E+11	1.21E+12	1.65E+12	2.59E+12
19	1.68E+12	6.71E+23	8.19E+11	28.04	0.46303	7.03E+11	1.10E+12	1.50E+12	2.06E+12	3.22E+12
20	7.72E+11	1.43E+23	3.78E+11	27.265	0.46328	3.24E+11	5.08E+11	6.94E+11	9.48E+11	1.49E+12
21	3.55E+10	3.01E+20	1.74E+10	24.185	0.46341	1.49E+10	2.33E+10	3.19E+10	4.35E+10	6.83E+10
22	1.78E+12	7.60E+23	8.72E+11	28.101	0.46328	7.47E+11	1.17E+12	1.60E+12	2.19E+12	3.43E+12
23	4.71E+11	5.31E+22	2.31E+11	26.772	0.46315	1.98E+11	3.10E+11	4.23E+11	5.79E+11	9.07E+11
24	1.15E+11	3.15E+21	5.61E+10	25.358	0.46341	4.81E+10	7.54E+10	1.03E+11	1.41E+11	2.21E+11
25	4.40E+10	4.63E+20	2.15E+10	24.4	0.46341	1.84E+10	2.89E+10	3.95E+10	5.40E+10	8.47E+10
26	7.22E+11	1.25E+23	3.53E+11	27.198	0.46328	3.03E+11	4.75E+11	6.49E+11	8.86E+11	1.39E+12
27	9.57E+11	2.19E+23	4.68E+11	27.479	0.46354	4.01E+11	6.29E+11	8.59E+11	1.17E+12	1.84E+12
28	3.81E+10	3.47E+20	1.86E+10	24.255	0.46368	1.59E+10	2.50E+10	3.42E+10	4.67E+10	7.33E+10
29	3.90E+11	3.65E+22	1.91E+11	26.582	0.46383	1.63E+11	2.56E+11	3.50E+11	4.79E+11	7.51E+11
30	7.71E+11	1.43E+23	3.78E+11	27.264	0.46383	3.23E+11	5.07E+11	6.93E+11	9.47E+11	1.49E+12
31	4.57E+11	5.02E+22	2.24E+11	26.74	0.46413	1.91E+11	3.00E+11	4.10E+11	5.61E+11	8.80E+11
32	2.41E+11	1.40E+22	1.18E+11	26.1	0.46446	1.01E+11	1.58E+11	2.16E+11	2.96E+11	4.64E+11
33	2.58E+11	1.60E+22	1.26E+11	26.167	0.46446	1.08E+11	1.69E+11	2.31E+11	3.16E+11	4.97E+11
34	4.48E+09	4.82E+18	2.20E+09	22.114	0.46429	1.87E+09	2.94E+09	4.02E+09	5.49E+09	8.62E+09
35	9.15E+10	2.02E+21	4.49E+10	25.132	0.46481	3.82E+10	6.00E+10	8.21E+10	1.12E+11	1.76E+11
36	9.35E+09	2.11E+19	4.59E+09	22.85	0.46516	3.90E+09	6.13E+09	8.39E+09	1.15E+10	1.80E+10
37	8.63E+09	1.79E+19	4.24E+09	22.77	0.46481	3.60E+09	5.66E+09	7.74E+09	1.06E+10	1.66E+10
38	2.69E+09	1.75E+18	1.32E+09	21.605	0.46516	1.12E+09	1.76E+09	2.41E+09	3.30E+09	5.19E+09
P.P.C.	1.82E+13	7.93E+25	8.90E+12			7.63E+12	1.20E+13	1.64E+13	2.23E+13	3.50E+13

Table 51: List of subplays in the lower unnamed member, Wind River Indian Reservation where the Waltman seal is absent play with calculated fractiles for in-place gas. Mean in-place gas is listed in column 2 for comparison. The play code for the spreadsheet is tfu2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Aggregation Name :			Wind River Reservation					
	In-place	In-place	In-place	In-place Fractiles				
Play	Mean gas	Var. gas	S.D. gas	F95	F75	F50	F25	F5
Name	(CF)	(CF)^2	(CF)	(CF)	(CF)	(CF)	(CF)	(CF)
TFU1	1.63E+13	5.32E+25	7.3E+12	7.34E+12	1.11E+13	1.48E+13	1.98E+13	3.00E+13
TFU2	1.82E+13	7.93E+25	8.90E+12	7.63E+12	1.20E+13	1.64E+13	2.23E+13	3.50E+13
LANCE1	8.3E+13	4.38E+26	2.09E+13	5.35E+13	6.81E+13	8.05E+13	9.52E+13	1.21E+14
LANCE2	1.56E+13	5.83E+25	7.64E+12	6.56E+12	1.03E+13	1.40E+13	1.92E+13	3.01E+13
MEET1	1.47E+13	1.3E+25	3.61E+12	9.56E+12	1.21E+13	1.42E+13	1.68E+13	2.12E+13
MEET2	2.14E+13	2.91E+25	5.39E+12	1.38E+13	1.76E+13	2.08E+13	2.46E+13	3.12E+13
MEET3	8.97E+12	1.92E+25	4.38E+12	3.76E+12	5.90E+12	8.06E+12	1.10E+13	1.73E+13
KMV1	1.3E+13	1.03E+25	3.2E+12	8.46E+12	1.07E+13	1.26E+13	1.49E+13	1.88E+13
KMV2	4.48E+12	1.27E+24	1.13E+12	2.89E+12	3.67E+12	4.34E+12	5.13E+12	6.53E+12
KMV3	2.97E+12	2.11E+24	1.45E+12	1.25E+12	1.95E+12	2.67E+12	3.65E+12	5.72E+12
KMV4	2.08E+13	2.62E+25	5.12E+12	1.35E+13	1.71E+13	2.02E+13	2.38E+13	3.01E+13
KMV5	2.43E+13	3.75E+25	6.13E+12	1.57E+13	2.00E+13	2.36E+13	2.79E+13	3.55E+13
KMV6	1.49E+13	5.3E+25	7.28E+12	6.25E+12	9.80E+12	1.34E+13	1.83E+13	2.87E+13
CODY3	2.79E+11	1.87E+22	1.37E+11	1.17E+11	1.84E+11	2.51E+11	3.43E+11	5.38E+11
FRONT1	3.73E+13	8.47E+25	9.2E+12	2.43E+13	3.08E+13	3.63E+13	4.27E+13	5.41E+13
FRONT2	1.84E+13	2.17E+25	4.65E+12	1.19E+13	1.51E+13	1.79E+13	2.11E+13	2.69E+13
FRONT3	1.72E+12	7.08E+23	8.41E+11	7.20E+11	1.13E+12	1.54E+12	2.11E+12	3.31E+12
Aggregation:								
P.P.C.	3.16E+14	9.47E+27	9.73E+13	1.87E+14	2.48E+14	3.02E+14	3.69E+14	4.96E+14

Table 52: List of mean in-place gas and the five fractiles for in-place gas for each of the 17 plays in the Wind River Indian Reservation. An aggregation of in-place gas for all 22 plays is listed at the bottom if the table.

Play Name :	Frontier > 300F									(Panel 1)
						a =	0.727	0.016	0.00008	
						b =	14.7	505	0	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
29	3.29	140	6	100	50	13,000	9465.7	713	1.04	1.74E+11
32	5.9	160	6	100	50	13,000	9465.7	713	1.04	3.56E+11
					13,000 Total					5.29E+11
26	7.92	160	6	100	50	14,000	10192.7	729	1.12	4.67E+11
28	17.58	145	6	100	50	14,000	10192.7	729	1.12	9.40E+11
31	8.78	170	6	100	50	14,000	10192.7	729	1.12	5.50E+11
					14,000 Total					1.96E+12
33	1.42	190	6	100	50	14,500	10556.2	737	1.16	9.84E+10
					14,500 Total					9.84E+10
25	15.45	160	6	100	50	15,000	10919.7	745	1.2	8.92E+11
27	11.55	145	6	100	50	15,000	10919.7	745	1.2	6.04E+11
30	25.03	175	6	100	50	15,000	10919.7	745	1.2	1.58E+12
					15,000 Total					3.08E+12
15	3.64	215	6	100	50	16,000	11646.7	761	1.28	2.76E+11
24	55.89	165	6	100	50	16,000	11646.7	761	1.28	3.26E+12
					16,000 Total					3.53E+12
14	5.8	225	6	100	50	17,000	12373.7	777	1.36	4.51E+11
23	47.19	175	6	100	50	17,000	12373.7	777	1.36	2.86E+12
					17,000 Total					3.31E+12
13	6.63	225	6	100	50	18,000	13100.7	793	1.44	5.05E+11
22	36.48	175	6	100	50	18,000	13100.7	793	1.44	2.16E+12
98	3.18	220	6	100	50	18,000	13100.7	793	1.44	2.37E+11
					18,000 Total					2.90E+12
6	1.02	250	6	100	50	19,000	13827.7	809	1.52	8.47E+10
12	7.27	225	6	100	50	19,000	13827.7	809	1.52	5.43E+11
21	33.26	175	6	100	50	19,000	13827.7	809	1.52	1.93E+12
					19,000 Total					2.56E+12
5	2.5	260	6	100	50	20,000	14554.7	825	1.6	2.12E+11
11	9.3	225	6	100	50	20,000	14554.7	825	1.6	6.81E+11
20	26.77	175	6	100	50	20,000	14554.7	825	1.6	1.53E+12
					20,000 Total					2.42E+12
4	4.13	260	6	100	50	21,000	15281.7	841	1.68	3.43E+11
10	9.04	225	6	100	50	21,000	15281.7	841	1.68	6.50E+11
19	23.33	175	6	100	50	21,000	15281.7	841	1.68	1.30E+12
					21,000 Total					2.30E+12
97	0.44	280	6	100	50	21,500	15645.2	849	1.72	3.90E+10
					21,500 Total					3.90E+10
3	7.72	280	6	100	50	22,000	16008.7	857	1.76	6.77E+11
9	10.79	225	6	100	50	22,000	16008.7	857	1.76	7.61E+11
18	23.58	175	6	100	50	22,000	16008.7	857	1.76	1.29E+12
					22,000 Total					2.73E+12
2	37.82	270	6	100	50	23,000	16735.7	873	1.84	3.14E+12
8	30.34	225	6	100	50	23,000	16735.7	873	1.84	2.10E+12
17	19.74	175	6	100	50	23,000	16735.7	873	1.84	1.06E+12
					23,000 Total					6.30E+12
1	19.88	260	6	100	50	24,000	17462.7	889	1.92	1.56E+12

Table 53

7	56.98	225	6	100	50	24,000	17462.7	889	1.92	3.87E+12
16	2.72	190	6	100	50	24,000	17462.7	889	1.92	1.56E+11
					24,000 Total					5.59E+12
					Grand Total					3.73E+13

Table 53: Mean in-place gas for subplays in the Frontier Formation highly overpressured play (T<300°F), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is front1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Front 2 > 1.1									(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.095	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
45	2.48	125	7	100	50	7,000	3654.7	617	1.095	5.78E+10
					7,000 Total					5.78E+10
44	3.08	125	7	100	50	8,000	4174.7	633	1.095	7.99E+10
					8,000 Total					7.99E+10
36	5	130	7	100	50	9,000	4694.7	649	1.095	1.48E+11
43	4.1	120	7	100	50	9,000	4694.7	649	1.095	1.12E+11
					9,000 Total					2.60E+11
23	6.74	225	7	100	50	10,000	5214.7	665	1.095	3.74E+11
29	8.83	175	7	100	50	10,000	5214.7	665	1.095	3.81E+11
35	26.88	130	7	100	50	10,000	5214.7	665	1.095	8.62E+11
40	1.25	145	7	100	50	10,000	5214.7	665	1.095	4.47E+10
42	8.79	125	7	100	50	10,000	5214.7	665	1.095	2.71E+11
					10,000 Total					1.93E+12
13	0.29	255	7	100	50	10,500	5474.7	673	1.095	1.89E+10
					10,500 Total					1.89E+10
12	1.15	255	7	100	50	11,000	5734.7	681	1.095	7.77E+10
14	2.34	255	7	100	50	11,000	5734.7	681	1.095	1.58E+11
22	8.45	225	7	100	50	11,000	5734.7	681	1.095	5.04E+11
28	14.85	175	7	100	50	11,000	5734.7	681	1.095	6.88E+11
34	37.24	130	7	100	50	11,000	5734.7	681	1.095	1.28E+12
					11,000 Total					2.71E+12
11	6.72	255	7	100	50	12,000	6254.7	697	1.095	4.84E+11
21	6.88	225	7	100	50	12,000	6254.7	697	1.095	4.37E+11
27	14.65	175	7	100	50	12,000	6254.7	697	1.095	7.24E+11
32	50.43	125	7	100	50	12,000	6254.7	697	1.095	1.78E+12
					12,000 Total					3.42E+12
10	4.1	265	7	100	50	13,000	6774.7	713	1.095	3.25E+11
20	8.36	225	7	100	50	13,000	6774.7	713	1.095	5.62E+11
26	11.77	185	7	100	50	13,000	6774.7	713	1.095	6.51E+11
31	24.95	140	7	100	50	13,000	6774.7	713	1.095	1.04E+12
33	1.04	135	7	100	50	13,000	6774.7	713	1.095	4.20E+10
41	0.66	155	7	100	50	13,000	6774.7	713	1.095	3.06E+10
					13,000 Total					2.65E+12
41a	3.76	150	7	100	50	13,500	7034.7	721	1.095	1.73E+11
					13,500 Total					1.73E+11
9	3.77	265	7	100	50	14,000	7294.7	729	1.095	3.14E+11
19	6.79	225	7	100	50	14,000	7294.7	729	1.095	4.81E+11
25	7.62	190	7	100	50	14,000	7294.7	729	1.095	4.56E+11
30	8.1	140	7	100	50	14,000	7294.7	729	1.095	3.57E+11
					14,000 Total					1.61E+12
8	3.52	265	7	100	50	15,000	7814.7	745	1.095	3.08E+11
18	8.2	225	7	100	50	15,000	7814.7	745	1.095	6.09E+11
24	0.49	200	7	100	50	15,000	7814.7	745	1.095	3.23E+10
					15,000 Total					9.49E+11
7	4.53	265	7	100	50	16,000	8334.7	761	1.095	4.14E+11
17	8.72	230	7	100	50	16,000	8334.7	761	1.095	6.91E+11

Table 54

					16,000 Total					1.10E+12
6	4.51	265	7	100	50	17,000	8854.7	777	1.095	4.28E+11
16	2.39	245	7	100	50	17,000	8854.7	777	1.095	2.10E+11
					17,000 Total					6.38E+11
5	6.88	265	7	100	50	18,000	9374.7	793	1.095	6.78E+11
15	0.89	245	7	100	50	18,000	9374.7	793	1.095	8.11E+10
					18,000 Total					7.59E+11
4	6.23	265	7	100	50	19,000	9894.7	809	1.095	6.35E+11
					19,000 Total					6.35E+11
3	5.96	265	7	100	50	20,000	10414.7	825	1.095	6.27E+11
					20,000 Total					6.27E+11
2	3.43	270	7	100	50	21,000	10934.7	841	1.095	3.79E+11
					21,000 Total					3.79E+11
1	3.64	270	7	100	50	22,000	11454.7	857	1.095	4.13E+11
					22,000 Total					4.13E+11
					Grand Total					1.84E+13

Table 54: Mean in-place gas for subplays in the Frontier Formation moderately overpressured play (Rm>1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is front2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Front .73-1.1									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.9074	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
31	2.52	120	7	50	50	6,000	2474.7	601	0.9074	2.36E+10
						6,000 Total				2.36E+10
7	4.77	215	7	50	50	7,000	2884.7	617	0.9074	9.10E+10
8	2.95	195	7	50	50	7,000	2884.7	617	0.9074	5.10E+10
13	0.81	150	7	50	50	7,000	2884.7	617	0.9074	1.08E+10
17	1.81	125	7	50	50	7,000	2884.7	617	0.9074	2.01E+10
20	3.46	90	7	50	50	7,000	2884.7	617	0.9074	2.76E+10
22	3.83	125	7	50	50	7,000	2884.7	617	0.9074	4.25E+10
30	0.91	120	7	50	50	7,000	2884.7	617	0.9074	9.69E+09
						7,000 Total				2.53E+11
1	0.78	250	7	50	50	8,000	3294.7	633	0.9074	1.93E+10
4	9.85	225	7	50	50	8,000	3294.7	633	0.9074	2.19E+11
9	5.02	190	7	50	50	8,000	3294.7	633	0.9074	9.42E+10
12	2.96	155	7	50	50	8,000	3294.7	633	0.9074	4.53E+10
16	4.76	125	7	50	50	8,000	3294.7	633	0.9074	5.88E+10
19	4.14	95	7	50	50	8,000	3294.7	633	0.9074	3.89E+10
21	6.97	120	7	50	50	8,000	3294.7	633	0.9074	8.26E+10
52	5.77	140	7	50	50	8,000	3294.7	633	0.9074	7.98E+10
						8,000 Total				6.38E+11
18	1.57	100	7	50	50	8,500	3499.7	641	0.9074	1.63E+10
						8,500 Total				1.63E+10
2	1.58	250	7	50	50	9,000	3704.7	649	0.9074	4.28E+10
5	10.02	225	7	50	50	9,000	3704.7	649	0.9074	2.44E+11
15	10.55	125	7	50	50	9,000	3704.7	649	0.9074	1.43E+11
51	4.86	125	7	50	50	9,000	3704.7	649	0.9074	6.58E+10
						9,000 Total				4.96E+11
3	1	255	7	50	50	10,000	4114.7	665	0.9074	2.99E+10
6	3.57	245	7	50	50	10,000	4114.7	665	0.9074	1.03E+11
11	3.75	160	7	50	50	10,000	4114.7	665	0.9074	7.05E+10
14	3.8	140	7	50	50	10,000	4114.7	665	0.9074	6.25E+10
						10,000 Total				2.66E+11
6a	0.83	250	7	50	50	11,500	4729.7	689	0.9074	2.70E+10
						11,500 Total				2.70E+10
						Grand Total				1.72E+12

Table 55: Mean in-place gas for subplays in the Frontier Formation transition play (Rm 0.73-1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is front3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Cody 1.1-.73									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.913	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
7	0.02	105	7	30	50	5,500	2269.7	593	0.913	9.10E+07
14	0.63	60	7	30	50	5,500	2269.7	593	0.913	1.64E+09
					5,500 Total					1.73E+09
13	2.35	70	7	30	50	6,000	2474.7	601	0.913	7.67E+09
					6,000 Total					7.67E+09
16	0.58	105	7	30	50	6,500	2679.7	609	0.913	3.03E+09
21	0.39	425	7	30	50	6,500	2679.7	609	0.913	8.26E+09
					6,500 Total					1.13E+10
3	7.83	75	7	30	50	7,000	2884.7	617	0.913	3.11E+10
12	2.39	75	7	30	50	7,000	2884.7	617	0.913	9.49E+09
15	3.35	110	7	30	50	7,000	2884.7	617	0.913	1.95E+10
20	1.05	425	7	30	50	7,000	2884.7	617	0.913	2.36E+10
					7,000 Total					8.37E+10
2	3.28	75	7	30	50	8,000	3294.7	633	0.913	1.45E+10
10	7.49	110	7	30	50	8,000	3294.7	633	0.913	4.85E+10
11	11.96	75	7	30	50	8,000	3294.7	633	0.913	5.28E+10
19	0.1	425	7	30	50	8,000	3294.7	633	0.913	2.50E+09
					8,000 Total					1.18E+11
8	4.62	75	7	30	50	9,000	3704.7	649	0.913	2.24E+10
9	0.51	100	7	30	50	9,000	3704.7	649	0.913	3.30E+09
					9,000 Total					2.57E+10
1	6.29	70	7	30	50	10,000	4114.7	665	0.913	3.08E+10
					10,000 Total					3.08E+10
					Grand Total					2.79E+11

Table 56: Mean in-place gas for subplays in the Cody Shale transition play (Rm 0.73-1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is cody3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Marine Kmv > 300									(Panel 1)
						a =	0.727	0.016	0.00008	
						b =	14.7	505	0	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
17	1.79	250	6	100	50	16,000	11646.7	761	1.28	1.58E+11
23	2.09	350	6	100	50	16,000	11646.7	761	1.28	2.58E+11
28	1.18	450	6	100	50	16,000	11646.7	761	1.28	1.87E+11
					16,000 Total					6.04E+11
5	2.98	100	6	100	50	17,000	12373.7	777	1.36	1.03E+11
10	5.88	150	6	100	50	17,000	12373.7	777	1.36	3.05E+11
16	2.17	250	6	100	50	17,000	12373.7	777	1.36	1.88E+11
22	2.41	350	6	100	50	17,000	12373.7	777	1.36	2.92E+11
27	2.1	450	6	100	50	17,000	12373.7	777	1.36	3.27E+11
					17,000 Total					1.21E+12
4	14.91	90	6	100	50	18,000	13100.7	793	1.44	4.55E+11
9	9.69	150	6	100	50	18,000	13100.7	793	1.44	4.92E+11
15	4.55	250	6	100	50	18,000	13100.7	793	1.44	3.85E+11
21	5.35	350	6	100	50	18,000	13100.7	793	1.44	6.34E+11
26	2.71	450	6	100	50	18,000	13100.7	793	1.44	4.13E+11
					18,000 Total					2.38E+12
3	13.2	80	6	100	50	19,000	13827.7	809	1.52	3.51E+11
8	17.25	150	6	100	50	19,000	13827.7	809	1.52	8.59E+11
14	6.88	250	6	100	50	19,000	13827.7	809	1.52	5.71E+11
20	7.29	350	6	100	50	19,000	13827.7	809	1.52	8.47E+11
25	3.74	450	6	100	50	19,000	13827.7	809	1.52	5.59E+11
					19,000 Total					3.19E+12
2	27.93	80	6	100	50	20,000	14554.7	825	1.6	7.27E+11
7	22.76	150	6	100	50	20,000	14554.7	825	1.6	1.11E+12
13	9.75	250	6	100	50	20,000	14554.7	825	1.6	7.94E+11
19	7.3	350	6	100	50	20,000	14554.7	825	1.6	8.32E+11
24	2.12	450	6	100	50	20,000	14554.7	825	1.6	3.11E+11
					20,000 Total					3.77E+12
1	6.23	90	6	100	50	21,000	15281.7	841	1.68	1.79E+11
6	17.42	150	6	100	50	21,000	15281.7	841	1.68	8.34E+11
12	5.93	250	6	100	50	21,000	15281.7	841	1.68	4.73E+11
18	3.15	350	6	100	50	21,000	15281.7	841	1.68	3.52E+11
					21,000 Total					1.84E+12
					Grand Total					1.30E+13

Table 57: Mean in-place gas for subplays in the marginal marine Mesaverde highly overpressured play (T>300°F), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is kmv1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Marine Kmv > 1.1									(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.16	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
35	1.82	530	7	50	50	11,500	5994.7	689	1.16	1.25E+11
					11,500 Total					1.25E+11
19	1.95	250	7	50	50	12,000	6254.7	697	1.16	6.50E+10
24	2.56	350	7	50	50	12,000	6254.7	697	1.16	1.19E+11
29	1.38	450	7	50	50	12,000	6254.7	697	1.16	8.27E+10
34	2.28	530	7	50	50	12,000	6254.7	697	1.16	1.61E+11
					12,000 Total					4.28E+11
9	1.37	100	7	50	50	12,500	6514.7	705	1.16	1.88E+10
14	3.33	150	7	50	50	12,500	6514.7	705	1.16	6.85E+10
					12,500 Total					8.73E+10
8	10.08	90	7	50	50	13,000	6774.7	713	1.16	1.28E+11
13	5.89	150	7	50	50	13,000	6774.7	713	1.16	1.25E+11
18	1.8	250	7	50	50	13,000	6774.7	713	1.16	6.35E+10
23	2.29	350	7	50	50	13,000	6774.7	713	1.16	1.13E+11
28	1.29	450	7	50	50	13,000	6774.7	713	1.16	8.19E+10
33	1.17	530	7	50	50	13,000	6774.7	713	1.16	8.75E+10
					13,000 Total					5.99E+11
7	9.51	80	7	50	50	14,000	7294.7	729	1.16	1.13E+11
12	4.6	150	7	50	50	14,000	7294.7	729	1.16	1.03E+11
17	2.11	250	7	50	50	14,000	7294.7	729	1.16	7.84E+10
22	2.46	350	7	50	50	14,000	7294.7	729	1.16	1.28E+11
27	1.47	450	7	50	50	14,000	7294.7	729	1.16	9.83E+10
32	0.55	530	7	50	50	14,000	7294.7	729	1.16	4.33E+10
96	8.59	140	7	50	50	14,000	7294.7	729	1.16	1.79E+11
97	2.97	210	7	50	50	14,000	7294.7	729	1.16	9.27E+10
98	2.21	175	7	50	50	14,000	7294.7	729	1.16	5.75E+10
99	0.43	450	7	50	50	14,000	7294.7	729	1.16	2.87E+10
					14,000 Total					9.21E+11
6	11.4	80	7	50	50	15,000	7814.7	745	1.16	1.42E+11
11	3.62	150	7	50	50	15,000	7814.7	745	1.16	8.46E+10
16	1.75	250	7	50	50	15,000	7814.7	745	1.16	6.81E+10
21	2.39	350	7	50	50	15,000	7814.7	745	1.16	1.30E+11
26	1.56	450	7	50	50	15,000	7814.7	745	1.16	1.09E+11
95	14.02	130	7	50	50	15,000	7814.7	745	1.16	2.84E+11
					15,000 Total					8.18E+11
15	0.49	250	7	50	50	15,500	8074.7	753	1.16	1.95E+10
20	0.57	350	7	50	50	15,500	8074.7	753	1.16	3.18E+10
25	0.81	450	7	50	50	15,500	8074.7	753	1.16	5.80E+10
					15,500 Total					1.09E+11
5	19.43	80	7	50	50	16,000	8334.7	761	1.16	2.53E+11
10	2.26	150	7	50	50	16,000	8334.7	761	1.16	5.51E+10
94	11.07	120	7	50	50	16,000	8334.7	761	1.16	2.16E+11
					16,000 Total					5.24E+11
93	2.14	100	7	50	50	16,500	8594.7	769	1.16	3.55E+10
					16,500 Total					3.55E+10
4	22.09	80	7	50	50	17,000	8854.7	777	1.16	2.99E+11

Table 58

					17,000 Total					2.99E+11
3	11.26	90	7	50	50	18,000	9374.7	793	1.16	1.78E+11
					18,000 Total					1.78E+11
2	10.44	80	7	50	50	19,000	9894.7	809	1.16	1.52E+11
					19,000 Total					1.52E+11
1	13.48	80	7	50	50	20,000	10414.7	825	1.16	2.02E+11
					20,000 Total					2.02E+11
					Grand Total					4.48E+12

Table 58: Mean in-place gas for subplays in the marginal marine Mesaverde moderately overpressured play (Rm>1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is kmv2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Marine Kmv 1.1-.73									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.8989	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
36	8.63	140	7	20	50	6,000	2474.7	601	0.8989	3.81E+10
63	1.81	440	7	20	50	6,000	2474.7	601	0.8989	2.51E+10
68	1.13	50	7	20	50	6,000	2474.7	601	0.8989	1.78E+09
					6,000 Total					6.50E+10
29	0.45	90	7	20	50	6,500	2679.7	609	0.8989	1.37E+09
58a	0.39	220	7	20	50	6,500	2679.7	609	0.8989	2.89E+09
					6,500 Total					4.26E+09
8	1.15	140	7	20	50	7,000	2884.7	617	0.8989	5.77E+09
28	5.98	80	7	20	50	7,000	2884.7	617	0.8989	1.71E+10
35	12.41	150	7	20	50	7,000	2884.7	617	0.8989	6.67E+10
43	7.7	250	7	20	50	7,000	2884.7	617	0.8989	6.90E+10
48	16.34	340	7	20	50	7,000	2884.7	617	0.8989	1.99E+11
53	1.06	450	7	20	50	7,000	2884.7	617	0.8989	1.71E+10
58	2.42	525	7	20	50	7,000	2884.7	617	0.8989	4.55E+10
62	4.47	440	7	20	50	7,000	2884.7	617	0.8989	7.05E+10
67	0.87	50	7	20	50	7,000	2884.7	617	0.8989	1.56E+09
					7,000 Total					4.92E+11
7	3.36	140	7	20	50	8,000	3294.7	633	0.8989	1.88E+10
27	8.06	70	7	20	50	8,000	3294.7	633	0.8989	2.25E+10
34	4.63	150	7	20	50	8,000	3294.7	633	0.8989	2.77E+10
42	2.91	250	7	20	50	8,000	3294.7	633	0.8989	2.90E+10
47	4.03	350	7	20	50	8,000	3294.7	633	0.8989	5.63E+10
52	0.92	450	7	20	50	8,000	3294.7	633	0.8989	1.65E+10
57	2.1	525	7	20	50	8,000	3294.7	633	0.8989	4.40E+10
61	2.09	440	7	20	50	8,000	3294.7	633	0.8989	3.67E+10
					8,000 Total					2.51E+11
20	0.65	140	7	20	50	8,500	3499.7	641	0.8989	3.81E+09
					8,500 Total					3.81E+09
6	5.18	140	7	20	50	9,000	3704.7	649	0.8989	3.17E+10
18	1.85	150	7	20	50	9,000	3704.7	649	0.8989	1.21E+10
19	1.96	210	7	20	50	9,000	3704.7	649	0.8989	1.80E+10
26	7.21	70	7	20	50	9,000	3704.7	649	0.8989	2.21E+10
33	4.98	150	7	20	50	9,000	3704.7	649	0.8989	3.27E+10
41	4.56	250	7	20	50	9,000	3704.7	649	0.8989	4.99E+10
46	3.84	350	7	20	50	9,000	3704.7	649	0.8989	5.88E+10
51	0.97	450	7	20	50	9,000	3704.7	649	0.8989	1.91E+10
56	2.41	525	7	20	50	9,000	3704.7	649	0.8989	5.54E+10
60	0.72	440	7	20	50	9,000	3704.7	649	0.8989	1.39E+10
					9,000 Total					3.14E+11
5	21.49	150	7	20	50	10,000	4114.7	665	0.8989	1.53E+11
12	6.42	220	7	20	50	10,000	4114.7	665	0.8989	6.70E+10
17	1.81	150	7	20	50	10,000	4114.7	665	0.8989	1.29E+10
25	9.7	70	7	20	50	10,000	4114.7	665	0.8989	3.22E+10
32	4.42	150	7	20	50	10,000	4114.7	665	0.8989	3.14E+10
40	4.42	250	7	20	50	10,000	4114.7	665	0.8989	5.24E+10
45	3.19	350	7	20	50	10,000	4114.7	665	0.8989	5.29E+10

Table 59

50	0.94	450	7	20	50	10,000	4114.7	665	0.8989	2.01E+10
55	1.84	525	7	20	50	10,000	4114.7	665	0.8989	4.58E+10
59	0.02	440	7	20	50	10,000	4114.7	665	0.8989	4.17E+08
					10,000 Total					4.68E+11
4	20.76	150	7	20	50	11,000	4524.7	681	0.8989	1.59E+11
11	7.98	220	7	20	50	11,000	4524.7	681	0.8989	8.94E+10
16	2.88	150	7	20	50	11,000	4524.7	681	0.8989	2.20E+10
24	13.57	70	7	20	50	11,000	4524.7	681	0.8989	4.84E+10
29a	0.48	500	7	20	50	11,000	4524.7	681	0.8989	1.22E+10
31	5.6	150	7	20	50	11,000	4524.7	681	0.8989	4.28E+10
39	3.38	250	7	20	50	11,000	4524.7	681	0.8989	4.30E+10
44	2.34	350	7	20	50	11,000	4524.7	681	0.8989	4.17E+10
49	0.76	450	7	20	50	11,000	4524.7	681	0.8989	1.74E+10
					11,000 Total					4.75E+11
10a	2.01	200	7	20	50	11,500	4729.7	689	0.8989	2.11E+10
44a	0.28	320	7	20	50	11,500	4729.7	689	0.8989	4.71E+09
54	0.41	525	7	20	50	11,500	4729.7	689	0.8989	1.13E+10
					11,500 Total					3.72E+10
3	12.97	150	7	20	50	12,000	4934.7	697	0.8989	1.06E+11
10	16.31	210	7	20	50	12,000	4934.7	697	0.8989	1.86E+11
15	3.01	150	7	20	50	12,000	4934.7	697	0.8989	2.45E+10
23	14.56	70	7	20	50	12,000	4934.7	697	0.8989	5.53E+10
30	3.38	150	7	20	50	12,000	4934.7	697	0.8989	2.75E+10
38	1.07	250	7	20	50	12,000	4934.7	697	0.8989	1.45E+10
					12,000 Total					4.13E+11
2	16.9	150	7	20	50	13,000	5344.7	713	0.8989	1.46E+11
9	10.98	210	7	20	50	13,000	5344.7	713	0.8989	1.32E+11
14	5.91	150	7	20	50	13,000	5344.7	713	0.8989	5.09E+10
22	11.28	70	7	20	50	13,000	5344.7	713	0.8989	4.54E+10
					13,000 Total					3.74E+11
1	4.55	150	7	20	50	13,500	5549.7	721	0.8989	4.03E+10
					13,500 Total					4.03E+10
13	2.18	150	7	20	50	14,000	5754.7	729	0.8989	1.98E+10
21	2.9	80	7	20	50	14,000	5754.7	729	0.8989	1.40E+10
					14,000 Total					3.38E+10
					Grand Total					2.97E+12

Table 59: Mean in-place gas for subplays in the marginal marine Mesaverde transition play (Rm 0.73-1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is kmv3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Nonmarine Kmv > 300				a =	0.727	0.016	0.00008	(Panel 1)
					b =	14.7	505	0	
	MEAN								
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
*37a	14.4	150	6	100	50	16,000	11646.7	761	1.28	7.63E+11
*38a	3.88	150	6	100	50	16,000	11646.7	761	1.28	2.05E+11
					16,000 Total					9.68E+11
6	9.26	320	6	100	50	17,000	12373.7	777	1.36	1.02E+12
*23a	2.38	250	6	100	50	17,000	12373.7	777	1.36	2.06E+11
*27a	1.72	450	6	100	50	17,000	12373.7	777	1.36	2.68E+11
28	4.74	300	6	100	50	17,000	12373.7	777	1.36	4.92E+11
*31a	1.84	200	6	100	50	17,000	12373.7	777	1.36	1.27E+11
*33a	1.2	150	6	100	50	17,000	12373.7	777	1.36	6.22E+10
*36a	2.68	150	6	100	50	17,000	12373.7	777	1.36	1.39E+11
					17,000 Total					2.32E+12
*22a	2.86	250	6	100	50	17,500	12737.2	785	1.4	2.45E+11
					17,500 Total					2.45E+11
5	33.28	340	6	100	50	18,000	13100.7	793	1.44	3.83E+12
*22b	8.68	225	6	100	50	18,000	13100.7	793	1.44	6.62E+11
*32a	7.86	175	6	100	50	18,000	13100.7	793	1.44	4.66E+11
					18,000 Total					4.96E+12
*15a	5.02	200	6	100	50	18,500	13464.2	801	1.48	3.37E+11
*16a	5.51	200	6	100	50	18,500	13464.2	801	1.48	3.70E+11
					18,500 Total					7.06E+11
2	9.7	415	6	100	50	19,000	13827.7	809	1.52	1.34E+12
4	29.4	350	6	100	50	19,000	13827.7	809	1.52	3.42E+12
*17a	28.26	225	6	100	50	19,000	13827.7	809	1.52	2.11E+12
					19,000 Total					6.86E+12
1	2.13	410	6	100	50	19,500	14191.2	817	1.56	2.87E+11
					19,500 Total					2.87E+11
3	36.92	370	6	100	50	20,000	14554.7	825	1.6	4.45E+12
					20,000 Total					4.45E+12
					Grand Total					2.08E+13

Table 60: Mean in-place gas for subplays in the nonmarine Mesaverde highly overpressured play (T>300°F), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is kmv4. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Nonmarine Kmv > 1.1									(Panel 1)
* Half thickness wedge shape area						a =	0.52	0.016	0	
						b =	14.7	505	1.24	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
42	0.14	190	7	100	50	11,000	5734.7	681	1.24	6.22E+09
					11,000 Total					6.22E+09
*92	0.29	200	7	100	50	11,500	5994.7	689	1.24	1.40E+10
*93	0.62	175	7	100	50	11,500	5994.7	689	1.24	2.62E+10
*94	5.26	120	7	100	50	11,500	5994.7	689	1.24	1.53E+11
*95	0.87	90	7	100	50	11,500	5994.7	689	1.24	1.89E+10
*96	0.36	90	7	100	50	11,500	5994.7	689	1.24	7.83E+09
					11,500 Total					2.20E+11
41	2.03	230	7	100	50	12,000	6254.7	697	1.24	1.16E+11
*90	15.92	130	7	100	50	12,000	6254.7	697	1.24	5.16E+11
*91	5.7	175	7	100	50	12,000	6254.7	697	1.24	2.49E+11
					12,000 Total					8.81E+11
40	7.64	250	7	100	50	13,000	6774.7	713	1.24	5.04E+11
*77	0.42	250	7	100	50	13,000	6774.7	713	1.24	2.77E+10
*80	1	240	7	100	50	13,000	6774.7	713	1.24	6.33E+10
*83	4.51	285	7	100	50	13,000	6774.7	713	1.24	3.39E+11
*85	4.11	225	7	100	50	13,000	6774.7	713	1.24	2.44E+11
*89	11.55	140	7	100	50	13,000	6774.7	713	1.24	4.27E+11
					13,000 Total					1.61E+12
*84	1.18	240	7	100	50	13,500	7034.7	721	1.24	7.68E+10
*86	2.42	175	7	100	50	13,500	7034.7	721	1.24	1.15E+11
					13,500 Total					1.92E+11
1	2.11	320	7	100	50	14,000	7294.7	729	1.24	1.88E+11
30	2.28	450	7	100	50	14,000	7294.7	729	1.24	2.85E+11
39	15.06	270	7	100	50	14,000	7294.7	729	1.24	1.13E+12
*76	0.92	250	7	100	50	14,000	7294.7	729	1.24	6.39E+10
*79	2.63	240	7	100	50	14,000	7294.7	729	1.24	1.75E+11
*82	5.39	280	7	100	50	14,000	7294.7	729	1.24	4.20E+11
*87	5.24	175	7	100	50	14,000	7294.7	729	1.24	2.55E+11
*88	2.25	145	7	100	50	14,000	7294.7	729	1.24	9.07E+10
					14,000 Total					2.61E+12
26	0.93	520	7	100	50	14,500	7554.7	737	1.24	1.38E+11
35	2.69	350	7	100	50	14,500	7554.7	737	1.24	2.68E+11
					14,500 Total					4.06E+11
25	3.83	550	7	100	50	15,000	7814.7	745	1.24	6.14E+11
29	4.64	450	7	100	50	15,000	7814.7	745	1.24	6.08E+11
34	10.62	350	7	100	50	15,000	7814.7	745	1.24	1.08E+12
38	10.53	270	7	100	50	15,000	7814.7	745	1.24	8.28E+11
*75	0.83	250	7	100	50	15,000	7814.7	745	1.24	6.05E+10
*78	2.27	240	7	100	50	15,000	7814.7	745	1.24	1.59E+11
*81	1.5	265	7	100	50	15,000	7814.7	745	1.24	1.16E+11
					15,000 Total					3.47E+12
14	0.26	510	7	100	50	15,500	8074.7	753	1.24	3.95E+10
21	0.53	480	7	100	50	15,500	8074.7	753	1.24	7.58E+10
					15,500 Total					1.15E+11
13	1.45	510	7	100	50	16,000	8334.7	761	1.24	2.25E+11

Table 61

20	3.06	480	7	100	50	16,000	8334.7	761	1.24	4.47E+11
24	4.95	520	7	100	50	16,000	8334.7	761	1.24	7.83E+11
28	3.41	450	7	100	50	16,000	8334.7	761	1.24	4.67E+11
33	9.42	350	7	100	50	16,000	8334.7	761	1.24	1.00E+12
37	2.29	290	7	100	50	16,000	8334.7	761	1.24	2.02E+11
*37a	14.4	150	7	100	50	16,000	8334.7	761	1.24	6.57E+11
*38a	3.88	150	7	100	50	16,000	8334.7	761	1.24	1.77E+11
					16,000 Total					3.96E+12
12	3.92	510	7	100	50	17,000	8854.7	777	1.24	6.33E+11
19	3.23	480	7	100	50	17,000	8854.7	777	1.24	4.91E+11
23	2.88	515	7	100	50	17,000	8854.7	777	1.24	4.70E+11
27	2.86	450	7	100	50	17,000	8854.7	777	1.24	4.07E+11
32	0.83	400	7	100	50	17,000	8854.7	777	1.24	1.05E+11
*23a	2.38	250	7	100	50	17,000	8854.7	777	1.24	1.88E+11
*27a	1.72	220	7	100	50	17,000	8854.7	777	1.24	1.20E+11
*31a	1.84	200	7	100	50	17,000	8854.7	777	1.24	1.17E+11
*33a	1.2	150	7	100	50	17,000	8854.7	777	1.24	5.70E+10
*36a	2.68	150	7	100	50	17,000	8854.7	777	1.24	1.27E+11
					17,000 Total					2.71E+12
*22a	2.86	250	7	100	50	17,500	9114.7	785	1.24	2.31E+11
					17,500 Total					2.31E+11
11	5.56	520	7	100	50	18,000	9374.7	793	1.24	9.49E+11
18	3.96	480	7	100	50	18,000	9374.7	793	1.24	6.24E+11
*22b	8.68	225	7	100	50	18,000	9374.7	793	1.24	6.41E+11
*32a	7.86	175	7	100	50	18,000	9374.7	793	1.24	4.52E+11
					18,000 Total					2.67E+12
10	6.61	510	7	100	50	18,500	9634.7	801	1.24	1.13E+12
17	8.05	475	7	100	50	18,500	9634.7	801	1.24	1.28E+12
*15a	5.02	200	7	100	50	18,500	9634.7	801	1.24	3.35E+11
*16a	5.51	200	7	100	50	18,500	9634.7	801	1.24	3.68E+11
					18,500 Total					3.11E+12
*17a	28.26	225	7	100	50	19,000	9894.7	809	1.24	2.16E+12
					19,000 Total					2.16E+12
					Grand Total					2.43E+13

Table 61: Mean in-place gas for subplays in the nonmarine Mesaverde moderately overpressured play (Rm>1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is kmv5. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Nonmarine Kmv 1.1-.73									(Panel 1)
* Wedge shaped area half thick						a =	0.41	0.016	0	
						b =	14.7	505	0.9328	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
*56	7.03	210	7	50	50	5,000	2064.7	585	0.9328	9.62E+10
					5,000 Total					9.62E+10
*38	0.4	275	7	50	50	5,500	2269.7	593	0.9328	7.77E+09
*60	2	180	7	50	50	5,500	2269.7	593	0.9328	2.54E+10
					5,500 Total					3.32E+10
*39	1.7	270	7	50	50	6,000	2474.7	601	0.9328	3.49E+10
*55	21	220	7	50	50	6,000	2474.7	601	0.9328	3.51E+11
*59	20.45	175	7	50	50	6,000	2474.7	601	0.9328	2.72E+11
*62	3.83	130	7	50	50	6,000	2474.7	601	0.9328	3.79E+10
99	1.5	250	7	50	50	6,000	2474.7	601	0.9328	2.85E+10
					6,000 Total					7.25E+11
*61	3.76	130	7	50	50	6,500	2679.7	609	0.9328	3.97E+10
					6,500 Total					3.97E+10
37	3.93	220	7	50	50	7,000	2884.7	617	0.9328	7.46E+10
*40	3.79	270	7	50	50	7,000	2884.7	617	0.9328	8.83E+10
*54	16.3	225	7	50	50	7,000	2884.7	617	0.9328	3.17E+11
*58	6.39	175	7	50	50	7,000	2884.7	617	0.9328	9.65E+10
98	0.43	230	7	50	50	7,000	2884.7	617	0.9328	8.54E+09
					7,000 Total					5.85E+11
35a	0.47	200	7	50	50	7,500	3089.7	625	0.9328	8.58E+09
*57	0.66	190	7	50	50	7,500	3089.7	625	0.9328	1.14E+10
					7,500 Total					2.00E+10
28	2	350	7	50	50	8,000	3294.7	633	0.9328	6.73E+10
32	1.61	250	7	50	50	8,000	3294.7	633	0.9328	3.87E+10
35	3.87	190	7	50	50	8,000	3294.7	633	0.9328	7.07E+10
36	1.46	220	7	50	50	8,000	3294.7	633	0.9328	3.09E+10
*41	4.36	275	7	50	50	8,000	3294.7	633	0.9328	1.15E+11
*53	16.33	225	7	50	50	8,000	3294.7	633	0.9328	3.53E+11
					8,000 Total					6.76E+11
6	0.27	520	7	50	50	8,500	3499.7	641	0.9328	1.42E+10
28a	1.2	410	7	50	50	8,500	3499.7	641	0.9328	4.96E+10
*47	1.04	300	7	50	50	8,500	3499.7	641	0.9328	3.15E+10
					8,500 Total					9.52E+10
5	0.83	520	7	50	50	9,000	3704.7	649	0.9328	4.55E+10
24	7.87	430	7	50	50	9,000	3704.7	649	0.9328	3.57E+11
27	1.58	350	7	50	50	9,000	3704.7	649	0.9328	5.83E+10
31	4.19	250	7	50	50	9,000	3704.7	649	0.9328	1.10E+11
34	4.95	180	7	50	50	9,000	3704.7	649	0.9328	9.39E+10
*42	6.08	275	7	50	50	9,000	3704.7	649	0.9328	1.76E+11
*46	3.97	310	7	50	50	9,000	3704.7	649	0.9328	1.30E+11
*50	4.44	275	7	50	50	9,000	3704.7	649	0.9328	1.29E+11
*52	14.99	225	7	50	50	9,000	3704.7	649	0.9328	3.55E+11
					9,000 Total					1.45E+12
4	2	520	7	50	50	10,000	4114.7	665	0.9328	1.19E+11
14	0.11	510	7	50	50	10,000	4114.7	665	0.9328	6.41E+09
23	16.17	430	7	50	50	10,000	4114.7	665	0.9328	7.94E+11

Table 62

23a	22.5	470	7	50	50	10,000	4114.7	665	0.9328	1.21E+12
26	3.83	350	7	50	50	10,000	4114.7	665	0.9328	1.53E+11
30	6.99	250	7	50	50	10,000	4114.7	665	0.9328	2.00E+11
33	3.55	180	7	50	50	10,000	4114.7	665	0.9328	7.30E+10
*43	4.8	280	7	50	50	10,000	4114.7	665	0.9328	1.54E+11
*45	1.75	310	7	50	50	10,000	4114.7	665	0.9328	6.20E+10
*49	3.63	275	7	50	50	10,000	4114.7	665	0.9328	1.14E+11
					10,000 Total					2.88E+12
10	0.57	490	7	50	50	10,500	4319.7	673	0.9328	3.31E+10
*44	0.56	310	7	50	50	10,500	4319.7	673	0.9328	2.06E+10
*44a	0.77	290	7	50	50	10,500	4319.7	673	0.9328	2.65E+10
					10,500 Total					8.01E+10
3	1.13	520	7	50	50	11,000	4524.7	681	0.9328	7.21E+10
9	2.21	490	7	50	50	11,000	4524.7	681	0.9328	1.33E+11
13	3.93	550	7	50	50	11,000	4524.7	681	0.9328	2.65E+11
16	2.62	620	7	50	50	11,000	4524.7	681	0.9328	1.99E+11
22	21.21	430	7	50	50	11,000	4524.7	681	0.9328	1.12E+12
25	1.66	350	7	50	50	11,000	4524.7	681	0.9328	7.13E+10
29	5.29	250	7	50	50	11,000	4524.7	681	0.9328	1.62E+11
*48	1.09	275	7	50	50	11,000	4524.7	681	0.9328	3.68E+10
*51	13.63	225	7	50	50	11,000	4524.7	681	0.9328	3.76E+11
					11,000 Total					2.43E+12
17	0.43	560	7	50	50	11,500	4729.7	689	0.9328	3.05E+10
21	1.59	400	7	50	50	11,500	4729.7	689	0.9328	8.06E+10
*92	0.29	200	7	50	50	11,500	4729.7	689	0.9328	7.35E+09
*93	0.62	175	7	50	50	11,500	4729.7	689	0.9328	1.38E+10
*94	5.26	120	7	50	50	11,500	4729.7	689	0.9328	8.00E+10
*95	0.87	90	7	50	50	11,500	4729.7	689	0.9328	9.92E+09
*96	0.36	90	7	50	50	11,500	4729.7	689	0.9328	4.11E+09
					11,500 Total					2.26E+11
2	0.98	520	7	50	50	12,000	4934.7	697	0.9328	6.66E+10
8	3.41	480	7	50	50	12,000	4934.7	697	0.9328	2.14E+11
12	10.29	550	7	50	50	12,000	4934.7	697	0.9328	7.40E+11
15	2.84	620	7	50	50	12,000	4934.7	697	0.9328	2.30E+11
18	20.59	440	7	50	50	12,000	4934.7	697	0.9328	1.18E+12
20	13.29	350	7	50	50	12,000	4934.7	697	0.9328	6.08E+11
*90	15.92	130	7	50	50	12,000	4934.7	697	0.9328	2.71E+11
*91	5.7	175	7	50	50	12,000	4934.7	697	0.9328	1.30E+11
					12,000 Total					3.44E+12
1	0.52	520	7	50	50	12,500	5139.7	705	0.9328	3.64E+10
7	1.62	480	7	50	50	12,500	5139.7	705	0.9328	1.05E+11
11	2.96	550	7	50	50	12,500	5139.7	705	0.9328	2.19E+11
18a	0.11	480	7	50	50	12,500	5139.7	705	0.9328	7.11E+09
19a	1.12	410	7	50	50	12,500	5139.7	705	0.9328	6.18E+10
					12,500 Total					4.29E+11
19	6.09	350	7	50	50	13,000	5344.7	713	0.9328	2.95E+11
*77	0.42	250	7	50	50	13,000	5344.7	713	0.9328	1.45E+10
*80	1	240	7	50	50	13,000	5344.7	713	0.9328	3.32E+10
*83	4.51	285	7	50	50	13,000	5344.7	713	0.9328	1.78E+11
*85	4.11	225	7	50	50	13,000	5344.7	713	0.9328	1.28E+11
*89	11.55	140	7	50	50	13,000	5344.7	713	0.9328	2.24E+11
					13,000 Total					8.72E+11

Table 62 (cont.)

*84	1.18	240	7	50	50	13,500	5549.7	721	0.9328	4.02E+10
*86	2.42	175	7	50	50	13,500	5549.7	721	0.9328	6.02E+10
					13,500 Total					1.00E+11
*76	0.92	250	7	50	50	14,000	5754.7	729	0.9328	3.35E+10
*79	2.63	240	7	50	50	14,000	5754.7	729	0.9328	9.20E+10
*82	5.39	280	7	50	50	14,000	5754.7	729	0.9328	2.20E+11
*87	5.24	175	7	50	50	14,000	5754.7	729	0.9328	1.34E+11
*88	2.25	145	7	50	50	14,000	5754.7	729	0.9328	4.76E+10
					14,000 Total					5.27E+11
*75	0.83	250	7	50	50	15,000	6164.7	745	0.9328	3.17E+10
*78	2.27	240	7	50	50	15,000	6164.7	745	0.9328	8.32E+10
*81	1.5	265	7	50	50	15,000	6164.7	745	0.9328	6.07E+10
					15,000 Total					1.76E+11
					Grand Total					1.49E+13

Table 62: Mean in-place gas for subplays in the nonmarine Mesaverde transition play (Rm 0.73-1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is kmv6. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Meeteetse > 300									(Panel 1)
						a =	0.727	0.016	0.00008	
						b =	14.7	505	0	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
17	5.79	260	6	100	50	16,000	11646.7	761	1.28	5.31E+11
					16,000 Total					5.31E+11
15	1.71	310	6	100	50	16,500	12010.2	769	1.32	1.85E+11
					16,500 Total					1.85E+11
14	13.75	320	6	100	50	17,000	12373.7	777	1.36	1.52E+12
16	14.97	275	6	100	50	17,000	12373.7	777	1.36	1.42E+12
18	0.19	350	6	100	50	17,000	12373.7	777	1.36	2.30E+10
					17,000 Total					2.97E+12
13	41.27	350	6	100	50	18,000	13100.7	793	1.44	4.89E+12
					18,000 Total					4.89E+12
12	48.92	375	6	100	50	19,000	13827.7	809	1.52	6.09E+12
					19,000 Total					6.09E+12
					Grand Total					1.47E+13

Table 63: Mean in-place gas for subplays in the Meeteetse highly overpressured play (T>300°F), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is meet1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Meeteetse > 1.1									(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.24	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
21	0.66	170	7	100	50	11,000	5734.7	681	1.24	2.62E+10
					11,000 Total					2.62E+10
20	4.64	180	7	100	50	12,000	6254.7	697	1.24	2.08E+11
					12,000 Total					2.08E+11
16	0.5	230	7	100	50	12,500	6514.7	705	1.24	2.95E+10
					12,500 Total					2.95E+10
15	5.97	250	7	100	50	13,000	6774.7	713	1.24	3.94E+11
19	5.9	185	7	100	50	13,000	6774.7	713	1.24	2.88E+11
50	2.71	380	7	100	50	13,000	6774.7	713	1.24	2.72E+11
					13,000 Total					9.54E+11
7	5.62	415	7	100	50	13,500	7034.7	721	1.24	6.32E+11
11	3.46	350	7	100	50	13,500	7034.7	721	1.24	3.28E+11
					13,500 Total					9.60E+11
6	6.15	410	7	100	50	14,000	7294.7	729	1.24	7.01E+11
10	16.8	350	7	100	50	14,000	7294.7	729	1.24	1.63E+12
14	9.23	250	7	100	50	14,000	7294.7	729	1.24	6.41E+11
18	4.4	190	7	100	50	14,000	7294.7	729	1.24	2.32E+11
					14,000 Total					3.21E+12
4	2.05	370	7	100	50	14,500	7554.7	737	1.24	2.16E+11
5	0.7	400	7	100	50	14,500	7554.7	737	1.24	7.97E+10
17	1.2	200	7	100	50	14,500	7554.7	737	1.24	6.83E+10
					14,500 Total					3.64E+11
9	25.54	350	7	100	50	15,000	7814.7	745	1.24	2.60E+12
13	10.99	250	7	100	50	15,000	7814.7	745	1.24	8.01E+11
					15,000 Total					3.41E+12
12	5.91	250	7	100	50	15,500	8074.7	753	1.24	4.40E+11
					15,500 Total					4.40E+11
8	26.89	350	7	100	50	16,000	8334.7	761	1.24	2.86E+12
					16,000 Total					2.86E+12
3	20.11	370	7	100	50	17,000	8854.7	777	1.24	2.36E+12
					17,000 Total					2.36E+12
2	43.44	370	7	100	50	18,000	9374.7	793	1.24	5.28E+12
					18,000 Total					5.28E+12
1	10.87	366	7	100	50	18,500	9634.7	801	1.24	1.33E+12
					18,500 Total					1.33E+12
					Grand Total					2.14E+13

Table 64: Mean in-place gas for subplays in the Meeteetse moderately overpressured play (Rm>1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is meet2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Meeteetse .73-1.1									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.97	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
41	0.47	100	7	50	50	6,500	2679.7	609	0.97	3.67E+09
42	1.14	100	7	50	50	6,500	2679.7	609	0.97	8.91E+09
					6,500 Total					1.26E+10
40	8.4	135	7	50	50	7,000	2884.7	617	0.97	9.41E+10
					7,000 Total					9.41E+10
5	0.48	260	7	50	50	7,500	3089.7	625	0.97	1.10E+10
					7,500 Total					1.10E+10
4	1.4	270	7	50	50	8,000	3294.7	633	0.97	3.49E+10
34	4.68	250	7	50	50	8,000	3294.7	633	0.97	1.08E+11
39	13.19	140	7	50	50	8,000	3294.7	633	0.97	1.71E+11
					8,000 Total					3.14E+11
28	0.89	320	7	50	50	8,500	3499.7	641	0.97	2.76E+10
					8,500 Total					2.76E+10
3	2.28	280	7	50	50	9,000	3704.7	649	0.97	6.47E+10
27	6.77	350	7	50	50	9,000	3704.7	649	0.97	2.40E+11
33	7.64	250	7	50	50	9,000	3704.7	649	0.97	1.94E+11
38	13.13	155	7	50	50	9,000	3704.7	649	0.97	2.06E+11
					9,000 Total					7.05E+11
11	1.06	310	7	50	50	9,500	3909.7	657	0.97	3.47E+10
					9,500 Total					3.47E+10
2	1.63	280	7	50	50	10,000	4114.7	665	0.97	5.01E+10
10	3.67	350	7	50	50	10,000	4114.7	665	0.97	1.41E+11
16	4.67	440	7	50	50	10,000	4114.7	665	0.97	2.26E+11
26	11.06	350	7	50	50	10,000	4114.7	665	0.97	4.25E+11
32	10.09	250	7	50	50	10,000	4114.7	665	0.97	2.77E+11
37	11.34	165	7	50	50	10,000	4114.7	665	0.97	2.06E+11
					10,000 Total					1.33E+12
17	2.79	520	7	50	50	10,500	4319.7	673	0.97	1.65E+11
18	0.32	510	7	50	50	10,500	4319.7	673	0.97	1.86E+10
19	2.17	500	7	50	50	10,500	4319.7	673	0.97	1.24E+11
20	0.47	500	7	50	50	10,500	4319.7	673	0.97	2.68E+10
21	0.64	500	7	50	50	10,500	4319.7	673	0.97	3.65E+10
22	3.82	440	7	50	50	10,500	4319.7	673	0.97	1.92E+11
					10,500 Total					5.62E+11
1	0.66	290	7	50	50	11,000	4524.7	681	0.97	2.26E+10
9	5.18	350	7	50	50	11,000	4524.7	681	0.97	2.14E+11
15	28.63	460	7	50	50	11,000	4524.7	681	0.97	1.55E+12
25	14.55	350	7	50	50	11,000	4524.7	681	0.97	6.01E+11
31	13.38	250	7	50	50	11,000	4524.7	681	0.97	3.95E+11
36	7.73	175	7	50	50	11,000	4524.7	681	0.97	1.60E+11
					11,000 Total					2.95E+12
35	2.41	180	7	50	50	11,500	4729.7	689	0.97	5.29E+10
					11,500 Total					5.29E+10
8	4.51	350	7	50	50	12,000	4934.7	697	0.97	1.98E+11
14	17.3	430	7	50	50	12,000	4934.7	697	0.97	9.35E+11
24	10.19	350	7	50	50	12,000	4934.7	697	0.97	4.48E+11

Table 65

30	7.14	250	7	50	50	12,000	4934.7	697	0.97	2.24E+11
					12,000 Total					1.81E+12
29	0.69	300	7	50	50	12,500	5139.7	705	0.97	2.68E+10
					12,500 Total					2.68E+10
7	4.97	350	7	50	50	13,000	5344.7	713	0.97	2.32E+11
13	6.67	420	7	50	50	13,000	5344.7	713	0.97	3.73E+11
23	5.94	350	7	50	50	13,000	5344.7	713	0.97	2.77E+11
					13,000 Total					8.81E+11
12	0.67	400	7	50	50	13,500	5549.7	721	0.97	3.66E+10
					13,500 Total					3.66E+10
6	2.73	350	7	50	50	14,000	5754.7	729	0.97	1.34E+11
					14,000 Total					1.34E+11
					Grand Total					8.97E+12

Table 65: Mean in-place gas for subplays in the Meeteetse transition play (Rm 0.73-1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is meet3. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Lance > 1.1									(Panel 1)
						a =	0.52	0.016	0	
						b =	14.7	505	1.15	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
1	3.31	1,200	7	100	50	10,000	5214.7	665	1.15	9.33E+11
					10,000 Total					9.33E+11
*55	7.34	400	7	100	50	11,000	5734.7	681	1.15	7.41E+11
					11,000 Total					7.41E+11
*54	20.27	400	7	100	50	12,000	6254.7	697	1.15	2.18E+12
					12,000 Total					2.18E+12
25	1.79	750	7	100	50	12,500	6514.7	705	1.15	3.72E+11
					12,500 Total					3.72E+11
24	16.49	750	7	100	50	13,000	6774.7	713	1.15	3.52E+12
*51	13.84	600	7	100	50	13,000	6774.7	713	1.15	2.36E+12
*52	14.43	400	7	100	50	13,000	6774.7	713	1.15	1.64E+12
*53	0.05	425	7	100	50	13,000	6774.7	713	1.15	6.05E+09
					13,000 Total					7.53E+12
17	5.39	1,200	7	100	50	14,000	7294.7	729	1.15	1.94E+12
20	3.39	1,000	7	100	50	14,000	7294.7	729	1.15	1.02E+12
23	31.16	800	7	100	50	14,000	7294.7	729	1.15	7.47E+12
*50	23.86	600	7	100	50	14,000	7294.7	729	1.15	4.29E+12
					14,000 Total					1.47E+13
*49	9.85	600	7	100	50	14,500	7554.7	737	1.15	1.81E+12
					14,500 Total					1.81E+12
18	46.83	1,200	7	100	50	15,000	7814.7	745	1.15	1.77E+13
22	35.62	800	7	100	50	15,000	7814.7	745	1.15	8.95E+12
					15,000 Total					2.66E+13
19	49.98	1,200	7	100	50	16,000	8334.7	761	1.15	1.97E+13
21	28.66	900	7	100	50	16,000	8334.7	761	1.15	8.46E+12
					16,000 Total					2.81E+13
					Grand Total					8.30E+13

Table 66: Mean in-place gas for subplays in the Lance moderately overpressured play (Rm>1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is lance1. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Lance .73-1.1									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.93	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
*41	3.7	200	7	50	50	6,000	2474.7	601	0.93	5.64E+10
					6,000 Total					5.64E+10
19	0.16	300	7	50	50	7,000	2884.7	617	0.93	4.16E+09
*40	4.94	200	7	50	50	7,000	2884.7	617	0.93	8.55E+10
					7,000 Total					8.97E+10
*38	1.4	250	7	50	50	7,500	3089.7	625	0.93	3.20E+10
*39	0.79	250	7	50	50	7,500	3089.7	625	0.93	1.81E+10
					7,500 Total					5.01E+10
18	2.27	400	7	50	50	8,000	3294.7	633	0.93	8.75E+10
*29	1.06	475	7	50	50	8,000	3294.7	633	0.93	4.85E+10
*37	13.24	275	7	50	50	8,000	3294.7	633	0.93	3.51E+11
					8,000 Total					4.87E+11
14	0.1	500	7	50	50	8,500	3499.7	641	0.93	5.06E+09
15	1.26	500	7	50	50	8,500	3499.7	641	0.93	6.37E+10
					8,500 Total					6.88E+10
7	0.86	1,000	7	50	50	9,000	3704.7	649	0.93	9.09E+10
13	6.99	550	7	50	50	9,000	3704.7	649	0.93	4.06E+11
*28	2.66	450	7	50	50	9,000	3704.7	649	0.93	1.27E+11
*36	21.74	300	7	50	50	9,000	3704.7	649	0.93	6.89E+11
					9,000 Total					1.31E+12
4	0.99	1,000	7	50	50	10,000	4114.7	665	0.93	1.13E+11
6	2.23	1,000	7	50	50	10,000	4114.7	665	0.93	2.56E+11
12	10.15	600	7	50	50	10,000	4114.7	665	0.93	6.98E+11
*27	2.5	450	7	50	50	10,000	4114.7	665	0.93	1.29E+11
					10,000 Total					1.20E+12
*30	0.85	300	7	50	50	10,500	4319.7	673	0.93	3.03E+10
*31	0.24	250	7	50	50	10,500	4319.7	673	0.93	7.13E+09
*33	0.47	250	7	50	50	10,500	4319.7	673	0.93	1.40E+10
*34	7.54	300	7	50	50	10,500	4319.7	673	0.93	2.69E+11
*35	21.2	325	7	50	50	10,500	4319.7	673	0.93	8.19E+11
					10,500 Total					1.14E+12
3	2.74	1,050	7	50	50	11,000	4524.7	681	0.93	3.54E+11
5	2.13	1,000	7	50	50	11,000	4524.7	681	0.93	2.62E+11
11	13.09	700	7	50	50	11,000	4524.7	681	0.93	1.13E+12
*26	9.9	375	7	50	50	11,000	4524.7	681	0.93	4.57E+11
*32	4.44	225	7	50	50	11,000	4524.7	681	0.93	1.23E+11
*55	7.34	400	7	50	50	11,000	4524.7	681	0.93	3.61E+11
					11,000 Total					2.68E+12
9	1.08	500	7	50	50	11,500	4729.7	689	0.93	6.87E+10
10	0.24	500	7	50	50	11,500	4729.7	689	0.93	1.53E+10
*25	2.99	375	7	50	50	11,500	4729.7	689	0.93	1.43E+11
					11,500 Total					2.26E+11
2	7.9	1,050	7	50	50	12,000	4934.7	697	0.93	1.09E+12
8	9.9	650	7	50	50	12,000	4934.7	697	0.93	8.44E+11
*54	20.27	400	7	50	50	12,000	4934.7	697	0.93	1.06E+12
					12,000 Total					2.99E+12

Table 67

1	2.63	1,100	7	50	50	12,500	5139.7	705	0.93	3.91E+11
					12,500 Total					3.91E+11
*51	13.84	600	7	50	50	13,000	5344.7	713	0.93	1.15E+12
*52	14.43	400	7	50	50	13,000	5344.7	713	0.93	8.01E+11
*53	0.05	425	7	50	50	13,000	5344.7	713	0.93	2.95E+09
					13,000 Total					1.96E+12
*50	23.86	600	7	50	50	14,000	5754.7	729	0.93	2.09E+12
					14,000 Total					2.09E+12
*49	9.85	600	7	50	50	14,500	5959.7	737	0.93	8.85E+11
					14,500 Total					8.85E+11
					Grand Total					1.56E+13

Table 67: Mean in-place gas for subplays in the Lance transition play (Rm 0.73-1.1), Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is lance2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Tful, Waltman present									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.909	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
31	2.94	625	7	70	50	6,000	2474.7	601	0.909	2.01E+11
						6,000 Total				2.01E+11
30	3.11	675	7	70	50	7,000	2884.7	617	0.909	2.60E+11
42	0.35	600	7	70	50	7,000	2884.7	617	0.909	2.60E+10
						7,000 Total				2.86E+11
20	2.05	800	7	70	50	7,500	3089.7	625	0.909	2.15E+11
						7,500 Total				2.15E+11
19	4.32	875	7	70	50	8,000	3294.7	633	0.909	5.22E+11
						8,000 Total				5.22E+11
14	1.38	1,050	7	70	50	8,500	3499.7	641	0.909	2.10E+11
						8,500 Total				2.10E+11
13	5.23	1,125	7	70	50	9,000	3704.7	649	0.909	8.91E+11
18	0.81	875	7	70	50	9,000	3704.7	649	0.909	1.07E+11
						9,000 Total				9.98E+11
12	2.49	1,300	7	70	50	10,000	4114.7	665	0.909	5.31E+11
12a	2.54	1,125	7	70	50	10,000	4114.7	665	0.909	4.69E+11
17	0.95	875	7	70	50	10,000	4114.7	665	0.909	1.36E+11
						10,000 Total				1.14E+12
21	0.45	625	7	70	50	10,500	4319.7	673	0.909	4.79E+10
						10,500 Total				4.79E+10
10	4.38	1,175	7	70	50	11,000	4524.7	681	0.909	9.07E+11
11	3.35	1,300	7	70	50	11,000	4524.7	681	0.909	7.68E+11
16	1.58	875	7	70	50	11,000	4524.7	681	0.909	2.44E+11
22	4.84	625	7	70	50	11,000	4524.7	681	0.909	5.33E+11
						11,000 Total				2.45E+12
1	6.22	450	7	70	50	11,500	4729.7	689	0.909	5.10E+11
						11,500 Total				5.10E+11
2	4.82	450	7	70	50	12,000	4934.7	697	0.909	4.07E+11
9	14.01	875	7	70	50	12,000	4934.7	697	0.909	2.30E+12
15	0.83	875	7	70	50	12,000	4934.7	697	0.909	1.36E+11
24	2.87	650	7	70	50	12,000	4934.7	697	0.909	3.50E+11
						12,000 Total				3.20E+12
7	2.83	1,050	7	70	50	12,500	5139.7	705	0.909	5.75E+11
8	0.97	900	7	70	50	12,500	5139.7	705	0.909	1.69E+11
						12,500 Total				7.43E+11
3	6.45	470	7	70	50	13,000	5344.7	713	0.909	6.03E+11
6	11.69	875	7	70	50	13,000	5344.7	713	0.909	2.03E+12
23	18.41	650	7	70	50	13,000	5344.7	713	0.909	2.38E+12
						13,000 Total				5.02E+12
4	2.99	650	7	70	50	13,500	5549.7	721	0.909	3.97E+11
5	2.15	780	7	70	50	13,500	5549.7	721	0.909	3.42E+11
						13,500 Total				7.39E+11
						Grand Total				1.63E+13

Table 68

Table 68: Mean in-place gas for subplays in the lower member of the Fort Union Formation, Waltman Shale present play, Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is tful. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Play Name :	Tful, no Waltman									(Panel 1)
						a =	0.41	0.016	0	
						b =	14.7	505	0.909	
Subplay	Closure	Thickness	Porosity	Trap fill	HC Sat.	Depth	Pressure	Temp.	Gas Comp.	Gas in place
No.	(sq.mi.)	(feet)	(%)	(%)	(%)	(feet)	(PSI)	(Deg.Rank.)	(no units)	(CF)
36	2.74	350	8	10	50	3,000	1244.7	553	0.909	9.35E+09
38	1.38	200	8	10	50	3,000	1244.7	553	0.909	2.69E+09
					3,000 Total					1.20E+10
35	20.76	350	8	10	50	4,000	1654.7	569	0.909	9.15E+10
37	1.37	250	8	20	50	4,000	1654.7	569	0.909	8.63E+09
					4,000 Total					1.00E+11
32	9.55	550	8	30	50	5,000	2064.7	585	0.909	2.41E+11
33	12.49	450	8	30	50	5,000	2064.7	585	0.909	2.58E+11
					5,000 Total					4.99E+11
34	0.18	500	8	30	50	5,500	2269.7	593	0.909	4.48E+09
					5,500 Total					4.48E+09
31	14.23	600	8	30	50	6,000	2474.7	601	0.909	4.57E+11
					6,000 Total					4.57E+11
29	9.17	700	8	30	50	7,000	2884.7	617	0.909	3.90E+11
30	18.81	675	8	30	50	7,000	2884.7	617	0.909	7.71E+11
					7,000 Total					1.16E+12
28	0.79	750	8	30	50	7,500	3089.7	625	0.909	3.81E+10
					7,500 Total					3.81E+10
27	16.17	875	8	30	50	8,000	3294.7	633	0.909	9.57E+11
					8,000 Total					9.57E+11
17	0.74	1,200	8	30	50	8,500	3499.7	641	0.909	6.30E+10
21	0.4	1,250	8	30	50	8,500	3499.7	641	0.909	3.55E+10
24	1.47	1,100	8	30	50	8,500	3499.7	641	0.909	1.15E+11
25	0.62	1,000	8	30	50	8,500	3499.7	641	0.909	4.40E+10
					8,500 Total					2.57E+11
8	1.03	750	8	30	50	9,000	3704.7	649	0.909	5.73E+10
12	3.93	875	8	30	50	9,000	3704.7	649	0.909	2.55E+11
16	4.46	1,125	8	30	50	9,000	3704.7	649	0.909	3.72E+11
20	8	1,300	8	30	50	9,000	3704.7	649	0.909	7.72E+11
22	21.35	1,125	8	30	50	9,000	3704.7	649	0.909	1.78E+12
26	10.82	900	8	30	50	9,000	3704.7	649	0.909	7.22E+11
					9,000 Total					3.96E+12
23	5.08	1,200	8	30	50	9,500	3909.7	657	0.909	4.71E+11
					9,500 Total					4.71E+11
7	3.02	725	8	30	50	10,000	4114.7	665	0.909	1.76E+11
11	3.43	875	8	30	50	10,000	4114.7	665	0.909	2.41E+11
15	3.6	1,125	8	30	50	10,000	4114.7	665	0.909	3.26E+11
19	16.03	1,300	8	30	50	10,000	4114.7	665	0.909	1.68E+12
					10,000 Total					2.42E+12
1	3.03	450	8	30	50	11,000	4524.7	681	0.909	1.18E+11
6	16.34	675	8	30	50	11,000	4524.7	681	0.909	9.52E+11
10	7.49	875	8	30	50	11,000	4524.7	681	0.909	5.66E+11
14	10.4	1,125	8	30	50	11,000	4524.7	681	0.909	1.01E+12
18	11.98	1,300	8	30	50	11,000	4524.7	681	0.909	1.34E+12
					11,000 Total					3.99E+12
2	2.47	450	8	30	50	12,000	4934.7	697	0.909	1.02E+11

Table 69

5	27.18	625	8	30	50	12,000	4934.7	697	0.909	1.56E+12
9	10.09	875	8	30	50	12,000	4934.7	697	0.909	8.12E+11
13	10.75	1,100	8	30	50	12,000	4934.7	697	0.909	1.09E+12
					12,000 Total					3.56E+12
3	0.87	500	8	30	50	12,500	5139.7	705	0.909	4.12E+10
4	4.61	625	8	30	50	12,500	5139.7	705	0.909	2.73E+11
					12,500 Total					3.14E+11
					Grand Total					1.82E+13

Table 69: Mean in-place gas for subplays in the lower member of the Fort Union Formation, Waltman Shale absent play , Wind River Indian Reservation, arranged according to depth. The play code for the spreadsheet is tfu2. For a detailed explanation of the symbols and formulas used in the spreadsheets see part B of this report.

Wind River Reservation Natural Gas Resources by Depth									
Depth (ft)	TFU1	TFU2	LANCE1	LANCE2	MEET1	MEET2	MEET3	KMV1	KMV2
3,000		1.20E+10							
3,500									
4,000		1.00E+11							
4,500									
5,000		4.99E+11							
5,500		4.48E+09							
6,000	2.01E+11	4.57E+11		5.64E+10					
6,500							1.26E+10		
7,000	2.86E+11	1.16E+12		8.97E+10			9.41E+10		
7,500	2.15E+11	3.81E+10		5.01E+10			1.10E+10		
8,000	5.22E+11	9.57E+11		4.87E+11			3.14E+11		
8,500	2.10E+11	2.57E+11		6.88E+10			2.76E+10		
9,000	9.98E+11	3.96E+12		1.31E+12			7.05E+11		
9,500		4.71E+11					3.47E+10		
10,000	1.14E+12	2.42E+12	9.33E+11	1.20E+12			1.33E+12		
10,500	4.79E+10			1.14E+12			5.62E+11		
11,000	2.45E+12	3.99E+12	7.41E+11	2.68E+12		2.62E+10	2.95E+12		
11,500	5.10E+11			2.26E+11			5.29E+10		1.25E+11
12,000	3.20E+12	3.56E+12	2.18E+12	2.99E+12		2.08E+11	1.81E+12		4.28E+11
12,500	7.43E+11	3.14E+11	3.72E+11	3.91E+11		2.95E+10	2.68E+10		8.73E+10
13,000	5.02E+12		7.53E+12	1.96E+12		9.54E+11	8.81E+11		5.99E+11
13,500	7.39E+11					9.60E+11	3.66E+10		
14,000			1.47E+13	2.09E+12		3.21E+12	1.34E+11		9.21E+11
14,500			1.81E+12	8.85E+11		3.64E+11			
15,000			2.66E+13			3.41E+12			8.18E+11
15,500						4.40E+11			1.09E+11
16,000			2.81E+13		5.31E+11	2.86E+12		6.04E+11	5.24E+11
16,500					1.85E+11				3.55E+10
17,000					2.97E+12	2.36E+12		1.21E+12	2.99E+11
17,500									
18,000					4.89E+12	5.28E+12		2.38E+12	1.78E+11
18,500						1.33E+12			
19,000					6.09E+12			3.19E+12	1.52E+11
19,500									
20,000								3.77E+12	2.02E+11
20,500									
21,000								1.84E+12	
21,500									
22,000									
22,500									
23,000									
23,500									
24,000									
Total	1.628E+13	1.82E+13	8.297E+13	1.562E+13	1.467E+13	2.143E+13	8.982E+12	1.299E+13	4.478E+12

Table 70

Wind River Reservation Natural Gas Resources by Depth (continued)									
KMV3	KMV4	KMV5	KMV6	CODY3	FRONT1	FRONT2	FRONT3	Total	Cum. Total
								1.2E+10	1.2E+10
								0	1.2E+10
								1E+11	1.12E+11
								0	1.12E+11
			9.62E+10					5.952E+11	7.072E+11
			3.32E+10	1.73E+09				3.941E+10	7.466E+11
6.50E+10			7.25E+11	7.67E+09			2.36E+10	1.536E+12	2.282E+12
4.26E+09			3.97E+10	1.13E+10				6.786E+10	2.35E+12
4.92E+11			5.85E+11	8.37E+10		5.78E+10	2.53E+11	3.101E+12	5.451E+12
			2.00E+10					3.342E+11	5.786E+12
2.51E+11			6.76E+11	1.18E+11		7.99E+10	6.38E+11	4.043E+12	9.829E+12
3.81E+09			9.52E+10				1.63E+10	6.787E+11	1.051E+13
3.14E+11			1.45E+12	2.57E+10		2.60E+11	4.96E+11	9.519E+12	2.003E+13
								5.057E+11	2.053E+13
4.68E+11			2.88E+12	3.08E+10		1.93E+12	2.66E+11	1.26E+13	3.313E+13
			8.01E+10			1.89E+10		1.849E+12	3.498E+13
4.75E+11		6.22E+09	2.43E+12			2.71E+12		1.846E+13	5.344E+13
3.72E+10		2.20E+11	2.26E+11				2.70E+10	1.424E+12	5.486E+13
4.13E+11		8.81E+11	3.44E+12			3.42E+12		2.253E+13	7.739E+13
			4.29E+11					2.393E+12	7.978E+13
3.74E+11		1.61E+12	8.72E+11		5.29E+11	2.65E+12		2.298E+13	1.028E+14
4.03E+10		1.92E+11	1.00E+11			1.73E+11		2.241E+12	1.05E+14
3.38E+10		2.61E+12	5.27E+11		1.96E+12	1.61E+12		2.78E+13	1.328E+14
		4.06E+11			9.84E+10			3.563E+12	1.364E+14
		3.47E+12	1.76E+11		3.08E+12	9.49E+11		3.85E+13	1.749E+14
		1.15E+11						6.64E+11	1.755E+14
	9.68E+11	3.96E+12			3.53E+12	1.10E+12		4.218E+13	2.177E+14
								2.205E+11	2.179E+14
	2.32E+12	2.71E+12			3.31E+12	6.38E+11		1.582E+13	2.337E+14
	2.45E+11	2.31E+11						4.76E+11	2.342E+14
	4.96E+12	2.67E+12			2.90E+12	7.59E+11		2.402E+13	2.582E+14
	7.06E+11	3.11E+12						5.146E+12	2.634E+14
	6.86E+12	2.16E+12			2.56E+12	6.35E+11		2.165E+13	2.85E+14
	2.87E+11							2.87E+11	2.853E+14
	4.45E+12				2.42E+12	6.27E+11		1.147E+13	2.968E+14
								0	2.968E+14
					2.30E+12	3.79E+11		4.519E+12	3.013E+14
					3.90E+10			3.9E+10	3.013E+14
					2.73E+12	4.13E+11		3.143E+12	3.045E+14
								0	3.045E+14
					6.30E+12			6.3E+12	3.108E+14
								0	3.108E+14
					5.59E+12			5.59E+12	3.164E+14
2.971E+12	2.08E+13	2.435E+13	1.488E+13	2.789E+11	3.735E+13	1.841E+13	1.72E+12	3.164E+14	

Table 70: Summary table listing total gas at each depth and cumulative gas from shallow to deep, Wind River Indian Reservation, Wyoming.