OIL AND GAS RESOURCE POTENTIAL OF THE BOWSER-WHITEHORSE AREA OF BRITISH COLUMBIA

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SUMMARY

Syntectonic Jura-Cretaceous sediments represent the principal basin fill in three strongly-deformed intermontane basins (Bowser and Sustut Basins and Whitehorse Trough). These basins are mainly gas-prone with smaller areas exhibiting oil generation characteristics. The hydrocarbon plays defined in this assessment incorporate variably preserved Permian to Recent strata. The development of reservoir occurs in fractured Late Paleozoic siliceous carbonates, Triassic reefal mounds and associated shallow-water platformal carbonates, Jura-Cretaceous non-marine fluvial and marginal to deep-water marine clastics, and in unconsolidated Quaternary till and alluvium. Seal is principally provided by Jura-Cretaceous shale in these basins although fine-grained volcaniclastics and tight carbonates also contribute to the sealing potential in some instances. Source material has been identified within Jura-Cretaceous and Jurassic shales, Lower Permian black shales and minor interspersed coal seams. The most important trapping mechanism for hydrocarbon accumulations are anticlinal structures that have been complicated further by at least four episodes of intense faulting. Stratigraphic traps are also recognized throughout the sequence. Structural traps were formed both contemporaneously and subsequent to hydrocarbon generation. All of these basins are very immature with respect to exploration. Two wells have been drilled in the Bowser Basin while no exploratory drillholes have been attempted in the other two basins.

Seventeen hydrocarbon plays have been identified in the Bowser-Whitehorse area of north-central British Columbia and southern Yukon. The plays are:

1. Bowser Skeena Structural Gas Play,
2. Bowser Skeena Structural Oil Play,
3. Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play,
4. Sustut Upper Cretaceous Structural Gas Play,
5. Sustut Upper Cretaceous Structural Oil Play,
6. Northern Rocky Mountain Trench Sifton Structural Gas Play,

7. Whitehorse Cenozoic Stratigraphic Gas Play,
8. Whitehorse Tantalus Structural Gas Play,
9. Whitehorse Tantalus Structural Oil Play,
10. Whitehorse Takwahoni Structural Gas Play,
11. Whitehorse Takwahoni Structural Oil Play,
12. Whitehorse Takwahoni Stratigraphic Gas Play,
13. Whitehorse Takwahoni Stratigraphic Oil Play,
14. Whitehorse Inklin Structural Gas Play,
15. Whitehorse Lewes River Structural Gas Play,
16. Whitehorse Lewes River Stratigraphic Gas Play, and
17. Whitehorse Taku Fractured Carbonate Gas Play.

The Bowser Skeena, Bowser Mid-Jurassic-Lower Cretaceous, Sustut Upper Cretaceous, Northern Rocky Mountain Trench Sifton, Whitehorse Tantalus, Whitehorse Takwahoni, Whitehorse Inklin, and Whitehorse Lewes River Structural Oil and Gas Plays have no established reserves or production and, therefore, are conceptual. The remaining five plays are classified as speculative, meaning insufficient petroleum geological information was available to properly assess potential hydrocarbon reserves. The conceptual plays were assessed using current practices employed at the Geological Survey of Canada.

The total oil and gas potential for the entire Bowser-Whitehorse assessment area is 4.0×10^{8} m^3 (2.52 billion barrels) and 3.89×10^{11} m^3 (13.7 TCF), respectively.

Good hydrocarbon potential is recognized in Skeena and Upper Cretaceous clastic sediments deposited in the Bowser and Sustut Basins. Laberge Group basin-fill sediments in the Whitehorse Trough are favourable areas for hydrocarbon accumulation.

INTRODUCTION

In October, 1992, John MacRae, Director of the Petroleum Geology Branch of British Columbia's Ministry of Energy, Mines and Petroleum Resources requested that the Institute of Sedimentary and Petroleum Geology of the Geological Survey of Canada assess the hydrocarbon potential of certain sedimentary basins in British Columbia. Consequently, an assessment of the sedimentary basins surrounding Vancouver Island was completed and submitted to the Ministry in January 1993. This work constituted Phase I of the information requested by the Ministry. Phase II, which involved the oil and gas potential of the Kootenay area of southeastern area of British Columbia, was submitted in April of 1993. An oil and gas assessment was then performed for the Nechako-Chilcotin area of south-central British Columbia. That report was presented in September 1994 representing Phase III. This report deals with the final phase which describes the results obtained from an oil and gas assessment of the Bowser-Whitehorse region of northern British Columbia and southern Yukon. Results from these assessments are to be employed by British Columbia's Commission on Resources and Environment, which is currently performing a detailed land-use planning study of selected areas in the Province.

G.S.C. hydrocarbon resource assessments are computer-generated by an internally formulated statistical program known as PETRIMES (Lee and Wang, 1990). These assessments can be applied to mature, immature and conceptual hydrocarbon plays. A play is defined as a family of hydrocarbon pools or prospects with similar histories of hydrocarbon generation and migration as well as similar trapping mechanisms and reservoir configurations. A mature play has sufficient discoveries and pool definitions for analysis by the "discovery process model" while an immature play has too few discoveries to allow analysis by this method. A conceptual play has no defined pools, just prospects.

All of the plays analyzed statistically in this assessment were defined as conceptual and the pool-size distributions were generated using probability distributions of geological variables substituted into the standard pool-size equation. Prospect-level and play-level risks were assigned to each play prior to analysis.

Following compilation of pertinent geological information in the Bowser-Whitehorse area of British Columbia as well as adjacent Yukon Territory (see reference list), seventeen geological hydrocarbon plays were recognized. Five of these plays have oil potential while the remainder are gas prospects. The play boundaries are illustrated on Maps 1 to 5.

Basins included in this study are the Bowser Basin, Sustut Basin, Whitehorse Trough and the Northern Rocky Mountain Trench.

Immediately apparent on the tectonic map of the Cordillera is the vast area covered by the Bowser Lake Assemblage of sediments in the Bowser Basin (Wheeler and McFeely, 1991). Very limited well control and complex tectonic and structural histories complicate the definition of the physical boundaries of the basins. Before defining any petroleum plays, it was necessary to compile and analyze the numerous tectonic and orogenic episodes and depositional events in the Intermontane

Belt of the Cordillera. The affiliation of basins with exotic terrane as well as the timing of accretion onto the continent were important elements used in interpreting the tectonic histories of each basin. Transgressive and regressive cycles were significant events in the formulation of depositional histories. Thicknesses of sedimentary and volcanic successions and identification of major unconformities were important geological criteria required to properly establish petroleum exploration plays.

Prior to the beginning of the Mesozoic Era, widely scattered volcanic arcs with associated oceanic plateaus in Panthalassa were separated from the west coast of ancestral North America by back-arc basins. In the study area, the arc is represented by the Nicola calc-alkaline assemblage in Quesnellia and the Hazelton low-alkali calc-alkaline volcanic succession in Stikinia. The Cache Creek assemblage represents an oceanic platform succession in the fore-arc that formed as an accretionary prism above a subduction zone (Souther, 1991). Overlap sedimentary successions such as the Bowser Lake, Skeena and Laberge Groups represent accretionary response assemblages that were derived from the amalgamation of Stikinia, Cache Creek and Quesnellia terranes forming the Intermontane Superterrane. This amalgamation episode could have occurred as early as the Late Triassic. These three terranes were at least loosely amalgamated by Pliensbachian time in the Whitehorse area due to the interfingering of Lower Jurassic sediments derived from separate terranes. The Intermontane Superterrane was formed previous to accretion to the North American continent. A thrusting episode commencing in Bajocian time, where the Cache Creek Terrane is thrust southwestward over Stikinia in northern British Columbia, may represent the accretion of the Intermontane Superterrane on to the continent. In southern B. C., accretion is represented by thrusting of the Cache Creek Terrane eastwards over Quesnellia in Late Jurassic time.

The Early Jurassic embraces a fundamental shift from terrane-specific geological processes of plutonism, volcanism and sedimentation to the development of overlap assemblages starting in the Middle Jurassic.

Lower to Middle Jurassic volcanic and volcaniclastic Hazelton Group rocks comprise a complex of island arcs surrounding Bowser, Sustut and Nechako Basins (Gabrielse and Yorath, 1991c). The development of the Skeena and Stikine Arches in the Early Jurassic influenced Jurassic deposition and tectonics in Stikinia. These arches separated and delineated the proto-Bowser, Nechako and Whitehorse basins. The Whitehorse Trough developed to the north of the Stikine Arch while the ancestral Bowser shale basin lies between the two arches. All of these basins, arches and volcanic belts are interrelated as one complex island arc terrane. However, the stratigraphic continuity is lacking between the various elements; thus the separation of Whitehorse and Bowser basins. Accretion of the Intermontane Superterrane onto North America most likely terminated in the mid-Jurassic.

Cordillera-wide erosion with the development of a major unconformity occurred in the Early Cretaceous before another episode of uplift in the Cordillera assisted in the deposition of the marine Aptian to Cenomanian Skeena Group assemblage in the Cordillera and equivalent Blairmore Group in the Rocky Mountain foredeep. Thick clastic marine and non-marine sediments were shed eastward from the Omineca Belt into the Sustut and Skeena Basins (Gabrielse and Yorath, 1991c). Post-accretionary deposition of Late Cretaceous to Paleocene marine and non-marine sediments are represented by westerly-derived rocks in the Sustut and Nechako Basins and the Brazeau Assemblage in the foredeep of the Rocky Mountain Foreland Belt. Extensional tectonics commenced in the mid-Eocene and continued to Recent time with concomitant block-faulting producing fault-bounded valleys where non-marine sediments have accumulated (Sifton and Tantalus Formations).

The Bowser Basin, located in north-central British Columbia, contains three oil and gas plays defined in Jurassic to Cretaceous sediments (Maps 1-3).

The Sustut Basin has two hydrocarbon plays defined in the Sustut assemblage. The older Tango Creek Formation of the Sustut Group is equivalent in age to the upper Skeena Group. (Maps 1-2).

Eleven oil and gas plays in Late Paleozoic to Quaternary sediments have been proposed within the Whitehorse Trough (Maps 1- 5).

One biogenic gas play has been defined in Paleocene sediments in the Northern Rocky Mountain Trench (Map 1).

Seventeen oil and gas plays have been designated in the area. They are the:

1) conceptual Bowser Skeena Structural Gas Play,
2) conceptual Bowser Skeena Structural Oil Play,
3) conceptual Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play,
4) conceptual Sustut Upper Cretaceous Structural Gas Play,
5) conceptual Sustut Upper Cretaceous Structural Oil Play,
6) conceptual Northern Rocky Mountain Trench Sifton Structural Gas Play,
7) speculative Whitehorse Cenozoic Stratigraphic Gas Play,
8) conceptual Whitehorse Tantalus Structural Gas Play,
9) conceptual Whitehorse Tantalus Structural Oil Play,
10) conceptual Whitehorse Takwahoni Structural Gas Play,
11) conceptual Whitehorse Takwahoni Structural Oil Play,
12) speculative Whitehorse Takwahoni Stratigraphic Gas Play,
13) speculative Whitehorse Takwahoni Stratigraphic Oil Play,
14) conceptual Whitehorse Inklin Structural Gas Play,
15) conceptual Whitehorse Lewes River Structural Gas Play,
16) speculative Whitehorse Lewes River Stratigraphic Gas Play, and
17) speculative Whitehorse Taku Fractured Carbonate Gas Play.

The Whitehorse Tantalus Structural Oil and Gas Plays, the Whitehorse Takwahoni Structural and Stratigraphic Oil Plays, and the Whitehorse Lewes River Stratigraphic Gas Play are located entirely within the Yukon Territory (Maps 1-4). These plays are described and the results are presented in a separate addendum at the end of this report. The hydrocarbon resources statistically determined in these plays may be of interest with respect to transportation corridors needed for export through the Province.

GEOLOGICAL SETTING AND PLAY PARAMETERS

Bowser Skeena Structural Gas Play

The Skeena Group of marine and non-marine sediments are preserved around the southern margin of the Bowser Basin. Skeena Group-equivalent sediments have also been mapped in the interior of the basin in the Groundhog coal field (MacIntyre et al, 1994) and have been included in the play. A regular orthogonal pattern of block faults on the margin represent domal uplifts that preserve these sediments on horst structures (Gabrielse et al, 1991a). The Skeena Group rests unconformably on the Hazelton Group and paraconformably on the Bowser Lake Group. A marine transgression in Albian time provided marine to nearshore depositional sites. Mid-Cretaceous uplift of the Omineca Belt resulting from the collision of Stikinia with the Cache Creek Terrane provided the source material for deposition of Skeena Group sediments in the Sustut Basin and Bowser Basins in northern British Columbia (Gabrielse et al, 1991d). Skeena Group sedimentation is thus characterized as an accretionary response assemblage. The boundaries for this play are illustrated on Map 1.

The play encompasses an area of 9400 square kilometres. No wells have been drilled and no hydrocarbon shows have been reported. Total succession thicknesses vary from 300 to 2800 metres (Gabrielse et al, 1991d; Hunt, 1992; Koch, 1973).

Petroleum trap-types that have developed in the play reflect the compressional tectonic regime associated with terrane accretion taking place from mid-Jurassic to mid-Eocene and subsequent extensional tectonic structures developed from mid-Eocene to Recent time. Structure trap-types encountered in the play are simple compressional anticlinal folds, folds associated with thrust faults, and normal block fault traps. Compressional tectonics form the anticlinal and thrust fault traps while block fault structures are associated with extensional tectonics. Both the Sustut Basin located to the northeast of Bowser Basin and the Nechako Basin to the south were used as analogues in identifying and limiting trap sizes and estimating number of prospects. The largest structure found in the Nechako Basin was an anticlinal fold with an area of closure of 175 square kilometres and a vertical closure of 1000 metres. These dimensions were used in this assessment. Average estimated closure area varies from 10 to 90 square kilometres as measured on the structural map of the Sustut Basin (Eisbacher, 1974). Block fault and thrust fault traps have a minimum area of closure of 1 square kilometre. The estimated mean amplitude for the numerous folds identified in the Sustut Basin varies from 100 to 300 metres (Eisbacher, 1974). Minimum vertical closure is interpreted to be one metre. If one determines the number of structures present in the Sustut Basin and apply it proportionately by play area in the Bowser Basin, a mean of 500 prospects is estimated. The maximum number of structures for the play is inferred to be 1000.

Thin reservoir sands within the marine and non-marine shale and sandstone succession are characteristic of this play. Estimated proportion of reservoirs compared to total thickness varies from 0 to 7%. Porosity ranges from 5 to 15% in the porous sands with an average of 10%. Secondary fracture porosity does develop in parts although most fractures are plugged with cementing material.

Vitrinite reflectance on surface outcrops of Skeena Group rocks vary from 0.35 to 5.60 (Hunt, 1992; Ryan 1992; Ryan and Dawson, 1994). In coal exploration drillholes at the Telkwa coal field, vitrinite reflectance varies from 0.80 to 1.55 (Ryan, 1992). In outcrop, TOC varies from 0.00 to 55.19. Nine out of 108 samples show very good TOC values ranging from 2.03 to 55.19 (Hunt, 1992). In outcrop, seven out of 108 samples show moderate to good gas-generating potential. Coal-bed methane is present in the Telkwa coal field. The estimated resource is 3.7 billion cubic metres or 131 BCF (Ryan and Dawson, 1994). Organic matter is dominantly classified as Type III material, with lesser amounts of Type I and II. Source rocks consist of carbonaceous and bituminous shales and sandstones, along with coal in parts.

Trap-forming structures in the play developed from mid-Jurassic to Recent time. These structures thus evolved previous to, contemporaneously and subsequent to hydrocarbon generation. The presence of numerous faults and fractures, some of which are open, produce opportunities for migration of fluids in these sediments. Geochemical maturity factors in numerous individual samples indicate that migration has taken place. In these samples, Tmax values of greater than 435^{o}C. are indicative of mature source rocks while production index values (S1/S1+S2) of <0.1 represent immature source material. Low production index values imply that migration of earlier formed S1 hydrocarbon away from the source strata has occurred. A significant area of Skeena Group sediments outcrop in the play so some risk to seal is applied even though numerous overlying and interbedded shales may provide a seal in some instances. Risk has also been assigned to the preservation of hydrocarbons that reflect the possibility of the breaching of structures (Appendix 1).

Bowser Skeena Structural Oil Play

The oil play occupies a somewhat smaller area compared to the gas due to the exclusion of the Groundhog area found in the centre of basin (compare Maps 1 and 2). Rocks are overmature with respect to oil generation and preservation, in the Groundhog coal field. In the remainder of the basin, the two play areas coincide. The reduced play area is now 7500 square kilometres. No oil shows have been reported in this play. Reservoir parameters are similar to the previous play. One sample out of 108 collected, show moderate oil-generating potential.

Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play

The Bowser Lake Group of sediments of mid-Jurassic to Lower Cretaceous age occupies a very large proportion of the Bowser Basin (see Map 3). The Bowser Basin encompasses the area between the Stikine and Skeena Arches on Stikinia Terrane. A play area of 54,200 square kilometres has been interpreted. The Bowser Lake Assemblage consists of clastic sediments that represent a foredeep where coarse-grained non-marine molasse progrades over fine-grained marine basinal flysch (Gabrielse et al, 1991d). Delta and pro-delta channel deposits and turbidites are overlain by alluvial and paralic deposits. The source for Bowser Lake Group sediments in the northern part of the basin was the marine Cache Creek Assemblage found in the Cache Creek Terrane that is situated to the north and east. The emergent Skeena Arch provided the source material for Bowser rocks in southern Bowser Basin. No contribution of sedimentary material from the Omineca or Coast Belts have been reported during Bowser deposition. Early to Middle Jurassic volcanics and volcanogenic sediments of the Hazelton Group surround the Bowser Basin. The upper and thickest part of the Bowser succession contains coal seams of anthracite rank. The Bowser Group is overlain unconformably by the non-marine Sustut Group on the northern and eastern margins of the basin and the marine and non-marine Skeena Group on the southern margin and in the central Groundhog area. Two hydrocarbon exploration wells have been completed in the play and both wet and dry cuttings gas was reported from one of the boreholes. The Bowser succession is up to 3500 metres thick. However, prospect thickness is interpreted to vary from 0 to 800 metres thick.

Most of the deformation in the Bowser Basin occurred in the mid-Jurassic to Tertiary interval while hydrocarbon generation arose in the Late Mesozoic. Therefore, structures developed before, contemporaneously, and subsequent to hydrocarbon generation. Simple compressional folding producing broad en echelon folds generates the main trap-type of the play; the large anticlinal structures. The folds are variable in this play; ranging from concentric to chevron and open to closed (Gabrielse et al, 1991a). In addition, drag folds associated with thrust faults are potential sites for hydrocarbon accumulation in this play. Often the thrusts are hard to recognize due to the lack of marker horizons and the presence of faults parallel to bedding planes. Normal block fault traps are also present, especially near the Skeena Arch. The underlying Hazelton Group which is deformed into broad warps is separated from the Bowser Group rocks by a decollement surface. Compressional tectonics in the mid-Jurassic to mid-Eocene interval generated the folds and thrust fault folds, while the extensional block faulting episode occurred post mid-Eocene. The largest area of closure has been identified as the Owegee Dome at 180 square kilometres. Another significant structure is the Ritchie Anticline with an area of closure of 65 square kilometres. The two wells in the play were drilled on this structure. The estimated mean area of structural closure is 10 square kilometres while the minimum is one square kilometre. Vertical closures range from 20 to 1000 metres with a mean of 100 metres. Structures occur up to 2000 metres below surface. Number of prospects range from 300 to 6000 with a mean of 3000.

A major risk associated with this play is the general lack of porosity in outcrop and in wells. Interspersed very thin porous sandstones and conglomerates represent the reservoir facies in the play. Reservoir is represented in <1% of the total succession. Secondary fracture porosity is not known in the Bowser Lake Group rocks.

Geochemical studies give vitrinite reflectances with a range of 1.43 to 5.80% in Bowser Lake Group rocks. Paleotemperatures range from 220 to 260^{o}C. implying the hydrocarbon generated would be methane only. Black, organic-rich shale of the Early Jurassic Spatsizi Group underlies the Bowser Group in northern Bowser Basin and represents potential source material. Organic-rich shales and coal seams are also interbedded within the Bowser Lake succession. One geochemical sample at the southern margin of the basin revealed good gas-generating potential. However, most of these rocks show prehnite-pumpellyite to subgreenschist-grade metamorphism which is indicative of dry gas or no hydrocarbon potential.

The presence of numerous faults and fractures in the play provide some opportunity for migration of hydrocarbons. Abundant overlying and interbedded shales may provide seal in some cases. Immense areas of Bowser Group rocks do outcrop which may contribute to leakage of hydrocarbons in certain areas due to breaching of structures or removal of seal by erosional processes.

Sustut Upper Cretaceous Structural Gas Play

The petroleum play defined as the Sustut Upper Cretaceous Structural Gas Play is found within the Sustut Basin which is located northeast of the Bowser Basin (Map 1). The interval of interest incorporates the Sustut Group of rocks ranging in age from Cenomanian to Maastrichtian (possibly to Eocene(?)). The oldest sediments are equivalent in age in part to the Skeena Group. The Sustut interval ranges in thickness from 300 to 2600 metres. No wells or shows have been reported in this play. Play area is estimated to be about 9825 square kilometres.

In the basin, the Sustut Group sediments reveal a record of mid-Cretaceous uplift of the Omineca Belt to the east and mid- to Late Cretaceous uplift of the Coast Belt and the western part of the Bowser Basin to the west (Gabrielse et al, 1991d). The metamorphic terranes of the Omineca source is represented by ubiquitous muscovite in the Sustut sediments. Mid- to Late Cretaceous magmatism associated with uplift in the Coast Belt and the Skeena Arch is also revealed in these sediments. The non-marine Sustut Group consists of the older Tango Creek Formation overlain conformably and unconformably by the Brothers Peak Formation. The fluvial Tango Creek Formation rests unconformably on the Bowser Lake Group in the western part of the basin and on the Hazelton Group on the eastern and northern margins. Interbedded sandstone, conglomerate and mudstone with local lenses of lignite make up the formation. The Tango Creek Formation is sourced by two principal river systems from the Omineca Belt. The younger Brothers Peak Formation has a basal conglomerate that represents a significant uplift of the Coast Belt and western side of Bowser Basin to the west. The overlying pebbly sandstones and mudstones are introduced to the basin from the northeast and then transported to the southwest and south along the main axis of the basin by fluvial processes (Gabrielse et al, 1991d).

The Tuya and Nahlin Basins on the lower reaches of the Tuya and Tanzilla Rivers and along the Nahlin River have been included in this play. These coarse, non-marine Eocene rocks are roughly located along trend with the Sustut Basin but separated by a fault. No direct paleogeographic evidence links these basins, however. The sequence contains conglomeratic sandstones, shale and carbonaceous shale along with abundant seams of lignite (Gabrielse et al, 1991d).

In the Sustut Basin, there are two fundamentally different structural zones; the eastern part of the basin resting unconformably on the Hazelton-Takla volcanic and plutonic terrane and the western section resting on the Bowser Lake Group. Broad, open folds with gentle dips characterize the eastern side of the basin while tight commonly thrust faulted anticlines and synclines deform the Sustut sediments to the west (see GSC map 14-1973, Eisbacher, 1974). Structural analysis of the western margin of the Sustut Basin infers that tight folds existed in the underlying Bowser Lake Group before deposition of the Sustut Group. Deformation and sedimentation related to the Coast Belt uplift overlapped the deposits resulting from uplift of the Omineca Belt to the east. Trap-types recognized in the play are simple compressional anticlinal structures and smaller-scale folds related to thrust faults. These structures developed both previous to, and contemporaneous with hydrocarbon generation. Area of closure range from 1 to 175 square kilometres with a mean of 10 square kilometres. Vertical closure varies from 20 to 1000 metres with a mean of 100.

The reservoir fraction in the play consists of thin porous and permeable sands within the clastic succession. The estimated thickness of reservoir material compared to total thickness varies from 0.5 to 5%. Porosity range is estimated to vary between 5 and 15% with an average of 10%, with secondary fracture porosity possible in localized zones.

Vitrinite reflectance on surface outcrops varies from 0.36 to 1.22% (Read et al, 1991). Total organic carbon in outcrop ranges from 0.0 to 67.79 and two out of nine samples have very good TOC values (13.11, 67.79). These two samples indicate good gas-generating potential. Type III kerogens dominate with lesser amounts of Type I and II. Carbonaceous and bituminous shales and sandstones with minor coal are probable source rocks in the play.

Open faults or fractures provide opportunities for hydrocarbon migration. Interbedded and overlying shales occur locally and these beds may provide seal in some cases. Significant areas of Sustut Group rocks do outcrop, however, which may indicate risk on seal. Preservation of hydrocarbons may not be attained because of breaching of structure due to erosion of the outcropping succession.

Sustut Upper Cretaceous Structural Oil Play

This play incorporates the same package of rocks as the gas component and encompasses the same play area. Play parameters are similar and the number of prospects probability distribution coincides with the gas play. In outcrop, one out of the nine geochemical samples analyzed indicate moderate to good oil-generating potential.

Northern Rocky Mountain Trench Sifton Structural Gas Play

A clastic non-marine assemblage of Upper Cretaceous to Paleogene sediments deposited in and along the northern Rocky Mountain Trench constitute the Northern Rocky Mountain Trench Sifton Structural Play (Map 1). Large dextral transcurrent displacements deform the sediments deposited in this fault-controlled basin. The Sifton Assemblage of rocks in the play extend from Williston Lake in the south to Watson Lake in the Yukon Territory. The play area is 2280 square kilometres. The rocks consist of conglomerate, sandstone, siltstone, and mudstone with minor lignite (Gabrielse, 1991a).

These rocks are characteristically highly deformed. Locally, this sequence is quite thick due to syndepositional faulting. Paleocurrent data indicate that the major drainage direction is to the south. The Sifton Formation probably occupied a much broader alluvial plain than the present floor of the trench.

Two episodes of deformation affected the Sifton sediments. Initial uplift of the Omineca Belt in mid-Cretaceous time resulted in extension and normal faulting in the basin. This phase of normal faulting precedes the deposition of the Sifton Formation. A later pulse of brittle and compressional deformation produced kink-folding and disruption along high-angle reverse faults (Eisbacher, 1974). Likely traps would be small-scale antithetic and synthetic normal and reverse fault structures. These traps were formed previous to and contemporaneous with hydrocarbon generation. Area of closure was estimated to range from 0.5 to 10 square kilometres, averaging about one square kilometre in area. Range of vertical closure varies from one to 150 metres. The number of prospects vary from 15 to 50 with a mean of 25.

Thin reservoir sandstones and conglomerates are expected in the succession. Reservoirs constitute between zero and 5% of the total thickness in the Sifton play. There is little evidence of fracturing in these rocks so secondary porosity is unlikely. The thin reservoir intervals have an estimated porosity range of 7 to 14%.

Coal seams within the basin range in rank from lignite to high-volatile bituminous A. Source rocks within the succession include these coal seams as well as carbonaceous and bituminous shales and sandstones. Biogenic gas is the most likely hydrocarbon generated in the play.

Migration and seal are adequate for hydrocarbon accumulations in some prospects.

Whitehorse Cenozoic Stratigraphic Gas Play

The Whitehorse Cenozoic Stratigraphic Gas Play is classified as speculative due to insufficient geological and petroleum reservoir information. Biogenic marsh gas is probably present in Quaternary to Recent unconsolidated alluvium and till in the Whitehorse Trough owing to reports of ignition of gaseous hydrocarbons at the tailpipes of vehicles to the north of Whitehorse

(Koch, 1973). Fractures and/or faults in underlying bedrock may provide migration corridors for thermogenic gas buried deep within the succession with subsequent accumulation in stratigraphic porous lenses interspersed within the alluvium and till. These gas saturated lenses can range in size from 10 to 500 metres long and vary in thickness from 10 to 50 metres. Alluvium and/or till is interpreted to cover the major portion of the Trough (see Map 5) (19,400 sq. km.). Gas pools, if present, are very small and they may represent a geotechnical hazard in exploiting hydrocarbons in this basin. No assessment was performed due to insufficient information and very low resource potential.

Whitehorse Takwahoni Structural Gas Play

The Jurassic rocks comprising the Laberge Group and subdivided into the Inklin and Takwahoni Formations define the extent of the Whitehorse Trough. The Trough was mainly developed on the Cache Creek Terrane but also on bordering parts of Stikinia and Quesnellia. These rocks are therefore an accretionary response assemblage. It has been observed in the northern part of the Trough that the Inklin rocks derived from Quesnellia interfinger with Takwahoni material sourced from Stikinia. This implies that Stikinia, Cache Creek, and Quesnellia were at least loosely amalgamated by Early Jurassic time. The Takwahoni Formation of Pliensbachian to Bajocian age represents the proximal facies derived from Stikinia to the southwest. The Formation consists of interbedded conglomerate, greywacke, siltstone and shale. Volcanic and plutonic clasts found in the conglomerate are derived from the Stikine Arch to the south and the Coast Belt to the west. The Takwahoni Formation disconformably overlies the Lewes River Group.

The gas play encompasses an area of 6040 square kilometres (Map 3). No wells have been drilled and no shows have been reported in the play. Thickness of the Takwahoni Formation varies from 1600 to 3350 metres.

Three major structural hydrocarbon trap-types have been identified. Compressional deformation episodes produce the simple anticlinal structures along with traps associated with thrust faulting. Normal block fault traps were formed in the post-mid-Eocene extensional tectonic regime. Folds and thrusts were developed from Late Paleozoic to mid-Eocene. Hydrocarbon generation occurred in the Late Mesozoic so structures were developed previous to, contemporaneously, and subsequent to the generation. Area of closure of significant structures are estimated to vary from 10 to 60 square kilometres. The amplitude of folds in this play range from 200 to 300 metres with an absolute maximum of 1000 metres. It is estimated that structures have developed at surface to the 3000 metre depth. Number of prospects vary from 40 to 750 with a mean of 375.

Thin porous sandstones and conglomerates in the Laberge Group is recognized as the primary reservoir in the Whitehorse Trough. Even though most of the Laberge Group has little or no porosity, there are occasional thin layers with excellent porosity. Porosity probability distribution range from 5 to 20% with a 10% mean.

The most probable source rocks for the play are dark grey to black shales and siltstones of the Jurassic Richthofen Formation. There are also coal seams and lenses present with ranks varying from high-volatile bituminous C to high-volatile bituminous A. Total organic carbon ranges from 0.11 to 30.5, HI from 0.0 to 58.71, and Ro max from 0.6 to 2.59 (Gunther, 1985). A potential for wet gas is present in the northwest corner of the Trough while dry gas potential occurs in the remainder of the basin.

Abundant overlying Jura-Cretaceous shales provide seal in some parts. However, significant outcrop areas of Laberge Group rocks may increase the risk on seal and hydrocarbon preservation.

Whitehorse Takwahoni Stratigraphic Gas Play

This speculative play incorporates stratigraphic hydrocarbon traps within the Takwahoni Formation adjacent to the King Salmon and Llewellyn Fault Systems in northern British Columbia and south-central Yukon, respectively (see Map 3, this report; and Fig. 8.75, Monger et al, 1991). Three distinct pulses of arkosic sandstone and conglomerate sediments were deposited in the Trough from the west and southwest and juxtaposed against Nordenskold dacite and tuff in the northern part of the Trough and against Inklin Formation sediments in northern B. C. Insufficient information on reservoir parameters precludes the assessment of the play.

Whitehorse Inklin Gas Play

The Whitehorse Inklin Structural Gas Play embodies the rocks of the Laberge Group in the eastern part of the Trough that constitute both a proximal facies derived from Quesnellia to the east and a distal facies obtained from Stikinia to the west. The Inklin Formation contains interbedded turbiditic greywackes, shales and siltstones. The play covers an area of 10,000 square kilometres in northern British Columbia and southern Yukon Territory. The rocks range in age from Hettangian to Bajocian. No wells or shows are encountered. Thickness of the sedimentary succession varies from 0 to 3000 metres.

Structure-type, area and range of vertical closures along with timing of structure formation with respect to hydrocarbon generation is similar in this play to the parameters in the Whitehorse Takwahoni play. Coal ranks in Inklin rocks vary from high-volatile bituminous C to high-volatile bituminous A. Total organic carbon ranges from 0.31 to 0.95. The hydrogen index varies from 0 to 11.11 and the vitrinite reflectance from 1.55 to 2.93 (Gunther, 1985). These geochemical values show that this play is dry gas prone. The Jurassic Richthofen Formation of dark grey to black shales and siltstones is the probable source rock for gas in the play. Although there is abundant overlying and interbedded tight shales, siltstones and conglomerates that may provide seal in some cases, significant outcrop areas of Inklin rocks may increase the risk on seal and/or preservation.

Whitehorse Lewes River Structural Gas Play

The carbonates and clastics of the Late Triassic Lewes River Group and Sinwa Formation are included in this play. These rocks are found in the Whitehorse Trough which is developed on both the Cache Creek and Stikinia Terranes. In southern Yukon on the Cache Creek Terrane, there is interbedded greywacke and radiolarian chert with conodonts of Late Triassic age. The greywacke is similar compositionally to clastics of the Lewes River Group in the Whitehorse Trough. This may represent the link between the Whitehorse Trough partly found in Stikinia and the Cache Creek Terrane (Monger et al, 1991). The Sinwa Formation located in northern B. C. consists of massive to thickly-bedded limestone up to 250 metres thick. This formation occurs on both sides of the King Salmon Fault separating the Cache Creek and Stikinia Terranes. Amalgamation of Cache Creek and Stikinia must have occurred previous to Sinwa deposition. The Lewes River Group in the southern Yukon contains interbedded clastics, volcanics and carbonates up to 3000 metres thick (Wheeler, 1961). Prominent reefal mounds are found within the carbonates. The reefoid masses are principally made up of carbonate muds with a lesser proportion of organism-generated framework structures (Reid and Templeman-Kluit, 1987). The Lewes River Group is overlain disconformably by the Jurassic Laberge Group in the western portion of the Whitehorse Trough while to the east the contact becomes gradational (Monger et al, 1991).

This gas play covers an area of 14,000 square kilometres in northern British Columbia and southern Yukon (Map 4). No wells have been drilled but a gas seep has been reported at Takhini Hot Springs north of Whitehorse.

In northern Stikinia, there was Late Permian to Early Triassic deformation that produced tight northerly-trending folds. Overprinted on these structures are southeasterly-trending Jurassic folds and thrust faults (Monger et al, 1991). Pre-Triassic structures were indicative of both easterly subduction of the Cache Creek Terrane and northeast-directed thrusting of Quesnellia onto North America. Jurassic structures reflect collision of Stikinia, Quesnellia and Cache Creek Terranes. In the early Cenozoic, extensional tectonics prevailed affecting Mesozoic structures with right-lateral transform motions (Monger et al, 1991). Structures developed before, during and subsequent to hydrocarbon generation in the Lewes River and Sinwa intervals. The main hydrocarbon trap in the play is simple compressional anticlinal folds. Another compressional trap-type is folds associated with thrusting. Extensional structures are represented by normal block fault traps. Folded structures developed from Late Permian to mid-Eocene while block faults were formed post-mid-Eocene. Major structures vary in area closure from 10 to 60 square kilometres. Vertical closures range from 200 to 1000 metres. It is estimated that the mean of number of prospects is 800 with a range of 80 to 1600.

There is a distinct lack of primary porosity and permeability in these carbonates. Porosity, if present, is secondary with the development of fractures in the carbonates in brecciated zones. Vuggy porosity was noted in outcrop. Estimated mean for the fracture porosity is 4% with a range of 3 to 10%. A risk factor of 0.50 was applied to the presence of porosity at a play level.

Vitrinite reflectance in outcrop varies from 0.53 to 2.93% Romax. The hydrogen index ranges from 8.93 to 20.24 and total organic carbon varies from 0.17 to 0.84. These numbers suggest that these rocks are generally overmature, lean and gas-prone (Gunther, 1985). Carbonaceous material in the limestones and organic-rich shales provide an adequate source for hydrocarbons.

The presence of numerous faults and fractures in the play provide adequate conditions for migration. Seal is sustained by abundant overlying and interbedded shales. However, large areas of Lewes River Group outcrop in the play may breach structures and provide opportunities for hydrocarbon leakage. Risk is assigned to seal and preservation to reflect this possible loss of hydrocarbon.

Whitehorse Taku Fractured Carbonate Gas Play

Map 4 illustrates the area covered by the Whitehorse Taku Fractured Carbonate Play. Massive carbonates of the Permian Taku Formation are an integral part of the Nakina and French Range Subterranes in northwestern British Columbia and south-central Yukon Territory. These subterranes represent the westernmost and easternmost facies belts of the oceanic Cache Creek Assemblage of the Cache Creek Terrane (Monger, et al, 1991). Shallow-water massive carbonates are the dominant lithological units in these marine assemblages. These limestone bodies have developed as atoll reefs on basal volcanic strata. Algalaminate dolostones frequently form in the back-reef environment, particularly in the Nakina Subterrane. There are infrequent pillowed mafic flows and tuff layers within the carbonate. Prominent carbonate in the French Range Subterrane consists of algalaminate dolostones similar to the lagoonal facies in the Nakina terrane. Fractures in the massive tight carbonates are interpreted as the principal site for gas accumulation. Dark argillaceous limestone containing organic matter with a fetid odour when broken, may represent source material in these rocks. Gas may form, migrate along the fracture system until it is trapped against the unconformity juxtaposing Permian rocks and overlying Jurassic Laberge Group sediments. Insufficient geological information for the play precludes an assessment analysis in this case. Gas potential is small and the play is a minor component in the overall basin assessment analysis.

ASSESSMENT TECHNIQUE

After compiling relevant material for each hydrocarbon play, an assessment committee assigned objective and subjective probabilities and risk factors for the play (see Appendix 1 for probabilities and risk factors and Appendix 2 for the statistical data retrieved). The risk factors were defined by analyzing the geological characteristics of various play parameters, comparing them to analogous settings, and then deciding upon reasonable limits for these parameters. Once the probabilities and risk factors were compiled, lognormal approximation and pool-size-by-rank options in PETRIMES were used to model the conceptual plays (Lee and Wang, 1990).

RESOURCE APPRAISAL

Following is a discussion of statistical results obtained for each play (see Appendix 2 for output data).

Bowser Skeena Structural Gas Play

Overall, the play-level risk is 1.0, which signifies total confidence in the existence of this conceptual hydrocarbon play. At the prospect-level, adequate preservation of hydrocarbons is assigned the greatest risk, because of the extensive outcrop exposure of Skeena Group sediments which may provide opportunities for leakage of hydrocarbons (see Appendix 1). Timing of hydrocarbon generation with respect to trap formation has been interpreted to be unfavourable in some cases, and the play has been appropriately risked. Risk has also been applied to the presence of closure in some prospects. An overall prospect-level risk of 0.04 has been calculated for the Bowser Skeena Structural Gas Play.

Complicated tectonic histories with numerous depositional episodes prevail in the Bowser assessment area of north-central British Columbia. Structural deformation is inferred to have occurred previous to, contemporaneous with, and subsequent to hydrocarbon generation and accumulation depending on location. Some hydrocarbon accumulations may have been affected by these deformation episodes. Such accumulations may have been cut by many faults and subsequently remigrated. Fields, rather than pools, are interpreted as representing these composite structurally-complex hydrocarbon accumulations. Thus, the largest undiscovered hydrocarbon accumulation in this assessment is considered to be a field, rather than a pool. We emphasize that readers consider the range of possible sizes for the largest recoverable field size (90% confidence interval) rather than simply quoting the median of the largest field size. This range more accurately describes the largest field size.

In this assessment, the mean of the expected number of fields present in the play is recorded. In addition, values representing the probability of one or more fields existing in a play and the number of fields at 1% are presented. The number of fields at 1% indicate the probable maximum of expected number of fields in a play and it would be 99% certain that no greater number of fields exists.

The total mean play potential of in-place resources in the Bowser Skeena Structural Gas Play is 7.19×10^{10} m^3 (2.54 TCF) of gas (see Appendix 2). Recoverable mean potential is 5.03×10^{10} m^3 (1.78 TCF). The in-place resource estimate for the largest field size varies from 3.25×10^{9} to 5.05×10^{10} m^3 (114 to 1783 BCF)(Figure 1). The median of the largest in-place field is 1.47×10^{10} m^3 (519 BCF)(Figure 1). Using a recovery factor of 0.70, we suggest that a largest recoverable field size of 2.28×10^{9} to 3.53×10^{10} m^3 (80 to 1248 BCF) occurs in the play. A mean of 19 gas fields is expected to occur in the play. It is 99% certain that no more than 45 gas fields are expected.

All plays in the Bowser and Sustut Basins are located entirely in British Columbia. Therefore, all potential resources quoted in the two basins occur in British Columbia.

Bowser Skeena Structural Oil Play

Similar reservoir parameters between the oil and gas plays are indicated by identical probability distributions (see Appendix 1). Geological risk factors are similar as well. The reduced play area signifying the rocks that are interpreted to occupy the oil window, is reflected in the diminished probability distribution for the number of prospects.

The Bowser Skeena Structural Play has a mean in-place oil potential of 2.01×10^{8} m^{3} or 1264 million barrels. Figure 2 indicates that the largest undiscovered in-place field size varies from 1.00×10^{7} to 1.42×10^{8} m^{3} or 63.1 to 893.3 million barrels. The median of the largest undiscovered field is 4.36×10^{7} m^{3} (274.4 million barrels). The range of the largest undiscovered recoverable field size is 2.01×10^{6} to 2.89×10^{7} m^{3} (12.6 to 181.5 million barrels). The mean number of fields expected to occur is 16. No more than 37 fields are expected in the play with a 99% certainty.

Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play

A play-level risk of 0.12 has been assigned. Regional metamorphism of these rocks was the main contributing factor in elevating risk at the play level. The substantial degree of metamorphism in the rocks probably has destroyed most of the petroleum which is indicated in the adequate preservation risk. Metamorphism also may destroy the primary porosity which is reflected in the elevated reservoir facies risk (see Appendix 1). Adequate seal at the prospect-level is risked to reflect the erosion of cap-rock where Bowser Group outcrops. Erosion may also breach structure and trapped hydrocarbons may have escaped.

The total mean in-place gas potential of the play is 5.78×10^{10} m^{3} or 2.0 TCF. The median of the largest undiscovered field (in-place) is statistically determined to be 1.80×10^{10} m^{3} (637 BCF). The median has been extracted from a range of 8.04×10^{9} to 4.26×10^{10} m^{3} (284-1505 BCF) for the largest undiscovered field (Figure 3). The recoverable range of largest field size is 6.43×10^{9} to 3.41×10^{10} m^{3} (227-1204 BCF). If gas fields do exist, the expected mean number of fields is 173. It is extremely unlikely that more than 2473 fields exist.

Sustut Upper Cretaceous Structural Gas Play

Adequate preservation of hydrocarbons is assigned the greatest prospect-level risk in the play due to extensive outcrop of Sustut Group rocks. This outcrop exposure may provide opportunities for leakage of hydrocarbons. Timing of hydrocarbon generation with respect to trap formation is unfavourable in some prospects and in such instances the parameter is appropriately risked. An overall prospect-level risk of 0.1 has been calculated. However, a play-level risk of 1.00 has been assigned which implies total confidence in the existence of the play.

The mean play potential (in-place) is 5.27×10^{10} m^3 or 1.86 TCF of gas. The largest undiscovered field (in-place) according to the field-size-by-rank diagram (Figure 4) within the 90% interval varies from 2.54×10^{9} to 4.48×10^{10} m^3 (90 to 1581 BCF). The median of the largest field size is determined to be 1.24×10^{10} m^3 (438 BCF). The recoverable largest field size range is 1.78×10^{9} to 3.13×10^{10} m^3 (63-1106 BCF). The expected number of fields in the play is 14, and it is extremely unlikely that no more than 34 gas fields are present.

Sustut Upper Cretaceous Structural Oil Play

Play conditions in this play are similar to the gas component. The mean in-place play potential is 1.84×10^{8} m^3 (1158 million barrels). The range of the largest undiscovered field (in-place) according to the field-size-by-rank diagram (Figure 5) within a 90% interval is 9.57×10^{6} to 1.38×10^{8} m^3 (60 to 865 million barrels). The median of the largest field size is determined to be 4.17×10^{7} m^3 or 262 million barrels. Recoverable largest undiscovered field size range is 1.92×10^{6} to 2.79×10^{7} m^3 (12 to 176 million barrels). The mean of the expected number of fields in the oil play is the same as the gas (14).

Northern Rocky Mountain Trench Sifton Structural Gas Play

An overall play-level risk of 0.90 has been assigned. This risk indicates the high confidence for the existence of gas in the play. At the prospect-level, however, a risk factor of 0.25 is specified, indicating a one in four chance in encountering hydrocarbons. The mean number of fields expected to exist is 7, and it is extremely unlikely that more than 16 fields are present.

The mean play potential is 1.46×10^{8} m^3 or 5 BCF of gas in-place. The largest undiscovered in-place gas field according to the field-size-by-rank diagram (Figure 6) varies from 8.34×10^{6} to 2.92×10^{8} m^3 (0.3 to 10 BCF). The median of the largest field size is 5.03×10^{7} m^3 (1.8 BCF). Recoverable largest field size ranges from 5.84×10^{6} to 2.04×10^{8} m^3 or 0.2 to 7 BCF.

This particular play extends into the Yukon Territory near Watson Lake (Map 1). Ninety-two percent of the play area is located in British Columbia so if gas resources are distributed evenly, the mean play potential for B.C. is 1.34×10^{8} m^3 (4.7 BCF).

Whitehorse Takwahoni Structural Gas Play

An overall play-level risk of 1.00 implies the absolute confidence in the existence of the play. A marginal probability of 0.04 at the prospect-level reflects the high risk in encountering hydrocarbons in individual prospects. The mean of the expected number of gas fields in the play is 14. There is a 99% chance that no more than 34 fields are present.

The in-place mean play potential is statistically determined to be 8.07×10^{10} m^3 or 2.85 TCF of gas. Figure 7 illustrates the range of the largest undiscovered gas field in a field-size-by-rank diagram. The largest field varies from 4.17×10^{9} to 5.92×10^{10} m^3 or 147 to 2092 BCF. The median of the largest field is 1.82×10^{10} m^3 (642 BCF). The recoverable range for the largest field extends from 3.13×10^9 to 4.45×10^{10} m^3 or 110 to 1571 BCF of gas.

The Whitehorse Takwahoni Structural Gas Play is located to the northwest of the Bowser Basin in northern British Columbia and extends further north into the Yukon Territory. Approximately 27% of the play area is found in British Columbia. Therefore, assuming gas resources are evenly distributed, the in-place mean potential within the Province is 2.18×10^{10} m^3 or 770 BCF of gas.

Whitehorse Inklin Structural Gas Play

The structural gas play that incorporates the Inklin Formation also has a play-level risk of 1.00 implying total confidence in the existence of the play. Again, significant risk has been assigned at the prospect-level to produce an overall risk of 0.03. The expected mean number of gas fields in the play is 20. It is 99% certain that no more than 45 fields are present.

It has been determined that the in-place mean potential is 2.21×10^{10} m^3 or 779 BCF of gas. The range for the largest undiscovered in-place gas field varies from 1.04×10^9 to 1.36×10^{10} m^3 (37 to 480 BCF) (Figure 8). The median of the largest undiscovered field is 4.29×10^{10} m^3 (151 BCF). Applying a recovery factor, the range for the largest recoverable undiscovered field is 7.79×10^8 to 1.02×10^{10} m^3 (28 - 361 BCF).

The Inklin play is found in northern British Columbia and southern Yukon. Seventy-one percent of the play area is found in northern British Columbia. If gas resources are distributed evenly throughout the play, then the expected resource in B. C. is 1.57×10^{10} m^3 (557 BCF) of gas.

Whitehorse Lewes River Structural Gas Play

A risk of 0.50 was assigned for the presence of porosity at a play-level. Relatively-high prospect-level risks were attributed to the presence of closure, adequate seal and timing as well as adequate preservation (see Appendix 2). If any gas fields do exist, the mean expected number is 10, and it is extremely unlikely that no more than 42 are present.

The mean play potential is 1.02×10^{11} m^3 (3.6 TCF)(in-place). The largest undiscovered field according to the field-size-by-rank diagram (Figure 9) ranges from 9.78×10^9 to 1.25×10^{11} m^3 (345 - 4398 BCF). The median of the largest field size is 3.97×10^{10} m^3 (1.4 TCF). Recoverable largest undiscovered field size varies from 5.87×10^9 to 7.47×10^{10} m^3 or 207 to 2639 BCF of gas.

Even distribution of resources indicates that 15% of the mean potential occurs in British Columbia. Therefore, the mean play potential in B. C. is 1.53×10^{10} m^3 (540 BCF).

HYDROCARBON POTENTIAL DISTRIBUTION

Map 6 illustrates a qualitative interpretation of the distribution of potential for hydrocarbon accumulation in the Bowser-Whitehorse assessment area. Good potential is indicative of favourable locations for hydrocarbon accumulations and should be the major focus for any future exploration activities. Medium potential signifies secondary and less important areas for oil and gas prospects but significant resources may occur. Poor potential marks areas where little or no hydrocarbon reserves are expected and would likely not be of interest to oil companies.

Sediments belonging to the Skeena Assemblage are included in areas of good hydrocarbon potential due to favourable reservoir parameters. The oil and gas components of both the Bowser Skeena and Sustut Upper Cretaceous Structural plays encompass areas of good potential since Skeena rocks are involved (Maps 1, 2 and 6). Good potential is also recognized in Jurassic Takwahoni sediments of the Laberge Group (Maps 3 and 6).

Medium potential areas include the Bowser Group sediments in north-central British Columbia and the Jurassic Inklin Formation rocks to the north. In addition, the carbonates in the Triassic Lewes River Group is classified as having medium hydrocarbon potential.

Areas of poor potential include the Whitehorse Taku Fractured region, the Whitehorse Tantalus and the Northern Rocky Mountain Trench Sifton play areas.

SUMMARY AND CONCLUSIONS

The Bowser Skeena Structural Gas Play incorporates an accumulation of Early Cretaceous clastic sediments in a near-shore to marine environment. Skeena sedimentation occurs subsequent to collision of the exotic Stikinia and Cache Creek Terranes with the North American continent. The Skeena Group of rocks is thus characterized as an accretionary response assemblage. Regular orthogonal block faults have preserved Skeena Group sediments in horst-type structures. The mean potential for this conceptual play is determined to be $7.19\text{x}10^{10}$ m^3 (2.54 TCF). These figures represent in-place petroleum resources. Similar geological and reservoir parameters can be applied to the Bowser Skeena Structural Oil Play. The total mean play potential is $2.01\text{x}10^8$ m^3 or 1264 million barrels.

In the conceptual Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play, potential gas prospects are found in a marine to non-marine clastic sequence where the coarse-grained non-marine molasse progrades over the fine-grained marine flysch. Major risks associated with the play involve the general lack of porosity and permeability along with the effects resulting from metamorphism of the sedimentary package from prehnite-pumpellyite to subgreenschist grade. At best, methane would be found in these rocks. These significant play-level risks are reflected in the marginal probability that the play exists (0.12). This play has a total mean gas potential of $5.78\text{x}10^{10}$ m^3 (2.04 TCF).

The Sustut Upper Cretaceous Structural Oil and Gas Play represents the single assemblage of sediments recognized as having hydrocarbon potential in Sustut as well as Tuya and Nahlin Basins. Deposits of terrestrial fluvial Sustut rocks are included in the play. The total mean play potential for gas is 5.27×10^{10} m^3 or 1.86 TCF. The mean potential of the Sustut Upper Cretaceous Structural Oil Play is 1.84×10^{8} m^3 (1158 million barrels).

A potential hydrocarbon play is present to the east in the Rocky Mountain Trench. Biogenic gas probably occurs in Sifton clastics of Upper Cretaceous to Paleogene age. This shallow gas has a total mean potential of 1.46×10^{8} m^3 (5 BCF).

Within the Whitehorse Trough, numerous oil and gas plays of Permian to Cenozoic age have been proposed. The most significant reservoir encountered within the Trough is found in the Jurassic Laberge Group that has been divided into the proximal Takwahoni Formation clastics to the west and the eastern proximal and distal Inklin Formation.

The coarse-grained westerly-derived proximal facies of the Laberge Group is represented in the Trough by the Takwahoni Formation. Several kilometres of marine interbedded conglomerate, greywacke, siltstone and shale along with minor flows and tuffs constitute the Takwahoni sequence. The Whitehorse Takwahoni Structural and Stratigraphic Gas Plays represent potential hydrocarbon accumulations in these rocks. The total mean play potential for the Whitehorse Takwahoni Structural Gas Play is 8.07×10^{10} m^3 (2.85 TCF).

The finer-grained easterly- and westerly-derived Inklin Formation belongs to the Laberge Group as well. Interbedded turbiditic greywacke, shale and siltstone is found in the Whitehorse Inklin Structural Gas Play. The ultimate mean play potential for these rocks is 2.21×10^{10} m^3 or 779 BCF of gas.

The Whitehorse Lewes River Structural Gas Play incorporates clastics, volcanics, radiolarian chert and carbonates of the Lewes River and Sinwa Groups. These rocks are tight so the presence of porosity was considered to be high-risk at the play level. There is a 50% chance that the play exists. If gas is present, then the total mean in-place play potential is 1.02×10^{11} m^3 (3.6 TCF).

The speculative Whitehorse Taku Fractured Carbonate Gas Play consists of shallow-water massive carbonate forming the main component of the reef on a basaltic substrate. A back-reef facies composed of algalaminate dolomite is also present. The speculative nature of this conceptual play; principally, the lack of information on possible shows, the absence of primary porosity, and increased levels of metamorphism which may have destroyed petroleum and volatiles, reduces the likelihood that the play exists and, consequently no assessment was attempted.

The Whitehorse Cenozoic Stratigraphic Gas Play does exist but no assessment was performed because of insufficient geological and reservoir information.

The total gas potential for all plays in this assessment is 3.87×10^{11} m^3 or 13.7 TCF. Oil potential total is 3.85×10^{8} m^3 or 2.42 billion barrels.

Good hydrocarbon potential is recognized in areas occupied by the Bowser Skeena, Sustut Upper Cretaceous, and Whitehorse Takwahoni Structural plays. Secondary or medium potential is interpreted in the Bowser Mid-Jurassic-Lower Cretaceous, Whitehorse Inklin and Lewes River Structural Gas Plays. The Whitehorse Taku Fractured Carbonate and the Northern Rocky Mountain Trench Sifton Structural Gas Plays are areas of poor to fair hydrocarbon potential.

ADDENDUM

INTRODUCTION

In this section, interpreted hydrocarbon plays identified within the Whitehorse Trough that are located entirely within the Yukon Territory is discussed. This information may be useful if sufficient interest is generated for the exploitation of resources and the subsequent need for development of a transportation corridor through the Province to market.

Plays discussed in this section are the:

1) conceptual Whitehorse Tantalus Structural Gas Play,
2) conceptual Whitehorse Tantalus Structural Oil Play,
3) conceptual Whitehorse Takwahoni Structural Oil Play,
4) speculative Whitehorse Takwahoni Stratigraphic Oil Play, and the
5) speculative Whitehorse Lewes River Stratigraphic Gas Play.

GEOLOGICAL SETTING AND PLAY PARAMETERS

Whitehorse Tantalus Structural Gas Play

Non-marine, coal-bearing fluvial clastic rocks occupy northwest-trending small partly fault-bounded pull-apart basins partially related to the Teslin Fault system (Gabrielse, 1991a). These sediments belong to the Late Jurassic to Early Cretaceous Tantalus Formation. The basins are located in the northwestern part of the Intermontane Belt in south-central Yukon near Carmacks (Map 1). Lowey and Hills, 1988 interprets the clastic material south of Dawson on the Indian River as correlative to the Tantalus Formation. The play area is quite limited; 610 square kilometres. No wells or shows have been reported. The succession varies in thickness from 200 to 1500 metres. In the lower part of the sedimentary succession, interbedded sandstones and shales prevail. Carbonaceous shale occurs irregularly along with discontinuous coal seams. The upper portion of the sequence consists of chert-pebble conglomerate. Southerly to southwesterly-flowing fluvial systems constitute the dominant control for sedimentation in the basins.

Tight folds and normal block fault traps represent the main trapping mechanisms in this play. Folding occurred contemporaneously and subsequent to deposition until the mid-Eocene. Post mid-Eocene extensional tectonics produce the antithetic and synthetic small-scale fault traps. Area of closure is estimated to range from 0.5 to 10 square kilometres while vertical closure varies from 1 to 1000 metres. Number of prospects is estimated to range from 25 to 100.

Thin reservoir sands and conglomerates are interspersed within the Tantalus sedimentary succession. Up to 7% of the succession constitutes the reservoir fraction. Trap fill ranges from 1.5 to 30% of the succession. The porous material varies in porosity from 5 to 15%, with a 10%

average. Secondary fracture porosity probably exists in the play.

Source rocks within the succession are carbonaceous and bituminous shales and sandstones along with some coal seams. Coal rank varies from high-volatile bituminous C to low-volatile bituminous at Carmacks, and low-volatile bituminous to anthracite rank at Whitehorse. Total organic carbon values in surface outcrop range from 0.72 to 42.99 (Gunther, 1985). Hydrogen index varies from 0.09 to 75.33 and vitrinite reflectance ranges from 0.53 to 3.45% implying the basin is gas-prone throughout (Hunt and Hart, 1994).

Numerous faults and fractures, some of which are open, may provide opportunities for migration of gas in the play. Abundant overlying and interbedded shales may provide seal in some cases.

Whitehorse Tantalus Structural Oil Play

In the northwest corner of the Whitehorse Trough at Carmacks, there exists a fairly-rich oil-prone zone in the Tantalus rocks. This 160 square kilometre play area constitutes the Whitehorse Tantalus Structural Oil Play (Map 2). Play parameters are similar to the gas play. The number of prospects is estimated to range from 1 to 10 with a 50% probability that 8 prospects are present.

Coal ranks range from high-volatile bituminous C to low-volatile bituminous in the area. Vitrinite reflectance (Romax) varies from 0.53 to 2.14% revealing that at least some of the material sampled is found within the oil window (Gunther, 1985). No oil shows are reported, however.

Whitehorse Takwahoni Structural Oil Play

The Whitehorse Takwahoni Structural Oil Play occupies an area of 1160 square kilometres within the Miners Range and the Anticline Mountain area northwest of Whitehorse (Map 3). The Takwahoni Formation of Pliensbachian to Bajocian age represents the western proximal facies of the Jurassic Laberge Group. This facies consisting of interbedded conglomerate, greywacke, siltstone, and shale is derived from the accreted Stikinia Terrane to the southwest. Volcanic and plutonic clasts within the conglomerates also indicate derivation from the Coast Belt to the west. To the east within the Trough, is a proximal to distal facies of the Laberge Group known as the Inklin Formation which is derived from both Quesnellia to the east and Stikinia to the west. The fact that the Inklin and Takwahoni Formation interfinger in the northern portion of the Trough implies that Quesnellia, Cache Creek and Stikinia were at least loosely amalgamated by Jurassic time. The Takwahoni Formation ranges in thickness from a few metres up to 3000 metres.

Three trap-types have been identified in the structural play. They are anticlinal traps formed by simple compressional folding, traps produced by normal block faulting, and anticlinal structures constructed as a result of thrust faulting. The compressional structures were developed during the mid-Jurassic to mid-Eocene interval when accretion of exotic terranes to the North American continent was taking place. Extensional tectonics prevailed in the post-mid-Eocene, when the block faulting was propagated.

Major structures range in size from 10 to 80 square kilometres with vertical closure varying from 40 to 200 metres. The estimated mean for the number of prospects is 75 with a minimum of 10 and a maximum of 150.

Thin porous sandstones and conglomerates within the succession represent the reservoir fraction. There is little or no porosity in most of the Laberge Group. However, there are minor sandstone and conglomerate layers with excellent porosity. These porous sands range from 5 to 20% porosity, with a 10% average. It is estimated that about 7% of the fill in traps is considered to be reservoir quality material. Secondary fracture porosity may be present in parts.

Dark grey to black shales and siltstones and possible oil shales of the Jurassic Richthofen Formation are most likely the major source for oil in the basin. Petro-Canada's geochemical survey in 1985 revealed that total organic carbon varies from 2.66 to 11.69 within the play area. Hydrogen index ranges from 13.25 to 58.71 and the vitrinite reflectance (Romax) from 0.6 to 1.6% (Gunther, 1985). These values imply an oil window is present in this area of the Whitehorse Trough, with indications of a relatively rich oil source in some samples.

Abundant Jura-Cretaceous overlying shales provide seal in some parts. However, significant outcrop areas of Laberge Group rocks may increase the risk on seal.

The formation of structure has been interpreted to occur both contemporaneously and before the generation of hydrocarbons. A risk of 0.5 was assigned to timing to reflect this interpretation.

Whitehorse Takwahoni Stratigraphic Oil Play

Small-scale stratigraphic hydrocarbon traps within the Takwahoni Formation adjacent to the Llewellyn Fault System in south-central Yukon constitute this oil play. Map 3 shows the extent of the play. This play has been classified as speculative due to the lack of geological information required to set reservoir parameters. Oil resources in the play are a minor component in the overall analysis. No assessment was performed on the play.

Whitehorse Lewes River Stratigraphic Gas Play

Map 4 shows the areal extent of the stratigraphic play starting just south of Whitehorse and continuing to the north along the western side of the Trough to Carmacks. Prominent reefal masses in the Lewes River limestones represent the dominant stratigraphic trapping mechanism in the play (Koch, 1973, Reid and Templeman-Kluit, 1987). These masses are principally made of carbonate muds with a lesser proportion of reefal framework organisms (Reid and Templeman-Kluit, 1987). The reefs lack good porosity and permeability but fracture porosity may occur. Brecciation has been observed in outcrop and cavernous to vuggy porosity is present in weathered material. The reefs range in thickness up to 150 metres. No assessment was performed on this play because of the lack of pertinent geological information for proper evaluation of reservoir.

RESOURCE APPRAISAL

Whitehorse Tantalus Structural Gas Play

It is almost certain that this play exists, but individual prospects embody a much greater risk in identifying hydrocarbon accumulations. Adequate timing and preservation are the highest risk factors at the prospect-level in the play. The expected number of undiscovered fields has a mean value of 5 while it is 99% certain that no more than 13 fields are expected in the play.

The mean potential for gas in the Whitehorse Tantalus Structural Play is 1.36×10^9 m^3 or 48 BCF. According to Figure 10, the range of the largest in-place undiscovered field at the 90% interval varies from 3.30×10^7 to 3.40×10^9 m^3 (1 to 120 BCF). The median of the largest undiscovered field (Figure 10, in-place) is 3.97×10^8 m^3 or 14 BCF of gas. The largest recoverable undiscovered field ranges in size from 2.60×10^7 to 2.72×10^9 m^3 (1 to 96 BCF).

Whitehorse Tantalus Structural Oil Play

There is a 38% chance that this oil play exists within the oil window in the northwest of the Whitehorse Trough. Substantial risk has been applied to adequate timing and preservation while lesser risk was assigned to adequate seal, all at the prospect level. The mean of the number of expected fields is less than 1 and it is 99% certain that no more than 3 oil fields are present in the Whitehorse Tantalus Structural Oil Play.

Mean play potential is 1.75×10^6 m^3 or 11 million barrels of oil. Figure 11 illustrates that the largest undiscovered in-place field ranges in size from 5.66×10^5 to 1.23×10^6 m^3 in the 90% interval (3.6 to 77.5 million barrels). The recoverable largest undiscovered field varies in size from 2.00×10^6 to 2.90×10^7 m^3 (13-182 million barrels).

Whitehorse Takwahoni Structural Oil Play

The probability that the Takwahoni Structural Oil play exists is 0.86. The mean in-place oil potential is determined to be 1.3×10^7 m^3 or 83 million barrels. The field-size-by-rank diagram for the play (Figure 12) indicates that the largest undiscovered in-place field ranges in size from 8.77×10^5 to 2.84×10^7 m^3 or 5.5 to 179 million barrels. Applying the recovery factor probability distribution in Appendix 1, the recoverable largest undiscovered field varies in size from 1.30×10^5 to 4.0×10^6 m^3 (0.8 to 28 million barrels). The median of the largest undiscovered in-place field is 6.0×10^6 m^3 or 37.5 million barrels (Figure 12).

HYDROCARBON POTENTIAL DISTRIBUTION

A favourable location for hydrocarbon accumulation is the area covered by the Whitehorse Takwahoni Structural Oil Play. Good potential is thus interpreted in the area (Map 6). Poor potential is assigned to the Whitehorse Tantalus Structural Oil and Gas Plays due to the limited areal extent with the reduced likelihood of encountering hydrocarbons. Note that the Tantalus plays are not shown on Map 6 since the favourable potential of the underlying Takwahoni Formation is illustrated in the area.

SUMMARY AND CONCLUSIONS

A Cretaceous coal-bearing fluvial clastic sedimentary succession represents the rocks associated with the Whitehorse Tantalus Structural Gas Play. This play has a mean in-place gas potential of $1.36x10^9$ m^3 or 48 BCF. The oil window is restricted to the Carmacks area in the same package of rocks. The mean potential of oil in-place is $1.75x10^6$ m^3 or 11 million barrels in the Whitehorse Tantalus Structural Oil Play.

The Whitehorse Takwahoni Structural Oil Play incorporates clastic rocks of the Laberge Group that represent a proximal facies of sediments that are derived from the Coast Belt and Stikinia to the west and southwest. This proximal facies consisting of conglomerates and sandstones is known as the Takwahoni Formation. The mean play potential is $1.30x10^7$ m^3 or 83 million barrels of in-place oil.

The stratigraphic oil play in the Takwahoni Formation with small-scale hydrocarbon traps adjacent to the Llewellyn Fault System is classified as a speculative play. Insufficient reservoir information was available in order to properly assess the play. Similarly, information was limited on the reefal carbonates constituting the Whitehorse Lewes River Stratigraphic Gas Play.

Total resource potential for the three conceptual plays analyzed above is $1.36x10^9$ m^3 (48 BCF) of gas and $1.48x10^7$ m^3 or 94 million barrels.

The total gas resource in the Yukon in the Whitehorse Trough is $1.53x10^{11}$ m^3 or 5.4 TCF. Similarly, the total oil resource in the Yukon portion of the Whitehorse Trough is $1.48x10^7$ m^3 or 94 million barrels.

The Whitehorse Takwahoni Structural Oil Play is classified as an area of good potential in the assessment. The Whitehorse Tantalus Structural Oil and Gas Plays are categorized as having poor potential due to the limited play areas involved.

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APPENDIX 1: PROBABILITY DISTRIBUTIONS AND RISK FACTORS
(INPUT DATA)

APPENDIX 2: STATISTICAL OUTPUT

FIGURE CAPTIONS

Map 1: Bowser/Whitehorse Oil & Gas Assessment - Cretaceous/Paleogene Gas Plays (Bowser Skeena Structural, Sustut Upper Cretaceous Structural, Whitehorse Tantalus Structural, Northern Rocky Mountain Trench Sifton Structural)

Map 2: Bowser/Whitehorse Oil & Gas Assessment - Cretaceous Oil Plays (Bowser Skeena Structural, Sustut Upper Cretaceous Structural, Whitehorse Tantalus Structural)

Map 3: Bowser/Whitehorse Oil & Gas Assessment - Jurassic Plays (Bowser Mid-Jurassic-Lower Cretaceous Structural (Gas), Whitehorse Takwahoni Structural & Stratigraphic (Oil & Gas), Whitehorse Inklin Structural (Gas))

Map 4: Bowser/Whitehorse Oil & Gas Assessment - Permian & Triassic Plays (Whitehorse Lewes River Structural & Stratigraphic (Gas), Whitehorse Taku Fractured Carbonate (Gas))

Map 5: Bowser/Whitehorse Oil & Gas Assessment - Cenozoic Plays (Whitehorse Cenozoic Stratigraphic Gas)

Map 6: Bowser/Whitehorse Oil & Gas Assessment - Hydrocarbon Potential Map

Figure 1: Field size by rank diagram of Bowser Skeena Structural Gas Play=
Figure 2: Field size by rank diagram of Bowser Skeena Structural Oil Play
Figure 3: Field size by rank diagram of Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play
Figure 4: Field size by rank diagram of Sustut Upper Cretaceous Structural Gas Play
Figure 5: Field size by rank diagram of Sustut Upper Cretaceous Structural Oil Play
Figure 6: Field size by rank diagram of Northern Rocky Mountain Trench Sifton Structural Gas Play
Figure 7: Field size by rank diagram of Whitehorse Takwahoni Structural Gas Play
Figure 8: Field size by rank diagram of Whitehorse Inklin Structural Gas Play
Figure 9: Field size by rank diagram of Whitehorse Lewes River Structural Gas Play
Figure 10: Field size by rank diagram of Whitehorse Tantalus Structural Gas Play
Figure 11: Field size by rank diagram of Whitehorse Tantalus Structural Oil Play
Figure 12: Field size by rank diagram of Whitehorse Takwahoni Structural Oil Play

APPENDIX 1: PROBABILITY DISTRIBUTIONS AND RISK FACTORS
(INPUT DATA)

Bowser Skeena Structural Gas Play

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	$mile^2$ / km^2	1	10	90	175
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m/ ft	20	100	300	1000
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.09	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	—	0.85	—	
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0024	0.0042	0.019	0.02
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	—	0.70	—	

Bowser Skeena Structural Gas Play

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.50
Presence of reservoir facies			0.80
Presence of porosity			
Adequate seal			0.60
Adequate timing			0.60
Adequate source			0.80
Adequate maturation			
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	50	500	1000
No of pools			

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	mile^2 / km^2	1	10	90	175
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	20	100	300	1000
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.09	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	—	0.65	—	
Shrinkage factor	decimal fraction	—	1.2	—	
Formation volume factor	decimal fraction				
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	0.15	0.20	0.29	0.30

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level	
		Play	Prospect
Presence of closure			0.50
Presence of reservoir facies			0.80
Presence of porosity			
Adequate seal			0.60
Adequate timing			0.60
Adequate source			0.80
Adequate maturation			
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles		
	0.99	0.5	0.0
No of prospects	40	400	800
No of pools			

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	$mile^2$ / km^2	1	10	180	200
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	20	100	300	1000
Porosity	decimal fraction	0.03	0.04	0.06	0.10
Trap fill	decimal fraction	0.015	0.07	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	—	0.70	—	
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0035	0.0058	0.012	0.02
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	—	0.80	—	

Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.90
Presence of reservoir facies		0.50	
Presence of porosity			
Adequate seal			0.50
Adequate timing		0.50	
Adequate source		0.95	
Adequate maturation			
Adequate preservation		0.50	
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	300	3000	6000
No of pools			

Sustut Upper Cretaceous Structural Gas Play

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	$mile^2$ / km^2	1	10	90	175
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	20	100	300	1000
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.09	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	—	0.85	—	
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0024	0.0042	0.019	0.02
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	—	0.70	—	

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.90
Presence of reservoir facies			0.80
Presence of porosity			
Adequate seal			0.90
Adequate timing			0.60
Adequate source			0.80
Adequate maturation			
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	15	135	270
No of pools			

Sustut Upper Cretaceous Structural Oil Play

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	$mile^2$ / km^2	1	10	90	175
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	20	100	300	1000
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.09	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	—	0.65	—	
Shrinkage factor	decimal fraction	—	1.2	—	
Formation volume factor	decimal fraction				
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	0.15	0.20	0.29	0.30

Sustut Upper Cretaceous Structural Oil Play

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.90
Presence of reservoir facies			0.80
Presence of porosity			
Adequate seal			0.90
Adequate timing			0.60
Adequate source			0.80
Adequate maturation			
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	15	135	270
No of pools			

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	$mile^2$ / km^2	0.5	1	10	15
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m/ ft	1	10	150	200
Porosity	decimal fraction	0.01	0.07	0.14	0.20
Trap fill	decimal fraction	0.01	0.05	0.30	1.00
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	—	0.85	—	
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0024	0.0042	0.019	0.02
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	—	0.70	—	

Northern Rocky Mountain Trench Sifton Structural Gas Play

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			
Presence of reservoir facies			
Presence of porosity			
Adequate seal			
Adequate timing			
Adequate source			
Adequate maturation			
Adequate preservation			
Adequate recovery			
Adequate play conditions		0.90	
Adequate prospect conditions			0.25

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	15	25	50
No of pools			

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	$mile^2$ / km^2	1	10	60	80
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	100	200	500	1500
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.07	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	0.50	0.60	0.70	0.875
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0021	0.0027	0.0041	0.02
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	0.65	0.75	0.80	0.85

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.50
Presence of reservoir facies			0.50
Presence of porosity			
Adequate seal			0.50
Adequate timing			
Adequate source			
Adequate maturation			0.90
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	40	375	750
No of pools			

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	$mile^2$ / km^2	1	10	60	80
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	10	100	500	1500
Porosity	decimal fraction	0.05	0.10	0.12	0.15
Trap fill	decimal fraction	0.015	0.07	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	0.50	0.60	0.70	0.875
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0041	0.007	0.022	0.025
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	0.65	0.75	0.80	0.85

Whitehorse Inklin Structural Gas Play

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.50
Presence of reservoir facies			0.50
Presence of porosity			
Adequate seal			0.50
Adequate timing			
Adequate source			
Adequate maturation			0.75
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	60	625	1250
No of pools			

Whitehorse Lewes River Structural Gas Play

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	mile^2 / km^2	1	10	60	80
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	10	200	1000	2000
Porosity	decimal fraction	0.03	0.04	0.06	0.10
Trap fill	decimal fraction	0.10	0.30	0.60	1.0
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	0.65	0.75	0.80	0.90
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0027	0.0031	0.0035	0.02
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	—	0.60	—	

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.50
Presence of reservoir facies			0.80
Presence of porosity		0.50	
Adequate seal			0.50
Adequate timing			0.50
Adequate source			0.80
Adequate maturation			0.90
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	80	800	1600
No of pools			

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	mile^2 / km^2	0.5	1	5	10
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	1	100	300	1000
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.07	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	0.59	0.64	0.75	0.80
Shrinkage factor	decimal fraction				
Formation volume factor	decimal fraction	0.0037	0.0069	0.037	0.89
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	0.70	0.80	0.90	0.95

Whitehorse Tantalus Structural Gas Play

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.90
Presence of reservoir facies			0.80
Presence of porosity			
Adequate seal			0.90
Adequate timing			0.50
Adequate source			
Adequate maturation			0.80
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	25	50	100
No of pools			

Whitehorse Tantalus Structural Oil Play

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	mile^2 / km^2	1	5	20	30
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	1	100	300	1000
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.07	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	0.50	0.60	0.65	0.70
Shrinkage factor	decimal fraction	1.125	1.131	1.138	1.14
Formation volume factor	decimal fraction				
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	—	0.20	—	

Whitehorse Takwahoni Structural Oil Play

Table 5-2. Format for entry of probability distributions.

Geological variable	Unit of measurement	Probability in upper percentiles 1.0	0.5	0.02/0.01	0.0
Area of closure/pool	mile^2 / km^2	1	10	80	100
Net pay/no of pay zones	m / ft / no				
Reservoir/ formation thickness	m / ft	10	40	200	750
Porosity	decimal fraction	0.05	0.10	0.15	0.20
Trap fill	decimal fraction	0.015	0.07	0.21	0.30
Favourable facies	decimal fraction				
Water saturation	decimal fraction				
Oil/gas saturation	decimal fraction	0.55	0.65	0.70	0.815
Shrinkage factor	decimal fraction	—	1.31	—	
Formation volume factor	decimal fraction				
Reservoir temperature	Celsius/ Fahrenheit				
Reservoir pressure	kPa/psi				
Recovery factor	decimal fraction	0.10	0.15	0.20	0.30

Whitehorse Tantalus Structural Oil Play

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.90
Presence of reservoir facies			0.80
Presence of porosity			
Adequate seal			0.70
Adequate timing			0.50
Adequate source			0.80
Adequate maturation			
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	1	8	10
No of pools			

Table 5-3. Format for entry of geological risk factors and their marginal probability.

Geological factors	Marginal probability	Level Play	Level Prospect
Presence of closure			0.50
Presence of reservoir facies			0.50
Presence of porosity			
Adequate seal			0.50
Adequate timing			
Adequate source			
Adequate maturation			0.90
Adequate preservation			0.33
Adequate recovery			
Adequate play conditions			
Adequate prospect conditions			

Table 5-4. Format for entry of number of prospects and pools.

Geological variable	Probability in upper percentiles 0.99	0.5	0.0
No of prospects	10	75	150
No of pools			

APPENDIX 2: STATISTICAL OUTPUT

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5B19501
PLAY	Bowser Skeena Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	WED, FEB 1, 1995, 11:37 AM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk	=	1.00
PROSPECT LEVEL	Presence of Closure	(1)	.50
	Presence of Reservoir Facies	(2)	.80
	Adequate Seal	(4)	.60
	Adequate Timing	(5)	.60
	Adequate Source	(6)	.80
	Adequate Preservation	(8)	.33
	Overall Prospect Level Risk	=	.04
EXPLORATION RISK:		=	.04

B) No. of Prospects Distribution

Minimum	=	50
Maximum	=	1000
Mean	=	510.75
S.D.	=	276.89

Frequency	No. of Prospects
99.00	50
95	87
90	133
80	225
75	271
60	409
50	500

40	600
25	750
20	800
10	900
5	950
1	990
0	1000

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	62
Mean	=	19.42
S.D.	=	11.38

Frequency	No. of Pools
99.46	0
99	1
95	3
90	5
80	8
75	10
60	15
50	19
40	22
25	28
20	30
10	35
5	39
1	45
0	62

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5B19501
PLAY	Bowser Skeena Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	THU, FEB 16, 1995, 1:56 PM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary	mu = 7.5074	MEAN = 3703.5		
Statistics	sig. sq= 1.4193	S.D. = 6556.8		

Upper	99.99% = 21.687	60.00% = 1346.9	15.00% = 6261.3
Percentiles	99.00% = 113.96	55.00% = 1568.2	10.00% = 8384.7
	95.00% = 256.66	50.00% = 1821.4	8.00% = 9713.9
	90.00% = 395.67	45.00% = 2115.6	6.00% = 11611.
	85.00% = 529.86	40.00% = 2463.2	5.00% = 12926.
	80.00% = 668.28	35.00% = 2882.5	4.00% = 14663.
	75.00% = 815.51	30.00% = 3402.0	2.00% = 21039.
	70.00% = 975.19	25.00% = 4068.1	1.00% = 29111.
	65.00% = 1150.9	20.00% = 4964.4	.01% = .15298E+06

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 62
Expectation = 19.42
Standard Deviation= 11.38

D) Pool Sizes By Rank

Pool Rank			Distribution			
1	MEAN	= 19433.	S.D.	= 18831.	P(N>=r)=	.99459
	99%	= 1165.4	75%	= 8826.1	10%	= 37727.
	95%	= 3253.6	50%	= 14701.	5%	= 50492.
	90%	= 5004.9	25%	= 23874.	1%	= 90879.
2	MEAN	= 10174.	S.D.	= 7104.4	P(N>=r)=	.97978
	99%	= 588.06	75%	= 5354.2	10%	= 18762.
	95%	= 1755.0	50%	= 8817.3	5%	= 23104.
	90%	= 2854.4	25%	= 13264.	1%	= 34548.
3	MEAN	= 7212.3	S.D.	= 4615.9	P(N>=r)=	.95716

	99%	= 410.78	75%	= 3907.7	10%	= 13070.
	95%	= 1209.8	50%	= 6511.1	5%	= 15639.
	90%	= 2006.9	25%	= 9589.2	1%	= 21893.
4	MEAN	= 5663.8	S.D.	= 3490.6	P(N>=r)	= .93045
	99%	= 330.67	75%	= 3095.0	10%	= 10180.
	95%	= 943.42	50%	= 5210.0	5%	= 12004.
	90%	= 1565.6	25%	= 7608.3	1%	= 16246.
5	MEAN	= 4682.8	S.D.	= 2827.2	P(N>=r)	= .90226
	99%	= 283.95	75%	= 2565.7	10%	= 8379.6
	95%	= 784.45	50%	= 4351.1	5%	= 9794.0
	90%	= 1292.8	25%	= 6330.6	1%	= 12986.
6	MEAN	= 3993.3	S.D.	= 2380.8	P(N>=r)	= .87368
	99%	= 251.84	75%	= 2188.7	10%	= 7128.0
	95%	= 675.95	50%	= 3731.8	5%	= 8282.9
	90%	= 1104.1	25%	= 5421.9	1%	= 10832.
7	MEAN	= 3476.6	S.D.	= 2055.7	P(N>=r)	= .84504
	99%	= 227.64	75%	= 1904.6	10%	= 6197.0
	95%	= 595.71	50%	= 3259.7	5%	= 7172.0
	90%	= 964.24	25%	= 4734.8	1%	= 9288.5
8	MEAN	= 3072.1	S.D.	= 1806.0	P(N>=r)	= .81640
	99%	= 208.43	75%	= 1682.0	10%	= 5471.7
	95%	= 533.36	50%	= 2885.8	5%	= 6314.4
	90%	= 855.73	25%	= 4193.1	1%	= 8119.8
9	MEAN	= 2745.3	S.D.	= 1607.0	P(N>=r)	= .78776
	99%	= 192.66	75%	= 1502.4	10%	= 4887.6
	95%	= 483.23	50%	= 2581.1	5%	= 5628.6
	90%	= 768.81	25%	= 3752.9	1%	= 7199.5
10	MEAN	= 2475.0	S.D.	= 1443.9	P(N>=r)	= .75913
	99%	= 179.38	75%	= 1354.2	10%	= 4405.2
	95%	= 441.88	50%	= 2327.5	5%	= 5065.4
	90%	= 697.44	25%	= 3386.7	1%	= 6453.0
11	MEAN	= 2247.0	S.D.	= 1307.2	P(N>=r)	= .73052
	99%	= 168.00	75%	= 1229.8	10%	= 3998.8
	95%	= 407.09	50%	= 2112.7	5%	= 4593.1
	90%	= 637.67	25%	= 3076.5	1%	= 5833.6
12	MEAN	= 2051.9	S.D.	= 1190.7	P(N>=r)	= .70195
	99%	= 158.09	75%	= 1123.7	10%	= 3650.9
	95%	= 377.32	50%	= 1928.1	5%	= 4190.5
	90%	= 586.80	25%	= 2809.8	1%	= 5310.0
13	MEAN	= 1882.6	S.D.	= 1090.0	P(N>=r)	= .67342
	99%	= 149.35	75%	= 1032.0	10%	= 3349.2
	95%	= 351.51	50%	= 1767.6	5%	= 3842.4
	90%	= 542.90	25%	= 2577.6	1%	= 4860.8
14	MEAN	= 1734.1	S.D.	= 1002.0	P(N>=r)	= .64498
	99%	= 141.56	75%	= 951.86	10%	= 3084.6
	95%	= 328.85	50%	= 1626.6	5%	= 3538.1
	90%	= 504.55	25%	= 2373.3	1%	= 4470.5
15	MEAN	= 1602.7	S.D.	= 924.34	P(N>=r)	= .61663

	99%	= 134.55	75%	= 881.12	10%	= 2850.5
	95%	= 308.74	50%	= 1501.6	5%	= 3269.4
	90%	= 470.67	25%	= 2192.1	1%	= 4128.0
16	MEAN	= 1485.5	S.D.	= 855.25	P(N>=r)	= .58843
	99%	= 128.18	75%	= 818.06	10%	= 2641.6
	95%	= 290.70	50%	= 1389.9	5%	= 3030.2
	90%	= 440.43	25%	= 2030.0	1%	= 3824.6
17	MEAN	= 1380.1	S.D.	= 793.37	P(N>=r)	= .56038
	99%	= 122.33	75%	= 761.38	10%	= 2453.9
	95%	= 274.36	50%	= 1289.4	5%	= 2815.8
	90%	= 413.15	25%	= 1884.2	1%	= 3553.7
18	MEAN	= 1284.8	S.D.	= 737.63	P(N>=r)	= .53251
	99%	= 116.91	75%	= 710.06	10%	= 2284.4
	95%	= 259.41	50%	= 1198.5	5%	= 2622.3
	90%	= 388.33	25%	= 1752.3	1%	= 3310.3
19	MEAN	= 1198.1	S.D.	= 687.16	P(N>=r)	= .50484
	99%	= 111.84	75%	= 663.28	10%	= 2130.4
	95%	= 245.61	50%	= 1115.7	5%	= 2446.9
	90%	= 365.57	25%	= 1632.2	1%	= 3090.3
20	MEAN	= 1118.9	S.D.	= 641.26	P(N>=r)	= .47737
	99%	= 107.07	75%	= 620.43	10%	= 1989.9
	95%	= 232.79	50%	= 1040.1	5%	= 2287.0
	90%	= 344.55	25%	= 1522.5	1%	= 2890.5
21	MEAN	= 1046.3	S.D.	= 599.36	P(N>=r)	= .45011
	99%	= 102.56	75%	= 581.00	10%	= 1861.1
	95%	= 220.82	50%	= 970.71	5%	= 2140.8
	90%	= 325.06	25%	= 1421.9	1%	= 2708.1
22	MEAN	= 979.44	S.D.	= 560.98	P(N>=r)	= .42308
	99%	= 98.271	75%	= 544.60	10%	= 1742.6
	95%	= 209.59	50%	= 906.87	5%	= 2006.4
	90%	= 306.90	25%	= 1329.3	1%	= 2541.1
23	MEAN	= 917.76	S.D.	= 525.70	P(N>=r)	= .39627
	99%	= 94.184	75%	= 510.89	10%	= 1633.5
	95%	= 199.03	50%	= 847.98	5%	= 1882.4
	90%	= 289.95	25%	= 1244.0	1%	= 2387.6
24	MEAN	= 860.69	S.D.	= 493.20	P(N>=r)	= .36972
	99%	= 90.284	75%	= 479.62	10%	= 1532.7
	95%	= 189.08	50%	= 793.53	5%	= 1767.7
	90%	= 274.08	25%	= 1165.1	1%	= 2246.0
25	MEAN	= 807.81	S.D.	= 463.19	P(N>=r)	= .34346
	99%	= 86.556	75%	= 450.54	10%	= 1439.3
	95%	= 179.69	50%	= 743.10	5%	= 1661.7
	90%	= 259.20	25%	= 1092.0	1%	= 2114.8
26	MEAN	= 758.71	S.D.	= 435.42	P(N>=r)	= .31753
	99%	= 82.988	75%	= 423.46	10%	= 1352.7
	95%	= 170.81	50%	= 696.33	5%	= 1563.6
	90%	= 245.22	25%	= 1024.2	1%	= 1993.4
27	MEAN	= 713.09	S.D.	= 409.69	P(N>=r)	= .29198

	99%	= 79.570	75%	= 398.21	10%	= 1272.2
	95%	= 162.41	50%	= 652.92	5%	= 1472.5
	90%	= 232.08	25%	= 961.29	1%	= 1881.5
28	MEAN	= 670.66	S.D.	= 385.82	P(N>=r)	= .26688
	99%	= 76.295	75%	= 374.67	10%	= 1197.4
	95%	= 154.45	50%	= 612.61	5%	= 1387.8
	90%	= 219.71	25%	= 902.85	1%	= 1777.5
29	MEAN	= 631.18	S.D.	= 363.64	P(N>=r)	= .24232
	99%	= 73.158	75%	= 352.73	10%	= 1127.8
	95%	= 146.92	50%	= 575.18	5%	= 1308.9
	90%	= 208.08	25%	= 848.55	1%	= 1679.5
30	MEAN	= 594.48	S.D.	= 343.03	P(N>=r)	= .21838
	99%	= 70.159	75%	= 332.30	10%	= 1063.0
	95%	= 139.80	50%	= 540.46	5%	= 1235.3
	90%	= 197.16	25%	= 798.11	1%	= 1587.9
31	MEAN	= 560.38	S.D.	= 323.87	P(N>=r)	= .19517
	99%	= 67.300	75%	= 313.32	10%	= 1002.8
	95%	= 133.09	50%	= 508.29	5%	= 1166.9
	90%	= 186.93	25%	= 751.31	1%	= 1503.0
32	MEAN	= 528.74	S.D.	= 306.04	P(N>=r)	= .17283
	99%	= 64.585	75%	= 295.71	10%	= 946.76
	95%	= 126.78	50%	= 478.53	5%	= 1103.1
	90%	= 177.37	25%	= 707.91	1%	= 1423.6
33	MEAN	= 499.41	S.D.	= 289.45	P(N>=r)	= .15150
	99%	= 62.017	75%	= 279.44	10%	= 894.71
	95%	= 120.88	50%	= 451.06	5%	= 1043.8
	90%	= 168.47	25%	= 667.72	1%	= 1349.9
34	MEAN	= 472.27	S.D.	= 274.02	P(N>=r)	= .13133
	99%	= 59.601	75%	= 264.43	10%	= 846.39
	95%	= 115.38	50%	= 425.75	5%	= 988.61
	90%	= 160.22	25%	= 630.55	1%	= 1281.5
35	MEAN	= 447.20	S.D.	= 259.65	P(N>=r)	= .11247
	99%	= 57.337	75%	= 250.63	10%	= 801.58
	95%	= 110.28	50%	= 402.47	5%	= 937.32
	90%	= 152.60	25%	= 596.23	1%	= 1217.5
36	MEAN	= 424.07	S.D.	= 246.30	P(N>=r)	= .95065E-01
	99%	= 55.222	75%	= 237.96	10%	= 760.05
	95%	= 105.55	50%	= 381.10	5%	= 889.67
	90%	= 145.57	25%	= 564.58	1%	= 1157.9
37	MEAN	= 402.76	S.D.	= 233.87	P(N>=r)	= .79232E-01
	99%	= 53.254	75%	= 226.36	10%	= 721.60
	95%	= 101.19	50%	= 361.51	5%	= 845.44
	90%	= 139.10	25%	= 535.43	1%	= 1102.3
38	MEAN	= 383.12	S.D.	= 222.33	P(N>=r)	= .65058E-01
	99%	= 51.426	75%	= 215.74	10%	= 686.03
	95%	= 97.162	50%	= 343.56	5%	= 804.40
	90%	= 133.16	25%	= 508.58	1%	= 1050.5
39	MEAN	= 365.05	S.D.	= 211.59	P(N>=r)	= .52583E-01

99%	= 49.731	75%	= 206.02	10%	= 653.12
95%	= 93.458	50%	= 327.12	5%	= 766.34
90%	= 127.71	25%	= 483.89	1%	= 1002.2

E) The mean of the potential = 71858.

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5B29501
PLAY	Bowser Skeena Structual Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	TUE, FEB 14, 1995, 11:13 AM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk	=	1.00
PROSPECT LEVEL	Presence of Closure	(1)	.50
	Presence of Reservoir Facies	(2)	.80
	Adequate Seal	(4)	.60
	Adequate Timing	(5)	.60
	Adequate Source	(6)	.80
	Adequate Preservation	(8)	.33
	Overall Prospect Level Risk	=	.04
EXPLORATION RISK:		=	.04

B) No. of Prospects Distribution

Minimum	=	40
Maximum	=	800
Mean	=	408.69
S.D.	=	221.51

Frequency	No. of Prospects
99.00	40
95	70
90	107
80	180
75	217
60	327
50	400

40	480
25	600
20	640
10	720
5	760
1	792
0	800

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	54
Mean	=	15.54
S.D.	=	9.27

Frequency	No. of Pools
99.06	0
99	1
95	2
90	4
80	6
75	8
60	12
50	15
40	18
25	23
20	24
10	28
5	31
1	37
0	54

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5B29501
PLAY	Bowser Skeena Structual Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	THU, FEB 16, 1995, 2:56 PM

A) Basic Information

TYPE OF RESOURCE =Oil In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = 1.9488	MEAN = 12.953	
	sig. sq= 1.2251	S.D. = 20.085	
Upper Percentiles	99.99% = .11445	60.00% = 5.3034	15.00% = 22.108
	99.00% = .53465	55.00% = 6.1085	10.00% = 28.998
	95.00% = 1.1367	50.00% = 7.0200	8.00% = 33.247
	90.00% = 1.6994	45.00% = 8.0676	6.00% = 39.238
	85.00% = 2.2291	40.00% = 9.2922	5.00% = 43.352
	80.00% = 2.7655	35.00% = 10.754	4.00% = 48.740
	75.00% = 3.3275	30.00% = 12.543	2.00% = 68.166
	70.00% = 3.9288	25.00% = 14.810	1.00% = 92.173
	65.00% = 4.5826	20.00% = 17.820	.01% = 430.58

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 54
Expectation = 15.54
Standard Deviation= 9.27

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 56.154	S.D. = 50.707	P(N>=r)= .99057
	99% = 3.7063	75% = 26.605	10% = 107.66
	95% = 10.033	50% = 43.629	5% = 142.03
	90% = 15.295	25% = 69.547	1% = 247.76
2	MEAN = 30.337	S.D. = 20.339	P(N>=r)= .96807
	99% = 2.0403	75% = 16.407	10% = 55.235
	95% = 5.6283	50% = 26.621	5% = 67.451
	90% = 8.9475	25% = 39.542	1% = 99.069
3	MEAN = 21.796	S.D. = 13.472	P(N>=r)= .93697

	99%	= 1.5090	75%	= 12.118	10%	= 38.993
	95%	= 4.0254	50%	= 19.831	5%	= 46.372
	90%	= 6.4442	25%	= 28.883	1%	= 64.084
4	MEAN	= 17.249	S.D.	= 10.283	P(N>=r)	= .90236
	99%	= 1.2508	75%	= 9.6790	10%	= 30.601
	95%	= 3.2147	50%	= 15.950	5%	= 35.910
	90%	= 5.1131	25%	= 23.049	1%	= 48.114
5	MEAN	= 14.330	S.D.	= 8.3735	P(N>=r)	= .86677
	99%	= 1.0901	75%	= 8.0710	10%	= 25.307
	95%	= 2.7115	50%	= 13.362	5%	= 29.464
	90%	= 4.2697	25%	= 19.243	1%	= 38.751
6	MEAN	= 12.258	S.D.	= 7.0746	P(N>=r)	= .83099
	99%	= .97514	75%	= 6.9158	10%	= 21.592
	95%	= 2.3588	50%	= 11.482	5%	= 25.012
	90%	= 3.6761	25%	= 16.513	1%	= 32.498
7	MEAN	= 10.694	S.D.	= 6.1203	P(N>=r)	= .79521
	99%	= .88671	75%	= 6.0394	10%	= 18.807
	95%	= 2.0938	50%	= 10.041	5%	= 21.713
	90%	= 3.2311	25%	= 14.435	1%	= 27.977
8	MEAN	= 9.4624	S.D.	= 5.3822	P(N>=r)	= .75944
	99%	= .81560	75%	= 5.3488	10%	= 16.624
	95%	= 1.8856	50%	= 8.8937	5%	= 19.149
	90%	= 2.8829	25%	= 12.788	1%	= 24.527
9	MEAN	= 8.4622	S.D.	= 4.7903	P(N>=r)	= .72373
	99%	= .75665	75%	= 4.7888	10%	= 14.856
	95%	= 1.7167	50%	= 7.9548	5%	= 17.086
	90%	= 2.6019	25%	= 11.442	1%	= 21.794
10	MEAN	= 7.6305	S.D.	= 4.3027	P(N>=r)	= .68810
	99%	= .70663	75%	= 4.3242	10%	= 13.389
	95%	= 1.5763	50%	= 7.1697	5%	= 15.384
	90%	= 2.3695	25%	= 10.317	1%	= 19.565
11	MEAN	= 6.9258	S.D.	= 3.8925	P(N>=r)	= .65259
	99%	= .66341	75%	= 3.9314	10%	= 12.147
	95%	= 1.4571	50%	= 6.5015	5%	= 13.950
	90%	= 2.1732	25%	= 9.3609	1%	= 17.705
12	MEAN	= 6.3194	S.D.	= 3.5419	P(N>=r)	= .61727
	99%	= .62543	75%	= 3.5937	10%	= 11.081
	95%	= 1.3541	50%	= 5.9246	5%	= 12.723
	90%	= 2.0046	25%	= 8.5354	1%	= 16.127
13	MEAN	= 5.7909	S.D.	= 3.2383	P(N>=r)	= .58217
	99%	= .59154	75%	= 3.2992	10%	= 10.152
	95%	= 1.2636	50%	= 5.4204	5%	= 11.658
	90%	= 1.8572	25%	= 7.8142	1%	= 14.768
14	MEAN	= 5.3252	S.D.	= 2.9727	P(N>=r)	= .54736
	99%	= .56085	75%	= 3.0390	10%	= 9.3359
	95%	= 1.1829	50%	= 4.9751	5%	= 10.725
	90%	= 1.7264	25%	= 7.1780	1%	= 13.583
15	MEAN	= 4.9111	S.D.	= 2.7383	P(N>=r)	= .51285

	99%	= .53266	75%	= 2.8069	10%	= 8.6117
	95%	= 1.1098	50%	= 4.5786	5%	= 9.8982
	90%	= 1.6089	25%	= 6.6121	1%	= 12.540
16	MEAN	= 4.5402	S.D.	= 2.5301	P(N>=r)	= .47867
	99%	= .50645	75%	= 2.5978	10%	= 7.9646
	95%	= 1.0430	50%	= 4.2230	5%	= 9.1611
	90%	= 1.5022	25%	= 6.1053	1%	= 11.614
17	MEAN	= 4.2060	S.D.	= 2.3439	P(N>=r)	= .44482
	99%	= .48184	75%	= 2.4084	10%	= 7.3829
	95%	= .98119	50%	= 3.9025	5%	= 8.4997
	90%	= 1.4043	25%	= 5.6489	1%	= 10.787
18	MEAN	= 3.9035	S.D.	= 2.1767	P(N>=r)	= .41131
	99%	= .45861	75%	= 2.2360	10%	= 6.8575
	95%	= .92378	50%	= 3.6124	5%	= 7.9030
	90%	= 1.3142	25%	= 5.2363	1%	= 10.042
19	MEAN	= 3.6288	S.D.	= 2.0257	P(N>=r)	= .37816
	99%	= .43662	75%	= 2.0788	10%	= 6.3813
	95%	= .87031	50%	= 3.3492	5%	= 7.3625
	90%	= 1.2310	25%	= 4.8620	1%	= 9.3695
20	MEAN	= 3.3790	S.D.	= 1.8889	P(N>=r)	= .34542
	99%	= .41581	75%	= 1.9353	10%	= 5.9482
	95%	= .82052	50%	= 3.1101	5%	= 6.8711
	90%	= 1.1543	25%	= 4.5218	1%	= 8.7592
21	MEAN	= 3.1514	S.D.	= 1.7646	P(N>=r)	= .31317
	99%	= .39619	75%	= 1.8046	10%	= 5.5536
	95%	= .77425	50%	= 2.8928	5%	= 6.4235
	90%	= 1.0835	25%	= 4.2122	1%	= 8.2037
22	MEAN	= 2.9440	S.D.	= 1.6513	P(N>=r)	= .28155
	99%	= .37775	75%	= 1.6855	10%	= 5.1936
	95%	= .73141	50%	= 2.6954	5%	= 6.0148
	90%	= 1.0185	25%	= 3.9302	1%	= 7.6968
23	MEAN	= 2.7551	S.D.	= 1.5478	P(N>=r)	= .25073
	99%	= .36052	75%	= 1.5772	10%	= 4.8646
	95%	= .69189	50%	= 2.5162	5%	= 5.6411
	90%	= .95892	25%	= 3.6733	1%	= 7.2328
24	MEAN	= 2.5830	S.D.	= 1.4530	P(N>=r)	= .22096
	99%	= .34449	75%	= 1.4790	10%	= 4.5640
	95%	= .65558	50%	= 2.3536	5%	= 5.2991
	90%	= .90453	25%	= 3.4393	1%	= 6.8074
25	MEAN	= 2.4263	S.D.	= 1.3662	P(N>=r)	= .19248
	99%	= .32963	75%	= 1.3901	10%	= 4.2891
	95%	= .62232	50%	= 2.2062	5%	= 4.9859
	90%	= .85498	25%	= 3.2261	1%	= 6.4175
26	MEAN	= 2.2837	S.D.	= 1.2864	P(N>=r)	= .16558
	99%	= .31592	75%	= 1.3096	10%	= 4.0377
	95%	= .59193	50%	= 2.0727	5%	= 4.6988
	90%	= .80995	25%	= 3.0321	1%	= 6.0595
27	MEAN	= 2.1539	S.D.	= 1.2132	P(N>=r)	= .14052

	99%	= .30329	75%	= 1.2369	10%	= 3.8077
	95%	= .56422	50%	= 1.9518	5%	= 4.4356
	90%	= .76907	25%	= 2.8554	1%	= 5.7305
28	MEAN	= 2.0358	S.D.	= 1.1459	P(N>=r)	= .11753
	99%	= .29167	75%	= 1.1712	10%	= 3.5973
	95%	= .53898	50%	= 1.8425	5%	= 4.1942
	90%	= .73200	25%	= 2.6946	1%	= 5.4276
29	MEAN	= 1.9283	S.D.	= 1.0841	P(N>=r)	= .96801E-01
	99%	= .28101	75%	= 1.1119	10%	= 3.4047
	95%	= .51599	50%	= 1.7434	5%	= 3.9727
	90%	= .69836	25%	= 2.5483	1%	= 5.1487
30	MEAN	= 1.8303	S.D.	= 1.0271	P(N>=r)	= .78445E-01
	99%	= .27121	75%	= 1.0582	10%	= 3.2284
	95%	= .49505	50%	= 1.6537	5%	= 3.7694
	90%	= .66783	25%	= 2.4150	1%	= 4.8916
31	MEAN	= 1.7410	S.D.	= .97476	P(N>=r)	= .62500E-01
	99%	= .26221	75%	= 1.0095	10%	= 3.0669
	95%	= .47595	50%	= 1.5724	5%	= 3.5826
	90%	= .64009	25%	= 2.2935	1%	= 4.6545

E) The mean of the potential = 200.97

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5B39502
PLAY	Bowser Mid-Jurassic - Lower Cretaceous Structural Gas
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	FRI, FEB 17, 1995, 10:24 AM

A) Risks

	GEOLOGICAL FACTOR			MARGINAL PROBABILITY	
PLAY LEVEL	Presence of Reservoir Facies	(2)		.50	.75
	Adequate Timing	(5)		.50	.50
	Adequate Source	(6)		.95	.95
	Adequate Preservation	(8)		.50	.7
	Overall Play Level Risk		=	.12	
PROSPECT LEVEL	Presence of Closure	(1)		.90	
	Adequate Seal	(4)		.50	1.0
	Overall Prospect Level Risk		=	.45	
EXPLORATION RISK:			=	.05	

B) No. of Prospects Distribution

Minimum	=	300
Maximum	=	6000
Mean	=	3062.00
S.D.	=	1661.28

Frequency	No. of Prospects
99.00	300
95	521
90	796
80	1347
75	1623
60	2449

50	3000
40	3600
25	4500
20	4800
10	5400
5	5700
1	5940
0	6000

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	2811
Mean	=	163.63
S.D.	=	514.92

Frequency	No. of Pools
11.87	0
10	502
5	1563
1	2473
0	2811

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5B39502
PLAY	Bowser Mid-Jurassic - Lower Cretaceous Structural Gas
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	MON, FEB 20, 1995, 8:10 AM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = 5.8228	MEAN = 712.65		
	sig. sq= 1.4923	S.D. = 1323.2		
Upper Percentiles	99.99% = 3.5955	60.00% = 247.98	15.00% = 1198.6	
	99.00% = 19.707	55.00% = 289.84	10.00% = 1617.1	
	95.00% = 45.308	50.00% = 337.93	8.00% = 1880.5	
	90.00% = 70.619	45.00% = 394.00	6.00% = 2257.8	
	85.00% = 95.272	40.00% = 460.51	5.00% = 2520.4	
	80.00% = 120.87	35.00% = 541.07	4.00% = 2868.3	
	75.00% = 148.25	30.00% = 641.27	2.00% = 4153.5	
	70.00% = 178.08	25.00% = 770.31	1.00% = 5794.7	
	65.00% = 211.06	20.00% = 944.79	.01% = 31761.	

C) No. of Pools Distribution

Lower Support = 0
Upper Support =2811
Expectation = 163.63
Standard Deviation= 514.92

D) Pool Sizes By Rank

Pool Rank			Distribution			
1	MEAN	= 20848.	S.D.	= 12627.	P(N>=r)=	.11875
	99%	= 5492.2	75%	= 13272.	10%	= 34314.
	95%	= 8038.2	50%	= 18024.	5%	= 42621.
	90%	= 9818.4	25%	= 24809.	1%	= 67360.
2	MEAN	= 13960.	S.D.	= 5749.5	P(N>=r)=	.11875
	99%	= 4255.1	75%	= 10085.	10%	= 21063.
	95%	= 6107.3	50%	= 13226.	5%	= 24224.
	90%	= 7461.5	25%	= 16869.	1%	= 32147.
3	MEAN	= 11423.	S.D.	= 4175.8	P(N>=r)=	.11875

	99%	= 3593.6	75%	= 8545.1	10%	= 16688.
	95%	= 5115.5	50%	= 11145.	5%	= 18684.
	90%	= 6270.2	25%	= 13854.	1%	= 23322.
4	MEAN	= 9970.5	S.D.	= 3455.0	P(N>=r)	= .11875
	99%	= 3154.6	75%	= 7568.3	10%	= 14333.
	95%	= 4473.5	50%	= 9880.4	5%	= 15822.
	90%	= 5505.8	25%	= 12128.	1%	= 19128.
5	MEAN	= 8987.1	S.D.	= 3029.1	P(N>=r)	= .11875
	99%	= 2832.5	75%	= 6870.6	10%	= 12800.
	95%	= 4010.9	50%	= 8995.6	5%	= 14003.
	90%	= 4958.0	25%	= 10962.	1%	= 16595.
6	MEAN	= 8259.2	S.D.	= 2741.7	P(N>=r)	= .11875
	99%	= 2581.9	75%	= 6336.8	10%	= 11696.
	95%	= 3655.6	50%	= 8326.2	5%	= 12716.
	90%	= 4539.1	25%	= 10102.	1%	= 14860.
7	MEAN	= 7689.6	S.D.	= 2531.3	P(N>=r)	= .11875
	99%	= 2378.9	75%	= 5909.6	10%	= 10850.
	95%	= 3371.1	50%	= 7793.8	5%	= 11740.
	90%	= 4204.3	25%	= 9430.0	1%	= 13578.
8	MEAN	= 7226.6	S.D.	= 2368.8	P(N>=r)	= .11875
	99%	= 2209.7	75%	= 5556.8	10%	= 10173.
	95%	= 3136.1	50%	= 7355.7	5%	= 10967.
	90%	= 3928.3	25%	= 8884.6	1%	= 12581.
9	MEAN	= 6839.7	S.D.	= 2238.1	P(N>=r)	= .11875
	99%	= 2065.7	75%	= 5258.3	10%	= 9614.1
	95%	= 2937.6	50%	= 6985.7	5%	= 10333.
	90%	= 3695.2	25%	= 8429.3	1%	= 11776.
10	MEAN	= 6509.4	S.D.	= 2130.1	P(N>=r)	= .11875
	99%	= 1941.0	75%	= 5000.9	10%	= 9141.9
	95%	= 2766.8	50%	= 6667.3	5%	= 9801.2
	90%	= 3494.7	25%	= 8040.8	1%	= 11109.
11	MEAN	= 6222.6	S.D.	= 2038.6	P(N>=r)	= .11875
	99%	= 1831.5	75%	= 4775.6	10%	= 8735.4
	95%	= 2617.7	50%	= 6386.8	5%	= 9345.6
	90%	= 3319.7	25%	= 7703.8	1%	= 10544.
12	MEAN	= 5970.4	S.D.	= 1959.8	P(N>=r)	= .11875
	99%	= 1734.4	75%	= 4576.1	10%	= 8380.4
	95%	= 2486.1	50%	= 6138.4	5%	= 8949.5
	90%	= 3165.1	25%	= 7407.5	1%	= 10057.
13	MEAN	= 5746.1	S.D.	= 1891.0	P(N>=r)	= .11875
	99%	= 1647.5	75%	= 4397.8	10%	= 8066.5
	95%	= 2368.8	50%	= 5916.4	5%	= 8600.6
	90%	= 3027.2	25%	= 7143.8	1%	= 9631.5
14	MEAN	= 5544.7	S.D.	= 1830.1	P(N>=r)	= .11875
	99%	= 1569.2	75%	= 4237.3	10%	= 7786.2
	95%	= 2263.5	50%	= 5716.6	5%	= 8290.1
	90%	= 2903.2	25%	= 6907.1	1%	= 9255.5
15	MEAN	= 5362.4	S.D.	= 1775.7	P(N>=r)	= .11875

	99% = 1498.2		75% = 4091.9		10% = 7533.6	
	95% = 2168.4		50% = 5535.5		5% = 8011.3	
	90% = 2791.3		25% = 6692.9		1% = 8919.8	
16	MEAN = 5196.4		S.D. = 1726.6		P(N>=r) = .11875	
	99% = 1433.7		75% = 3959.6		10% = 7304.5	
	95% = 2082.1		50% = 5370.6		5% = 7758.9	
	90% = 2689.5		25% = 6497.2		1% = 8617.7	
17	MEAN = 5044.2		S.D. = 1682.0		P(N>=r) = .11875	
	99% = 1374.7		75% = 3838.7		10% = 7095.1	
	95% = 2003.4		50% = 5219.7		5% = 7528.9	
	90% = 2596.6		25% = 6318.4		1% = 8343.9	
18	MEAN = 4904.0		S.D. = 1641.3		P(N>=r) = .11875	
	99% = 1320.5		75% = 3727.5		10% = 6902.9	
	95% = 1931.2		50% = 5080.9		5% = 7318.2	
	90% = 2511.3		25% = 6154.5		1% = 8094.1	
19	MEAN = 4774.2		S.D. = 1603.8		P(N>=r) = .11875	
	99% = 1270.6		75% = 3624.8		10% = 6725.4	
	95% = 1864.7		50% = 4952.5		5% = 7124.1	
	90% = 2432.7		25% = 6003.4		1% = 7864.9	
20	MEAN = 4653.6		S.D. = 1569.2		P(N>=r) = .11875	
	99% = 1224.4		75% = 3529.4		10% = 6562.9	
	95% = 1803.0		50% = 4833.1		5% = 6944.5	
	90% = 2359.7		25% = 5863.2		1% = 7653.7	
21	MEAN = 4541.0		S.D. = 1537.1		P(N>=r) = .11875	
	99% = 1181.3		75% = 3440.2		10% = 6413.9	
	95% = 1745.5		50% = 4721.6		5% = 6777.6	
	90% = 2291.6		25% = 5732.2		1% = 7458.1	
22	MEAN = 4435.7		S.D. = 1507.2		P(N>=r) = .11875	
	99% = 1140.4		75% = 3356.4		10% = 6273.9	
	95% = 1691.7		50% = 4616.7		5% = 6622.8	
	90% = 2227.7		25% = 5609.2		1% = 7276.3	
23	MEAN = 4336.8		S.D. = 1479.2		P(N>=r) = .11875	
	99% = 1101.8		75% = 3277.3		10% = 6141.7	
	95% = 1641.0		50% = 4517.7		5% = 6481.2	
	90% = 2167.5		25% = 5493.2		1% = 7106.7	
24	MEAN = 4243.8		S.D. = 1453.0		P(N>=r) = .11875	
	99% = 1065.4		75% = 3202.5		10% = 6016.4	
	95% = 1593.2		50% = 4423.9		5% = 6346.8	
	90% = 2110.7		25% = 5383.5		1% = 6948.0	
25	MEAN = 4155.9		S.D. = 1428.3		P(N>=r) = .11875	
	99% = 1031.0		75% = 3131.6		10% = 5897.5	
	95% = 1548.0		50% = 4334.9		5% = 6218.6	
	90% = 2056.8		25% = 5279.4		1% = 6799.0	
26	MEAN = 4072.8		S.D. = 1405.0		P(N>=r) = .11875	
	99% = 998.45		75% = 3064.3		10% = 5784.5	
	95% = 1505.3		50% = 4250.3		5% = 6096.6	
	90% = 2005.8		25% = 5180.5		1% = 6658.6	
27	MEAN = 3994.0		S.D. = 1382.9		P(N>=r) = .11875	

	99%	= 967.66	75%	= 3000.3	10%	= 5677.1
	95%	= 1464.7	50%	= 4169.8	5%	= 5980.5
	90%	= 1957.4	25%	= 5086.5	1%	= 6522.1
28	MEAN	= 3919.2	S.D.	= 1362.0	P(N>=r)	= .11875
	99%	= 938.44	75%	= 2939.4	10%	= 5575.2
	95%	= 1426.2	50%	= 4093.2	5%	= 5870.2
	90%	= 1911.4	25%	= 4997.1	1%	= 6391.0
29	MEAN	= 3848.0	S.D.	= 1342.2	P(N>=r)	= .11875
	99%	= 910.68	75%	= 2881.5	10%	= 5478.3
	95%	= 1389.7	50%	= 4020.2	5%	= 5765.5
	90%	= 1867.7	25%	= 4912.1	1%	= 6267.2
30	MEAN	= 3780.1	S.D.	= 1323.3	P(N>=r)	= .11875
	99%	= 884.24	75%	= 2826.3	10%	= 5386.1
	95%	= 1355.0	50%	= 3950.7	5%	= 5666.1
	90%	= 1826.1	25%	= 4831.0	1%	= 6150.6
31	MEAN	= 3715.3	S.D.	= 1305.3	P(N>=r)	= .11875
	99%	= 859.04	75%	= 2773.6	10%	= 5298.3
	95%	= 1322.0	50%	= 3884.2	5%	= 5571.6
	90%	= 1786.4	25%	= 4753.6	1%	= 6041.0
32	MEAN	= 3653.4	S.D.	= 1288.1	P(N>=r)	= .11875
	99%	= 834.98	75%	= 2723.3	10%	= 5214.6
	95%	= 1290.4	50%	= 3820.7	5%	= 5481.7
	90%	= 1748.6	25%	= 4679.7	1%	= 5937.6
33	MEAN	= 3594.0	S.D.	= 1271.6	P(N>=r)	= .11875
	99%	= 811.98	75%	= 2675.2	10%	= 5134.6
	95%	= 1260.3	50%	= 3759.9	5%	= 5395.9
	90%	= 1712.4	25%	= 4608.9	1%	= 5839.8
34	MEAN	= 3537.1	S.D.	= 1255.8	P(N>=r)	= .11875
	99%	= 789.96	75%	= 2629.0	10%	= 5058.1
	95%	= 1231.5	50%	= 3701.6	5%	= 5314.0
	90%	= 1677.8	25%	= 4541.1	1%	= 5746.9
35	MEAN	= 3482.5	S.D.	= 1240.7	P(N>=r)	= .11875
	99%	= 768.85	75%	= 2584.8	10%	= 4984.7
	95%	= 1203.9	50%	= 3645.6	5%	= 5235.5
	90%	= 1644.6	25%	= 4476.0	1%	= 5658.4
36	MEAN	= 3430.1	S.D.	= 1226.2	P(N>=r)	= .11875
	99%	= 748.61	75%	= 2542.2	10%	= 4914.3
	95%	= 1177.5	50%	= 3591.7	5%	= 5160.2
	90%	= 1612.8	25%	= 4413.5	1%	= 5573.8
37	MEAN	= 3379.6	S.D.	= 1212.2	P(N>=r)	= .11875
	99%	= 729.16	75%	= 2501.3	10%	= 4846.6
	95%	= 1152.1	50%	= 3539.9	5%	= 5087.9
	90%	= 1582.1	25%	= 4353.3	1%	= 5492.8
38	MEAN	= 3331.0	S.D.	= 1198.8	P(N>=r)	= .11875
	99%	= 710.46	75%	= 2461.9	10%	= 4781.4
	95%	= 1127.7	50%	= 3490.0	5%	= 5018.4
	90%	= 1552.7	25%	= 4295.3	1%	= 5415.0
39	MEAN	= 3284.1	S.D.	= 1185.8	P(N>=r)	= .11875

	99%	= 692.47	75%	= 2423.9	10%	= 4718.7
	95%	= 1104.2	50%	= 3441.8	5%	= 4951.4
	90%	= 1524.3	25%	= 4239.3	1%	= 5340.2
40	MEAN	= 3238.8	S.D.	= 1173.3	P(N>=r)	= .11875
	99%	= 675.14	75%	= 2387.3	10%	= 4658.1
	95%	= 1081.6	50%	= 3395.3	5%	= 4886.9
	90%	= 1497.0	25%	= 4185.3	1%	= 5268.3
41	MEAN	= 3195.2	S.D.	= 1161.2	P(N>=r)	= .11875
	99%	= 658.43	75%	= 2351.9	10%	= 4599.7
	95%	= 1059.7	50%	= 3350.4	5%	= 4824.6
	90%	= 1470.6	25%	= 4133.1	1%	= 5198.9
42	MEAN	= 3152.9	S.D.	= 1149.5	P(N>=r)	= .11875
	99%	= 642.31	75%	= 2317.7	10%	= 4543.2
	95%	= 1038.7	50%	= 3306.9	5%	= 4764.5
	90%	= 1445.1	25%	= 4082.7	1%	= 5131.9
43	MEAN	= 3112.1	S.D.	= 1138.2	P(N>=r)	= .11875
	99%	= 626.75	75%	= 2284.6	10%	= 4488.6
	95%	= 1018.4	50%	= 3264.9	5%	= 4706.3
	90%	= 1420.5	25%	= 4033.8	1%	= 5067.3
44	MEAN	= 3072.6	S.D.	= 1127.3	P(N>=r)	= .11875
	99%	= 611.71	75%	= 2252.5	10%	= 4435.8
	95%	= 998.71	50%	= 3224.1	5%	= 4650.1
	90%	= 1396.7	25%	= 3986.5	1%	= 5004.8
45	MEAN	= 3034.3	S.D.	= 1116.7	P(N>=r)	= .11875
	99%	= 597.16	75%	= 2221.5	10%	= 4384.6
	95%	= 979.71	50%	= 3184.6	5%	= 4595.7
	90%	= 1373.7	25%	= 3940.7	1%	= 4944.3
46	MEAN	= 2997.1	S.D.	= 1106.4	P(N>=r)	= .11875
	99%	= 583.08	75%	= 2191.4	10%	= 4334.9
	95%	= 961.32	50%	= 3146.3	5%	= 4542.9
	90%	= 1351.4	25%	= 3896.2	1%	= 4885.8
47	MEAN	= 2961.1	S.D.	= 1096.4	P(N>=r)	= .11875
	99%	= 569.46	75%	= 2162.2	10%	= 4286.8
	95%	= 943.51	50%	= 3109.2	5%	= 4491.8
	90%	= 1329.7	25%	= 3853.0	1%	= 4829.1
48	MEAN	= 2926.1	S.D.	= 1086.7	P(N>=r)	= .11875
	99%	= 556.25	75%	= 2133.9	10%	= 4240.1
	95%	= 926.25	50%	= 3073.1	5%	= 4442.2
	90%	= 1308.8	25%	= 3811.1	1%	= 4774.1
49	MEAN	= 2892.1	S.D.	= 1077.3	P(N>=r)	= .11875
	99%	= 543.44	75%	= 2106.4	10%	= 4194.8
	95%	= 909.51	50%	= 3038.0	5%	= 4394.1
	90%	= 1288.4	25%	= 3770.4	1%	= 4720.8
50	MEAN	= 2859.1	S.D.	= 1068.2	P(N>=r)	= .11875
	99%	= 531.02	75%	= 2079.7	10%	= 4150.7
	95%	= 893.27	50%	= 3003.9	5%	= 4347.3
	90%	= 1268.7	25%	= 3730.8	1%	= 4669.1
51	MEAN	= 2827.0	S.D.	= 1059.3	P(N>=r)	= .11875

	99% = 518.96	75%	= 2053.7	10%	= 4107.8
	95% = 877.50	50%	= 2970.7	5%	= 4301.9
	90% = 1249.5	25%	= 3692.2	1%	= 4618.8
52	MEAN = 2795.8	S.D.	= 1050.6	P(N>=r)	= .11875
	99% = 507.25	75%	= 2028.4	10%	= 4066.2
	95% = 862.19	50%	= 2938.4	5%	= 4257.6
	90% = 1230.8	25%	= 3654.7	1%	= 4570.0
53	MEAN = 2765.4	S.D.	= 1042.1	P(N>=r)	= .11875
	99% = 495.87	75%	= 2003.8	10%	= 4025.6
	95% = 847.30	50%	= 2906.9	5%	= 4214.6
	90% = 1212.7	25%	= 3618.2	1%	= 4522.5
54	MEAN = 2735.8	S.D.	= 1033.9	P(N>=r)	= .11875
	99% = 484.81	75%	= 1979.8	10%	= 3986.1
	95% = 832.83	50%	= 2876.3	5%	= 4172.8
	90% = 1195.0	25%	= 3582.6	1%	= 4476.3
55	MEAN = 2706.9	S.D.	= 1025.9	P(N>=r)	= .11875
	99% = 474.05	75%	= 1956.5	10%	= 3947.6
	95% = 818.75	50%	= 2846.4	5%	= 4132.0
	90% = 1177.8	25%	= 3547.9	1%	= 4431.3
56	MEAN = 2678.8	S.D.	= 1018.1	P(N>=r)	= .11875
	99% = 463.58	75%	= 1933.7	10%	= 3910.0
	95% = 805.04	50%	= 2817.3	5%	= 4092.2
	90% = 1161.1	25%	= 3514.0	1%	= 4387.5
57	MEAN = 2651.3	S.D.	= 1010.4	P(N>=r)	= .11875
	99% = 453.38	75%	= 1911.5	10%	= 3873.4
	95% = 791.69	50%	= 2788.9	5%	= 4053.5
	90% = 1144.8	25%	= 3481.0	1%	= 4344.8
58	MEAN = 2624.6	S.D.	= 1003.0	P(N>=r)	= .11875
	99% = 443.45	75%	= 1889.9	10%	= 3837.7
	95% = 778.69	50%	= 2761.2	5%	= 4015.7
	90% = 1128.9	25%	= 3448.8	1%	= 4303.2
59	MEAN = 2598.4	S.D.	= 995.71	P(N>=r)	= .11875
	99% = 433.78	75%	= 1868.8	10%	= 3802.9
	95% = 766.02	50%	= 2734.1	5%	= 3978.8
	90% = 1113.4	25%	= 3417.3	1%	= 4262.6
60	MEAN = 2572.9	S.D.	= 988.60	P(N>=r)	= .11875
	99% = 424.34	75%	= 1848.2	10%	= 3768.8
	95% = 753.66	50%	= 2707.7	5%	= 3942.8
	90% = 1098.3	25%	= 3386.5	1%	= 4223.0
61	MEAN = 2548.0	S.D.	= 981.64	P(N>=r)	= .11875
	99% = 415.14	75%	= 1828.0	10%	= 3735.6
	95% = 741.61	50%	= 2681.8	5%	= 3907.7
	90% = 1083.5	25%	= 3356.5	1%	= 4184.4
62	MEAN = 2523.6	S.D.	= 974.84	P(N>=r)	= .11875
	99% = 406.17	75%	= 1808.3	10%	= 3703.1
	95% = 729.85	50%	= 2656.5	5%	= 3873.3
	90% = 1069.1	25%	= 3327.1	1%	= 4146.6
63	MEAN = 2499.8	S.D.	= 968.19	P(N>=r)	= .11875

	99%	= 397.41	75%	= 1789.1	10%	= 3671.3
	95%	= 718.37	50%	= 2631.8	5%	= 3839.8
	90%	= 1055.0	25%	= 3298.3	1%	= 4109.8
64	MEAN	= 2476.5	S.D.	= 961.68	P(N>=r)	= .11875
	99%	= 388.85	75%	= 1770.3	10%	= 3640.3
	95%	= 707.16	50%	= 2607.7	5%	= 3807.0
	90%	= 1041.3	25%	= 3270.2	1%	= 4073.7
65	MEAN	= 2453.7	S.D.	= 955.31	P(N>=r)	= .11875
	99%	= 380.50	75%	= 1751.9	10%	= 3609.9
	95%	= 696.21	50%	= 2584.0	5%	= 3774.9
	90%	= 1027.8	25%	= 3242.7	1%	= 4038.5
66	MEAN	= 2431.4	S.D.	= 949.06	P(N>=r)	= .11875
	99%	= 372.34	75%	= 1733.9	10%	= 3580.1
	95%	= 685.51	50%	= 2560.9	5%	= 3743.5
	90%	= 1014.7	25%	= 3215.7	1%	= 4004.1
67	MEAN	= 2409.6	S.D.	= 942.95	P(N>=r)	= .11875
	99%	= 364.36	75%	= 1716.3	10%	= 3551.0
	95%	= 675.05	50%	= 2538.2	5%	= 3712.7
	90%	= 1001.9	25%	= 3189.3	1%	= 3970.4
68	MEAN	= 2388.2	S.D.	= 936.96	P(N>=r)	= .11875
	99%	= 356.56	75%	= 1699.0	10%	= 3522.5
	95%	= 664.82	50%	= 2516.0	5%	= 3682.6
	90%	= 989.29	25%	= 3163.5	1%	= 3937.4
69	MEAN	= 2367.3	S.D.	= 931.09	P(N>=r)	= .11875
	99%	= 348.93	75%	= 1682.2	10%	= 3494.6
	95%	= 654.82	50%	= 2494.3	5%	= 3653.2
	90%	= 976.99	25%	= 3138.1	1%	= 3905.2
70	MEAN	= 2346.8	S.D.	= 925.33	P(N>=r)	= .11875
	99%	= 341.46	75%	= 1665.6	10%	= 3467.2
	95%	= 645.03	50%	= 2472.9	5%	= 3624.3
	90%	= 964.95	25%	= 3113.3	1%	= 3873.6
71	MEAN	= 2326.7	S.D.	= 919.68	P(N>=r)	= .11875
	99%	= 334.16	75%	= 1649.4	10%	= 3440.4
	95%	= 635.45	50%	= 2452.1	5%	= 3596.0
	90%	= 953.16	25%	= 3089.0	1%	= 3842.6
72	MEAN	= 2307.0	S.D.	= 914.14	P(N>=r)	= .11875
	99%	= 327.00	75%	= 1633.5	10%	= 3414.1
	95%	= 626.07	50%	= 2431.6	5%	= 3568.3
	90%	= 941.61	25%	= 3065.1	1%	= 3812.3
73	MEAN	= 2287.6	S.D.	= 908.70	P(N>=r)	= .11875
	99%	= 320.00	75%	= 1617.9	10%	= 3388.3
	95%	= 616.88	50%	= 2411.5	5%	= 3541.1
	90%	= 930.29	25%	= 3041.6	1%	= 3782.6
74	MEAN	= 2268.7	S.D.	= 903.36	P(N>=r)	= .11875
	99%	= 313.14	75%	= 1602.7	10%	= 3363.0
	95%	= 607.89	50%	= 2391.8	5%	= 3514.5
	90%	= 919.21	25%	= 3018.7	1%	= 3753.4
75	MEAN	= 2250.1	S.D.	= 898.12	P(N>=r)	= .11875

	99%	= 306.42	75%	= 1587.7	10%	= 3338.2
	95%	= 599.07	50%	= 2372.4	5%	= 3488.3
	90%	= 908.34	25%	= 2996.1	1%	= 3724.8
76	MEAN	= 2231.8	S.D.	= 892.97	P(N>=r)	= .11875
	99%	= 299.83	75%	= 1573.0	10%	= 3313.9
	95%	= 590.43	50%	= 2353.4	5%	= 3462.6
	90%	= 897.68	25%	= 2973.9	1%	= 3696.8
77	MEAN	= 2213.9	S.D.	= 887.92	P(N>=r)	= .11875
	99%	= 293.37	75%	= 1558.5	10%	= 3289.9
	95%	= 581.97	50%	= 2334.8	5%	= 3437.5
	90%	= 887.23	25%	= 2952.2	1%	= 3669.3
78	MEAN	= 2196.3	S.D.	= 882.95	P(N>=r)	= .11875
	99%	= 287.03	75%	= 1544.4	10%	= 3266.5
	95%	= 573.66	50%	= 2316.5	5%	= 3412.7
	90%	= 876.97	25%	= 2930.8	1%	= 3642.3
79	MEAN	= 2179.0	S.D.	= 878.07	P(N>=r)	= .11875
	99%	= 280.82	75%	= 1530.5	10%	= 3243.4
	95%	= 565.52	50%	= 2298.5	5%	= 3388.4
	90%	= 866.91	25%	= 2909.8	1%	= 3615.9
80	MEAN	= 2162.0	S.D.	= 873.27	P(N>=r)	= .11875
	99%	= 274.72	75%	= 1516.8	10%	= 3220.7
	95%	= 557.53	50%	= 2280.8	5%	= 3364.6
	90%	= 857.04	25%	= 2889.2	1%	= 3589.9
81	MEAN	= 2145.4	S.D.	= 868.55	P(N>=r)	= .11875
	99%	= 268.74	75%	= 1503.4	10%	= 3198.5
	95%	= 549.69	50%	= 2263.4	5%	= 3341.2
	90%	= 847.35	25%	= 2868.9	1%	= 3564.3
82	MEAN	= 2129.0	S.D.	= 863.91	P(N>=r)	= .11875
	99%	= 262.86	75%	= 1490.2	10%	= 3176.6
	95%	= 541.99	50%	= 2246.4	5%	= 3318.2
	90%	= 837.83	25%	= 2849.0	1%	= 3539.2
83	MEAN	= 2112.9	S.D.	= 859.34	P(N>=r)	= .11875
	99%	= 257.10	75%	= 1477.3	10%	= 3155.1
	95%	= 534.44	50%	= 2229.6	5%	= 3295.5
	90%	= 828.49	25%	= 2829.4	1%	= 3514.6
84	MEAN	= 2097.0	S.D.	= 854.85	P(N>=r)	= .11875
	99%	= 251.43	75%	= 1464.6	10%	= 3133.9
	95%	= 527.03	50%	= 2213.1	5%	= 3273.3
	90%	= 819.31	25%	= 2810.1	1%	= 3490.4
85	MEAN	= 2081.5	S.D.	= 850.43	P(N>=r)	= .11875
	99%	= 245.86	75%	= 1452.0	10%	= 3113.1
	95%	= 519.74	50%	= 2196.9	5%	= 3251.4
	90%	= 810.29	25%	= 2791.2	1%	= 3466.6
86	MEAN	= 2066.1	S.D.	= 846.08	P(N>=r)	= .11875
	99%	= 240.39	75%	= 1439.7	10%	= 3092.7
	95%	= 512.59	50%	= 2180.9	5%	= 3229.9
	90%	= 801.42	25%	= 2772.5	1%	= 3443.2
87	MEAN	= 2051.1	S.D.	= 841.80	P(N>=r)	= .11875

	99%	= 235.01	75%	= 1427.6	10%	= 3072.6
	95%	= 505.56	50%	= 2165.2	5%	= 3208.8
	90%	= 792.71	25%	= 2754.2	1%	= 3420.2
88	MEAN	= 2036.3	S.D.	= 837.59	P(N>=r)	= .11875
	99%	= 229.73	75%	= 1415.7	10%	= 3052.8
	95%	= 498.66	50%	= 2149.8	5%	= 3188.0
	90%	= 784.15	25%	= 2736.1	1%	= 3397.5
89	MEAN	= 2021.7	S.D.	= 833.43	P(N>=r)	= .11875
	99%	= 224.53	75%	= 1404.0	10%	= 3033.3
	95%	= 491.87	50%	= 2134.6	5%	= 3167.5
	90%	= 775.73	25%	= 2718.3	1%	= 3375.3
90	MEAN	= 2007.3	S.D.	= 829.35	P(N>=r)	= .11875
	99%	= 219.41	75%	= 1392.5	10%	= 3014.1
	95%	= 485.20	50%	= 2119.6	5%	= 3147.3
	90%	= 767.45	25%	= 2700.8	1%	= 3353.4
91	MEAN	= 1993.2	S.D.	= 825.32	P(N>=r)	= .11875
	99%	= 214.38	75%	= 1381.2	10%	= 2995.2
	95%	= 478.64	50%	= 2104.9	5%	= 3127.5
	90%	= 759.31	25%	= 2683.6	1%	= 3331.8
92	MEAN	= 1979.3	S.D.	= 821.35	P(N>=r)	= .11875
	99%	= 209.43	75%	= 1370.0	10%	= 2976.6
	95%	= 472.18	50%	= 2090.4	5%	= 3108.0
	90%	= 751.30	25%	= 2666.6	1%	= 3310.6
93	MEAN	= 1965.6	S.D.	= 817.44	P(N>=r)	= .11875
	99%	= 204.56	75%	= 1359.0	10%	= 2958.3
	95%	= 465.84	50%	= 2076.1	5%	= 3088.7
	90%	= 743.42	25%	= 2649.9	1%	= 3289.7
94	MEAN	= 1952.1	S.D.	= 813.59	P(N>=r)	= .11875
	99%	= 199.76	75%	= 1348.2	10%	= 2940.3
	95%	= 459.60	50%	= 2062.0	5%	= 3069.8
	90%	= 735.67	25%	= 2633.4	1%	= 3269.1
95	MEAN	= 1938.8	S.D.	= 809.79	P(N>=r)	= .11875
	99%	= 195.03	75%	= 1337.6	10%	= 2922.5
	95%	= 453.46	50%	= 2048.2	5%	= 3051.1
	90%	= 728.03	25%	= 2617.2	1%	= 3248.9
96	MEAN	= 1925.7	S.D.	= 806.04	P(N>=r)	= .11875
	99%	= 190.37	75%	= 1327.1	10%	= 2905.0
	95%	= 447.41	50%	= 2034.5	5%	= 3032.8
	90%	= 720.52	25%	= 2601.2	1%	= 3229.0
97	MEAN	= 1912.8	S.D.	= 802.35	P(N>=r)	= .11875
	99%	= 185.78	75%	= 1316.7	10%	= 2887.8
	95%	= 441.47	50%	= 2021.0	5%	= 3014.7
	90%	= 713.12	25%	= 2585.4	1%	= 3209.3
98	MEAN	= 1900.1	S.D.	= 798.71	P(N>=r)	= .11875
	99%	= 181.26	75%	= 1306.6	10%	= 2870.8
	95%	= 435.61	50%	= 2007.8	5%	= 2996.8
	90%	= 705.84	25%	= 2569.9	1%	= 3190.0
99	MEAN	= 1887.5	S.D.	= 795.12	P(N>=r)	= .11875

	99%	= 176.80	75%	= 1296.5	10%	= 2854.0
	95%	= 429.85	50%	= 1994.7	5%	= 2979.2
	90%	= 698.66	25%	= 2554.6	1%	= 3170.9
100	MEAN	= 1875.2	S.D.	= 791.58	P(N>=r)	= .11875
	99%	= 172.40	75%	= 1286.6	10%	= 2837.5
	95%	= 424.17	50%	= 1981.8	5%	= 2961.9
	90%	= 691.60	25%	= 2539.4	1%	= 3152.1
101	MEAN	= 1863.0	S.D.	= 788.08	P(N>=r)	= .11875
	99%	= 168.07	75%	= 1276.9	10%	= 2821.2
	95%	= 418.58	50%	= 1969.1	5%	= 2944.8
	90%	= 684.64	25%	= 2524.5	1%	= 3133.6
102	MEAN	= 1851.0	S.D.	= 784.64	P(N>=r)	= .11875
	99%	= 163.79	75%	= 1267.3	10%	= 2805.1
	95%	= 413.08	50%	= 1956.6	5%	= 2928.0
	90%	= 677.78	25%	= 2509.8	1%	= 3115.3
103	MEAN	= 1839.2	S.D.	= 781.24	P(N>=r)	= .11875
	99%	= 159.57	75%	= 1257.8	10%	= 2789.3
	95%	= 407.66	50%	= 1944.2	5%	= 2911.3
	90%	= 671.03	25%	= 2495.3	1%	= 3097.4
104	MEAN	= 1827.5	S.D.	= 777.88	P(N>=r)	= .11875
	99%	= 155.40	75%	= 1248.5	10%	= 2773.6
	95%	= 402.32	50%	= 1932.0	5%	= 2895.0
	90%	= 664.37	25%	= 2481.0	1%	= 3079.6
105	MEAN	= 1816.0	S.D.	= 774.56	P(N>=r)	= .11875
	99%	= 151.29	75%	= 1239.3	10%	= 2758.2
	95%	= 397.05	50%	= 1920.0	5%	= 2878.8
	90%	= 657.81	25%	= 2466.9	1%	= 3062.1
106	MEAN	= 1804.6	S.D.	= 771.29	P(N>=r)	= .11875
	99%	= 147.22	75%	= 1230.2	10%	= 2743.0
	95%	= 391.87	50%	= 1908.1	5%	= 2862.8
	90%	= 651.34	25%	= 2453.0	1%	= 3044.8
107	MEAN	= 1793.4	S.D.	= 768.06	P(N>=r)	= .11875
	99%	= 143.21	75%	= 1221.2	10%	= 2728.0
	95%	= 386.77	50%	= 1896.4	5%	= 2847.1
	90%	= 644.97	25%	= 2439.3	1%	= 3027.8
108	MEAN	= 1782.3	S.D.	= 764.87	P(N>=r)	= .11875
	99%	= 139.25	75%	= 1212.4	10%	= 2713.2
	95%	= 381.74	50%	= 1884.9	5%	= 2831.6
	90%	= 638.69	25%	= 2425.7	1%	= 3011.0
109	MEAN	= 1771.4	S.D.	= 761.72	P(N>=r)	= .11875
	99%	= 135.35	75%	= 1203.7	10%	= 2698.5
	95%	= 376.79	50%	= 1873.5	5%	= 2816.2
	90%	= 632.50	25%	= 2412.3	1%	= 2994.4
110	MEAN	= 1760.6	S.D.	= 758.60	P(N>=r)	= .11875
	99%	= 131.49	75%	= 1195.1	10%	= 2684.1
	95%	= 371.92	50%	= 1862.2	5%	= 2801.1
	90%	= 626.41	25%	= 2399.1	1%	= 2978.1
111	MEAN	= 1750.0	S.D.	= 755.52	P(N>=r)	= .11875

	99% = 127.68	75%	= 1186.6	10%	= 2669.8	
	95% = 367.12	50%	= 1851.1	5%	= 2786.2	
	90% = 620.41	25%	= 2386.0	1%	= 2962.0	
112	MEAN = 1739.5	S.D.	= 752.47	P(N>=r)	= .11874	
	99% = 123.93	75%	= 1178.3	10%	= 2655.8	
	95% = 362.41	50%	= 1840.1	5%	= 2771.5	
	90% = 614.50	25%	= 2373.1	1%	= 2946.0	
113	MEAN = 1729.2	S.D.	= 749.46	P(N>=r)	= .11874	
	99% = 120.23	75%	= 1170.0	10%	= 2641.9	
	95% = 357.79	50%	= 1829.3	5%	= 2756.9	
	90% = 608.68	25%	= 2360.4	1%	= 2930.3	
114	MEAN = 1718.9	S.D.	= 746.47	P(N>=r)	= .11874	
	99% = 116.59	75%	= 1161.9	10%	= 2628.2	
	95% = 353.25	50%	= 1818.6	5%	= 2742.5	
	90% = 602.97	25%	= 2347.8	1%	= 2914.8	
115	MEAN = 1708.9	S.D.	= 743.51	P(N>=r)	= .11874	
	99% = 113.02	75%	= 1153.9	10%	= 2614.6	
	95% = 348.81	50%	= 1808.1	5%	= 2728.3	
	90% = 597.36	25%	= 2335.4	1%	= 2899.4	
116	MEAN = 1698.9	S.D.	= 740.57	P(N>=r)	= .11873	
	99% = 109.52	75%	= 1146.0	10%	= 2601.2	
	95% = 344.48	50%	= 1797.7	5%	= 2714.3	
	90% = 591.86	25%	= 2323.2	1%	= 2884.3	
117	MEAN = 1689.1	S.D.	= 737.65	P(N>=r)	= .11873	
	99% = 106.10	75%	= 1138.3	10%	= 2588.0	
	95% = 340.26	50%	= 1787.4	5%	= 2700.5	
	90% = 586.47	25%	= 2311.1	1%	= 2869.4	
118	MEAN = 1679.5	S.D.	= 734.74	P(N>=r)	= .11872	
	99% = 102.77	75%	= 1130.6	10%	= 2574.9	
	95% = 336.17	50%	= 1777.3	5%	= 2686.8	
	90% = 581.21	25%	= 2299.1	1%	= 2854.6	
119	MEAN = 1670.0	S.D.	= 731.85	P(N>=r)	= .11871	
	99% = 99.540	75%	= 1123.1	10%	= 2562.0	
	95% = 332.21	50%	= 1767.3	5%	= 2673.3	
	90% = 576.08	25%	= 2287.3	1%	= 2840.0	
120	MEAN = 1660.6	S.D.	= 728.96	P(N>=r)	= .11870	
	99% = 96.393	75%	= 1115.8	10%	= 2549.3	
	95% = 328.41	50%	= 1757.5	5%	= 2659.9	
	90% = 571.09	25%	= 2275.6	1%	= 2825.6	
121	MEAN = 1651.4	S.D.	= 726.07	P(N>=r)	= .11869	
	99% = 93.346	75%	= 1108.6	10%	= 2536.7	
	95% = 324.77	50%	= 1747.8	5%	= 2646.8	
	90% = 566.26	25%	= 2264.1	1%	= 2811.4	
122	MEAN = 1642.3	S.D.	= 723.17	P(N>=r)	= .11867	
	99% = 90.657	75%	= 1101.5	10%	= 2524.3	
	95% = 321.31	50%	= 1738.2	5%	= 2633.7	
	90% = 561.60	25%	= 2252.7	1%	= 2797.3	
123	MEAN = 1633.4	S.D.	= 720.26	P(N>=r)	= .11865	

	99%	= 88.040	75%	= 1094.6	10%	= 2512.0
	95%	= 318.06	50%	= 1728.8	5%	= 2620.9
	90%	= 557.11	25%	= 2241.5	1%	= 2783.4
124	MEAN	= 1624.6	S.D.	= 717.34	P(N>=r)	= .11862
	99%	= 85.489	75%	= 1087.8	10%	= 2499.8
	95%	= 315.01	50%	= 1719.6	5%	= 2608.2
	90%	= 552.81	25%	= 2230.4	1%	= 2769.7
125	MEAN	= 1616.0	S.D.	= 714.40	P(N>=r)	= .11859
	99%	= 83.175	75%	= 1081.2	10%	= 2487.8
	95%	= 312.19	50%	= 1710.4	5%	= 2595.6
	90%	= 548.71	25%	= 2219.5	1%	= 2756.2
126	MEAN	= 1607.6	S.D.	= 711.43	P(N>=r)	= .11856
	99%	= 81.093	75%	= 1074.8	10%	= 2476.0
	95%	= 309.61	50%	= 1701.5	5%	= 2583.2
	90%	= 544.82	25%	= 2208.7	1%	= 2742.7
127	MEAN	= 1599.3	S.D.	= 708.44	P(N>=r)	= .11852
	99%	= 79.246	75%	= 1068.6	10%	= 2464.2
	95%	= 307.27	50%	= 1692.7	5%	= 2570.9
	90%	= 541.14	25%	= 2198.0	1%	= 2729.5
128	MEAN	= 1591.2	S.D.	= 705.42	P(N>=r)	= .11848
	99%	= 77.653	75%	= 1062.5	10%	= 2452.7
	95%	= 305.18	50%	= 1684.0	5%	= 2558.8
	90%	= 537.68	25%	= 2187.5	1%	= 2716.4
129	MEAN	= 1583.3	S.D.	= 702.37	P(N>=r)	= .11843
	99%	= 76.328	75%	= 1056.6	10%	= 2441.2
	95%	= 303.34	50%	= 1675.5	5%	= 2546.8
	90%	= 534.43	25%	= 2177.1	1%	= 2703.5
130	MEAN	= 1575.5	S.D.	= 699.28	P(N>=r)	= .11837
	99%	= 75.287	75%	= 1050.8	10%	= 2429.9
	95%	= 301.73	50%	= 1667.1	5%	= 2534.9
	90%	= 531.39	25%	= 2166.9	1%	= 2690.7
131	MEAN	= 1567.9	S.D.	= 696.17	P(N>=r)	= .11831
	99%	= 74.542	75%	= 1045.3	10%	= 2418.7
	95%	= 300.36	50%	= 1658.9	5%	= 2523.2
	90%	= 528.55	25%	= 2156.7	1%	= 2678.0
132	MEAN	= 1560.4	S.D.	= 693.04	P(N>=r)	= .11825
	99%	= 74.102	75%	= 1039.8	10%	= 2407.7
	95%	= 299.20	50%	= 1650.8	5%	= 2511.6
	90%	= 525.91	25%	= 2146.7	1%	= 2665.5
133	MEAN	= 1553.0	S.D.	= 689.88	P(N>=r)	= .11818
	99%	= 73.970	75%	= 1034.6	10%	= 2396.7
	95%	= 298.23	50%	= 1642.8	5%	= 2500.1
	90%	= 523.43	25%	= 2136.9	1%	= 2653.2
134	MEAN	= 1545.8	S.D.	= 686.71	P(N>=r)	= .11811
	99%	= 74.142	75%	= 1029.4	10%	= 2385.9
	95%	= 297.43	50%	= 1635.0	5%	= 2488.8
	90%	= 521.11	25%	= 2127.1	1%	= 2640.9
135	MEAN	= 1538.7	S.D.	= 683.54	P(N>=r)	= .11803

	99%	= 74.605	75%	= 1024.4	10%	= 2375.3
	95%	= 296.78	50%	= 1627.2	5%	= 2477.6
	90%	= 518.92	25%	= 2117.5	1%	= 2628.8
136	MEAN	= 1531.8	S.D.	= 680.36	P(N>=r)	= .11795
	99%	= 75.332	75%	= 1019.5	10%	= 2364.7
	95%	= 296.23	50%	= 1619.6	5%	= 2466.5
	90%	= 516.84	25%	= 2107.9	1%	= 2616.9
137	MEAN	= 1524.9	S.D.	= 677.19	P(N>=r)	= .11787
	99%	= 76.283	75%	= 1014.6	10%	= 2354.2
	95%	= 295.76	50%	= 1612.1	5%	= 2455.5
	90%	= 514.84	25%	= 2098.5	1%	= 2605.0
138	MEAN	= 1518.1	S.D.	= 674.04	P(N>=r)	= .11779
	99%	= 77.409	75%	= 1009.9	10%	= 2343.9
	95%	= 295.34	50%	= 1604.6	5%	= 2444.7
	90%	= 512.90	25%	= 2089.2	1%	= 2593.3
139	MEAN	= 1511.4	S.D.	= 670.91	P(N>=r)	= .11770
	99%	= 78.652	75%	= 1005.2	10%	= 2333.6
	95%	= 294.94	50%	= 1597.3	5%	= 2433.9
	90%	= 511.00	25%	= 2080.0	1%	= 2581.7
140	MEAN	= 1504.7	S.D.	= 667.81	P(N>=r)	= .11762
	99%	= 79.985	75%	= 1000.6	10%	= 2323.5
	95%	= 294.54	50%	= 1590.0	5%	= 2423.3
	90%	= 509.11	25%	= 2070.8	1%	= 2570.3
141	MEAN	= 1498.1	S.D.	= 664.75	P(N>=r)	= .11754
	99%	= 81.312	75%	= 995.95	10%	= 2313.4
	95%	= 294.10	50%	= 1582.8	5%	= 2412.8
	90%	= 507.21	25%	= 2061.8	1%	= 2558.9
142	MEAN	= 1491.6	S.D.	= 661.74	P(N>=r)	= .11746
	99%	= 82.453	75%	= 991.36	10%	= 2303.5
	95%	= 293.61	50%	= 1575.7	5%	= 2402.4
	90%	= 505.30	25%	= 2052.8	1%	= 2547.7
143	MEAN	= 1485.1	S.D.	= 658.77	P(N>=r)	= .11738
	99%	= 83.506	75%	= 986.80	10%	= 2293.7
	95%	= 293.05	50%	= 1568.6	5%	= 2392.0
	90%	= 503.35	25%	= 2044.0	1%	= 2536.6
144	MEAN	= 1478.7	S.D.	= 655.85	P(N>=r)	= .11731
	99%	= 84.586	75%	= 982.24	10%	= 2283.9
	95%	= 292.42	50%	= 1561.5	5%	= 2381.8
	90%	= 501.36	25%	= 2035.2	1%	= 2525.6
145	MEAN	= 1472.3	S.D.	= 652.99	P(N>=r)	= .11724
	99%	= 85.512	75%	= 977.69	10%	= 2274.3
	95%	= 291.70	50%	= 1554.5	5%	= 2371.7
	90%	= 499.31	25%	= 2026.5	1%	= 2514.6
146	MEAN	= 1465.9	S.D.	= 650.18	P(N>=r)	= .11717
	99%	= 86.267	75%	= 973.14	10%	= 2264.7
	95%	= 290.90	50%	= 1547.6	5%	= 2361.7
	90%	= 497.22	25%	= 2017.8	1%	= 2503.9
147	MEAN	= 1459.5	S.D.	= 647.42	P(N>=r)	= .11710

	99%	= 86.869	75%	= 968.60	10%	= 2255.2
	95%	= 290.00	50%	= 1540.7	5%	= 2351.7
	90%	= 495.07	25%	= 2009.2	1%	= 2493.2
148	MEAN	= 1453.2	S.D.	= 644.71	P(N>=r)	= .11703
	99%	= 87.332	75%	= 964.06	10%	= 2245.8
	95%	= 289.03	50%	= 1533.9	5%	= 2341.9
	90%	= 492.88	25%	= 2000.7	1%	= 2482.6
149	MEAN	= 1446.9	S.D.	= 642.06	P(N>=r)	= .11697
	99%	= 87.663	75%	= 959.53	10%	= 2236.5
	95%	= 287.98	50%	= 1527.1	5%	= 2332.2
	90%	= 490.64	25%	= 1992.3	1%	= 2472.1
150	MEAN	= 1440.7	S.D.	= 639.45	P(N>=r)	= .11691
	99%	= 87.875	75%	= 955.00	10%	= 2227.3
	95%	= 286.86	50%	= 1520.3	5%	= 2322.5
	90%	= 488.36	25%	= 1984.0	1%	= 2461.7
151	MEAN	= 1434.5	S.D.	= 636.88	P(N>=r)	= .11685
	99%	= 87.980	75%	= 950.49	10%	= 2218.1
	95%	= 285.68	50%	= 1513.6	5%	= 2312.9
	90%	= 486.05	25%	= 1975.7	1%	= 2451.4
152	MEAN	= 1428.3	S.D.	= 634.36	P(N>=r)	= .11680
	99%	= 87.993	75%	= 945.99	10%	= 2209.1
	95%	= 284.45	50%	= 1507.0	5%	= 2303.5
	90%	= 483.72	25%	= 1967.5	1%	= 2441.2
153	MEAN	= 1422.2	S.D.	= 631.88	P(N>=r)	= .11674
	99%	= 87.925	75%	= 941.52	10%	= 2200.1
	95%	= 283.18	50%	= 1500.4	5%	= 2294.1
	90%	= 481.36	25%	= 1959.4	1%	= 2431.1
154	MEAN	= 1416.1	S.D.	= 629.43	P(N>=r)	= .11669
	99%	= 87.790	75%	= 937.06	10%	= 2191.2
	95%	= 281.87	50%	= 1493.8	5%	= 2284.8
	90%	= 478.99	25%	= 1951.3	1%	= 2421.1
155	MEAN	= 1410.0	S.D.	= 627.02	P(N>=r)	= .11664
	99%	= 87.601	75%	= 932.63	10%	= 2182.4
	95%	= 280.54	50%	= 1487.3	5%	= 2275.6
	90%	= 476.62	25%	= 1943.3	1%	= 2411.2
156	MEAN	= 1404.0	S.D.	= 624.64	P(N>=r)	= .11659
	99%	= 87.367	75%	= 928.23	10%	= 2173.7
	95%	= 279.19	50%	= 1480.9	5%	= 2266.4
	90%	= 474.25	25%	= 1935.4	1%	= 2401.4
157	MEAN	= 1398.1	S.D.	= 622.28	P(N>=r)	= .11654
	99%	= 87.099	75%	= 923.86	10%	= 2165.0
	95%	= 277.84	50%	= 1474.5	5%	= 2257.4
	90%	= 471.88	25%	= 1927.5	1%	= 2391.7
158	MEAN	= 1392.2	S.D.	= 619.95	P(N>=r)	= .11649
	99%	= 86.804	75%	= 919.52	10%	= 2156.5
	95%	= 276.47	50%	= 1468.2	5%	= 2248.4
	90%	= 469.52	25%	= 1919.7	1%	= 2382.1
159	MEAN	= 1386.3	S.D.	= 617.65	P(N>=r)	= .11644

	99%	= 86.489	75%	= 915.22	10%	= 2147.9
	95%	= 275.10	50%	= 1461.9	5%	= 2239.5
	90%	= 467.17	25%	= 1912.0	1%	= 2372.5
160	MEAN	= 1380.5	S.D.	= 615.37	P(N>=r)	= .11639
	99%	= 86.160	75%	= 910.95	10%	= 2139.5
	95%	= 273.74	50%	= 1455.6	5%	= 2230.7
	90%	= 464.84	25%	= 1904.3	1%	= 2363.0
161	MEAN	= 1374.8	S.D.	= 613.11	P(N>=r)	= .11634
	99%	= 85.822	75%	= 906.72	10%	= 2131.2
	95%	= 272.38	50%	= 1449.5	5%	= 2222.0
	90%	= 462.52	25%	= 1896.8	1%	= 2353.7
162	MEAN	= 1369.0	S.D.	= 610.87	P(N>=r)	= .11629
	99%	= 85.477	75%	= 902.53	10%	= 2122.9
	95%	= 271.03	50%	= 1443.4	5%	= 2213.3
	90%	= 460.22	25%	= 1889.2	1%	= 2344.4
163	MEAN	= 1363.4	S.D.	= 608.65	P(N>=r)	= .11624
	99%	= 85.129	75%	= 898.37	10%	= 2114.7
	95%	= 269.69	50%	= 1437.3	5%	= 2204.8
	90%	= 457.94	25%	= 1881.8	1%	= 2335.2
164	MEAN	= 1357.8	S.D.	= 606.45	P(N>=r)	= .11619
	99%	= 84.779	75%	= 894.26	10%	= 2106.6
	95%	= 268.36	50%	= 1431.3	5%	= 2196.3
	90%	= 455.69	25%	= 1874.4	1%	= 2326.0
165	MEAN	= 1352.2	S.D.	= 604.27	P(N>=r)	= .11615
	99%	= 84.429	75%	= 890.18	10%	= 2098.5
	95%	= 267.05	50%	= 1425.3	5%	= 2187.8
	90%	= 453.45	25%	= 1867.1	1%	= 2317.0
166	MEAN	= 1346.7	S.D.	= 602.11	P(N>=r)	= .11610
	99%	= 84.080	75%	= 886.14	10%	= 2090.5
	95%	= 265.74	50%	= 1419.4	5%	= 2179.5
	90%	= 451.24	25%	= 1859.8	1%	= 2308.0
167	MEAN	= 1341.3	S.D.	= 599.97	P(N>=r)	= .11605
	99%	= 83.733	75%	= 882.13	10%	= 2082.6
	95%	= 264.45	50%	= 1413.6	5%	= 2171.2
	90%	= 449.04	25%	= 1852.6	1%	= 2299.1
168	MEAN	= 1335.9	S.D.	= 597.84	P(N>=r)	= .11600
	99%	= 83.389	75%	= 878.16	10%	= 2074.7
	95%	= 263.17	50%	= 1407.8	5%	= 2163.0
	90%	= 446.87	25%	= 1845.5	1%	= 2290.3
169	MEAN	= 1330.5	S.D.	= 595.73	P(N>=r)	= .11595
	99%	= 83.047	75%	= 874.23	10%	= 2066.9
	95%	= 261.90	50%	= 1402.0	5%	= 2154.8
	90%	= 444.72	25%	= 1838.4	1%	= 2281.6
170	MEAN	= 1325.2	S.D.	= 593.64	P(N>=r)	= .11591
	99%	= 82.709	75%	= 870.34	10%	= 2059.2
	95%	= 260.65	50%	= 1396.3	5%	= 2146.8
	90%	= 442.59	25%	= 1831.4	1%	= 2272.9
171	MEAN	= 1319.9	S.D.	= 591.56	P(N>=r)	= .11586

	99%	= 82.373	75%	= 866.48	10%	= 2051.5
	95%	= 259.40	50%	= 1390.7	5%	= 2138.7
	90%	= 440.48	25%	= 1824.4	1%	= 2264.4
172	MEAN	= 1314.7	S.D.	= 589.50	P(N>=r)=	.11581
	99%	= 82.041	75%	= 862.65	10%	= 2043.9
	95%	= 258.17	50%	= 1385.1	5%	= 2130.8
	90%	= 438.40	25%	= 1817.5	1%	= 2255.8
173	MEAN	= 1309.5	S.D.	= 587.46	P(N>=r)=	.11576
	99%	= 81.712	75%	= 858.86	10%	= 2036.4
	95%	= 256.96	50%	= 1379.5	5%	= 2122.9
	90%	= 436.33	25%	= 1810.7	1%	= 2247.4

E) The mean of the potential = 57841. 48875

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
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UAI	C5C19501
PLAY	Sustut Upper Cretaceous Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	WED, FEB 15, 1995, 1:07 PM

A) Risks

	GEOLOGICAL FACTOR			MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk		=	1.00
PROSPECT LEVEL	Presence of Closure	(1)		.90
	Presence of Reservoir Facies	(2)		.80
	Adequate Seal	(4)		.90
	Adequate Timing	(5)		.60
	Adequate Source	(6)		.80
	Adequate Preservation	(8)		.33
	Overall Prospect Level Risk		=	.10
EXPLORATION RISK:			=	.10

B) No. of Prospects Distribution

Minimum	=	15
Maximum	=	270
Mean	=	138.64
S.D.	=	74.33

Frequency	No. of Prospects
99.00	15
95	25
90	38
80	62
75	74
60	111
50	135

40	162
25	203
20	216
10	243
5	257
1	268
0	270

C) No. of Pools Distribution

Minimum = 0
Maximum = 50
Mean = 14.23
S.D. = 8.42

Frequency	No. of Pools
99.10	0
99	1
95	2
90	3
80	6
75	7
60	11
50	14
40	16
25	21
20	22
10	26
5	29
1	34
0	50

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5C19501
PLAY	Sustut Upper Cretaceous Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	FRI, FEB 17, 1995, 1:31 PM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = 7.5074	MEAN = 3703.5	
	sig. sq= 1.4193	S.D. = 6556.8	
Upper Percentiles	99.99% = 21.687	60.00% = 1346.9	15.00% = 6261.3
	99.00% = 113.96	55.00% = 1568.2	10.00% = 8384.7
	95.00% = 256.66	50.00% = 1821.4	8.00% = 9713.9
	90.00% = 395.67	45.00% = 2115.6	6.00% = 11611.
	85.00% = 529.86	40.00% = 2463.2	5.00% = 12926.
	80.00% = 668.28	35.00% = 2882.5	4.00% = 14663.
	75.00% = 815.51	30.00% = 3402.0	2.00% = 21039.
	70.00% = 975.19	25.00% = 4068.1	1.00% = 29111.
	65.00% = 1150.9	20.00% = 4964.4	.01% = .15298E+06

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 50
Expectation = 14.23
Standard Deviation= 8.42

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 16776.	S.D. = 17095.	P(N>=r)= .99100
	99% = 885.27	75% = 7240.9	10% = 33139.
	95% = 2544.5	50% = 12398.	5% = 44776.
	90% = 3988.5	25% = 20601.	1% = 81874.
2	MEAN = 8479.2	S.D. = 6243.7	P(N>=r)= .96771
	99% = 457.33	75% = 4246.9	10% = 15988.
	95% = 1344.9	50% = 7199.4	5% = 19882.
	90% = 2207.6	25% = 11097.	1% = 30221.
3	MEAN = 5885.4	S.D. = 3968.2	P(N>=r)= .93406

	99%	= 327.94	75%	= 3038.9	10%	= 10916.
	95%	= 929.42	50%	= 5203.0	5%	= 13195.
	90%	= 1536.9	25%	= 7857.6	1%	= 18788.
4	MEAN	= 4546.4	S.D.	= 2947.2	P(N>=r)	= .89588
	99%	= 267.36	75%	= 2372.9	10%	= 8365.4
	95%	= 727.36	50%	= 4092.0	5%	= 9968.9
	90%	= 1193.2	25%	= 6129.2	1%	= 13732.
5	MEAN	= 3705.2	S.D.	= 2349.7	P(N>=r)	= .85640
	99%	= 230.39	75%	= 1943.6	10%	= 6786.8
	95%	= 604.78	50%	= 3365.7	5%	= 8020.2
	90%	= 980.50	25%	= 5022.8	1%	= 10831.
6	MEAN	= 3118.1	S.D.	= 1950.4	P(N>=r)	= .81666
	99%	= 204.21	75%	= 1640.3	10%	= 5696.0
	95%	= 520.03	50%	= 2846.4	5%	= 6695.4
	90%	= 833.14	25%	= 4241.2	1%	= 8925.8
7	MEAN	= 2681.0	S.D.	= 1661.3	P(N>=r)	= .77692
	99%	= 184.18	75%	= 1413.4	10%	= 4889.1
	95%	= 456.94	50%	= 2453.7	5%	= 5726.8
	90%	= 723.94	25%	= 3654.0	1%	= 7567.6
8	MEAN	= 2340.9	S.D.	= 1440.6	P(N>=r)	= .73724
	99%	= 168.16	75%	= 1236.7	10%	= 4263.9
	95%	= 407.78	50%	= 2144.9	5%	= 4982.8
	90%	= 639.36	25%	= 3193.9	1%	= 6544.2
9	MEAN	= 2067.8	S.D.	= 1265.8	P(N>=r)	= .69765
	99%	= 154.95	75%	= 1095.0	10%	= 3763.0
	95%	= 368.20	50%	= 1894.9	5%	= 4390.9
	90%	= 571.69	25%	= 2822.1	1%	= 5742.0
10	MEAN	= 1842.9	S.D.	= 1123.2	P(N>=r)	= .65824
	99%	= 143.80	75%	= 978.42	10%	= 3351.4
	95%	= 335.48	50%	= 1687.9	5%	= 3907.0
	90%	= 516.12	25%	= 2514.5	1%	= 5094.2
11	MEAN	= 1654.0	S.D.	= 1004.6	P(N>=r)	= .61907
	99%	= 134.19	75%	= 880.58	10%	= 3006.3
	95%	= 307.84	50%	= 1513.4	5%	= 3503.2
	90%	= 469.45	25%	= 2255.3	1%	= 4559.1
12	MEAN	= 1492.9	S.D.	= 904.12	P(N>=r)	= .58021
	99%	= 125.75	75%	= 796.96	10%	= 2712.3
	95%	= 284.00	50%	= 1363.9	5%	= 3160.5
	90%	= 429.46	25%	= 2033.5	1%	= 4108.8
13	MEAN	= 1353.5	S.D.	= 817.99	P(N>=r)	= .54175
	99%	= 118.20	75%	= 724.38	10%	= 2458.6
	95%	= 263.05	50%	= 1234.2	5%	= 2865.7
	90%	= 394.56	25%	= 1841.3	1%	= 3724.2
14	MEAN	= 1231.6	S.D.	= 743.34	P(N>=r)	= .50371
	99%	= 111.34	75%	= 660.57	10%	= 2237.4
	95%	= 244.32	50%	= 1120.6	5%	= 2609.3
	90%	= 363.61	25%	= 1673.2	1%	= 3391.6
15	MEAN	= 1124.1	S.D.	= 678.08	P(N>=r)	= .46613

	99% = 105.01	75% = 603.90	10% = 2042.8		
	95% = 227.35	50% = 1020.2	5% = 2384.3		
	90% = 335.80	25% = 1525.0	1% = 3101.3		
16	MEAN = 1028.6	S.D. = 620.62	P(N>=r)= .42901		
	99% = 99.103	75% = 553.20	10% = 1870.4		
	95% = 211.80	50% = 931.01	5% = 2185.2		
	90% = 310.59	25% = 1393.4	1% = 2845.6		
17	MEAN = 943.32	S.D. = 569.72	P(N>=r)= .39236		
	99% = 93.567	75% = 507.67	10% = 1716.8		
	95% = 197.50	50% = 851.39	5% = 2008.2		
	90% = 287.63	25% = 1276.1	1% = 2618.9		
18	MEAN = 866.98	S.D. = 524.39	P(N>=r)= .35624		
	99% = 88.372	75% = 466.69	10% = 1579.5		
	95% = 184.32	50% = 780.15	5% = 1850.0		
	90% = 266.68	25% = 1171.2	1% = 2416.8		
19	MEAN = 798.50	S.D. = 483.86	P(N>=r)= .32071		
	99% = 83.507	75% = 429.82	10% = 1456.4		
	95% = 172.19	50% = 716.35	5% = 1708.1		
	90% = 247.59	25% = 1077.2	1% = 2235.9		
20	MEAN = 736.99	S.D. = 447.48	P(N>=r)= .28592		
	99% = 78.974	75% = 396.70	10% = 1345.6		
	95% = 161.07	50% = 659.22	5% = 1580.5		
	90% = 230.25	25% = 992.74	1% = 2073.3		
21	MEAN = 681.75	S.D. = 414.74	P(N>=r)= .25211		
	99% = 74.772	75% = 366.99	10% = 1245.9		
	95% = 150.92	50% = 608.07	5% = 1465.6		
	90% = 214.55	25% = 916.94	1% = 1926.8		
22	MEAN = 632.14	S.D. = 385.20	P(N>=r)= .21954		
	99% = 70.901	75% = 340.42	10% = 1156.1		
	95% = 141.70	50% = 562.35	5% = 1361.9		
	90% = 200.39	25% = 848.89	1% = 1794.4		
23	MEAN = 587.61	S.D. = 358.51	P(N>=r)= .18856		
	99% = 67.353	75% = 316.69	10% = 1075.2		
	95% = 133.37	50% = 521.51	5% = 1268.2		
	90% = 187.67	25% = 787.81	1% = 1674.7		
24	MEAN = 547.65	S.D. = 334.36	P(N>=r)= .15951		
	99% = 64.114	75% = 295.54	10% = 1002.2		
	95% = 125.85	50% = 485.06	5% = 1183.6		
	90% = 176.26	25% = 733.00	1% = 1566.3		
25	MEAN = 511.81	S.D. = 312.49	P(N>=r)= .13274		
	99% = 61.167	75% = 276.71	10% = 936.38		
	95% = 119.08	50% = 452.57	5% = 1107.1		
	90% = 166.05	25% = 683.84	1% = 1468.0		
26	MEAN = 479.66	S.D. = 292.67	P(N>=r)= .10852		
	99% = 58.491	75% = 259.94	10% = 877.02		
	95% = 113.00	50% = 423.59	5% = 1037.9		
	90% = 156.92	25% = 639.76	1% = 1378.7		
27	MEAN = 450.80	S.D. = 274.70	P(N>=r)= .87079E-01		

	99%	= 56.064	75%	= 245.02	10%	= 823.47
	95%	= 107.54	50%	= 397.75	5%	= 975.28
	90%	= 148.75	25%	= 600.21	1%	= 1297.6
28	MEAN	= 424.89	S.D.	= 258.39	P(N>=r)	= .68508E-01
	99%	= 53.863	75%	= 231.71	10%	= 775.13
	95%	= 102.63	50%	= 374.69	5%	= 918.60
	90%	= 141.44	25%	= 564.72	1%	= 1223.8
29	MEAN	= 401.60	S.D.	= 243.58	P(N>=r)	= .52799E-01
	99%	= 51.866	75%	= 219.83	10%	= 731.46
	95%	= 98.218	50%	= 354.09	5%	= 867.24
	90%	= 134.89	25%	= 532.84	1%	= 1156.6

E) The mean of the potential = 52658.

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5C29501
PLAY	Sustut Upper Cretaceous Structural Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	TUE, FEB 14, 1995, 9:55 AM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk	=	1.00
PROSPECT LEVEL	Presence of Closure	(1)	.90
	Presence of Reservoir Facies	(2)	.80
	Adequate Seal	(4)	.90
	Adequate Timing	(5)	.60
	Adequate Source	(6)	.80
	Adequate Preservation	(8)	.33
	Overall Prospect Level Risk	=	.10
EXPLORATION RISK:		=	.10

B) No. of Prospects Distribution

Minimum	=	15
Maximum	=	270
Mean	=	138.64
S.D.	=	74.33

Frequency	No. of Prospects
99.00	15
95	25
90	38
80	62
75	74
60	111
50	135

40	162
25	203
20	216
10	243
5	257
1	268
0	270

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	50
Mean	=	14.23
S.D.	=	8.42

Frequency	No. of Pools
99.10	0
99	1
95	2
90	3
80	6
75	7
60	11
50	14
40	16
25	21
20	22
10	26
5	29
1	34
0	50

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5C29501
PLAY	Sustut Upper Cretaceous Structural Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	FRI, FEB 17, 1995, 2:52 PM

A) Basic Information

TYPE OF RESOURCE =Oil In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = 1.9488	MEAN = 12.953	
	sig. sq= 1.2251	S.D. = 20.085	
Upper Percentiles	99.99% = .11445	60.00% = 5.3034	15.00% = 22.108
	99.00% = .53465	55.00% = 6.1085	10.00% = 28.998
	95.00% = 1.1367	50.00% = 7.0200	8.00% = 33.247
	90.00% = 1.6994	45.00% = 8.0676	6.00% = 39.238
	85.00% = 2.2291	40.00% = 9.2922	5.00% = 43.352
	80.00% = 2.7655	35.00% = 10.754	4.00% = 48.740
	75.00% = 3.3275	30.00% = 12.543	2.00% = 68.166
	70.00% = 3.9288	25.00% = 14.810	1.00% = 92.173
	65.00% = 4.5826	20.00% = 17.820	.01% = 430.58

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 50
Expectation = 14.23
Standard Deviation= 8.42

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 54.006	S.D. = 49.372	P(N>=r)= .99100
	99% = 3.5911	75% = 25.305	10% = 103.96
	95% = 9.5769	50% = 41.705	5% = 137.51
	90% = 14.541	25% = 66.848	1% = 240.90
2	MEAN = 28.846	S.D. = 19.607	P(N>=r)= .96771
	99% = 1.9442	75% = 15.414	10% = 52.820
	95% = 5.2960	50% = 25.170	5% = 64.678
	90% = 8.3929	25% = 37.624	1% = 95.433
3	MEAN = 20.578	S.D. = 12.905	P(N>=r)= .93406

	99%	= 1.4274	75%	= 11.294	10%	= 37.054
	95%	= 3.7572	50%	= 18.614	5%	= 44.192
	90%	= 5.9951	25%	= 27.301	1%	= 61.365
4	MEAN	= 16.200	S.D.	= 9.7992	P(N>=r)=	.89588
	99%	= 1.1807	75%	= 8.9753	10%	= 28.936
	95%	= 2.9919	50%	= 14.891	5%	= 34.057
	90%	= 4.7386	25%	= 21.674	1%	= 45.857
5	MEAN	= 13.401	S.D.	= 7.9426	P(N>=r)=	.85640
	99%	= 1.0282	75%	= 7.4564	10%	= 23.827
	95%	= 2.5205	50%	= 12.419	5%	= 27.826
	90%	= 3.9487	25%	= 18.014	1%	= 36.784
6	MEAN	= 11.419	S.D.	= 6.6813	P(N>=r)=	.81666
	99%	= .91920	75%	= 6.3691	10%	= 20.247
	95%	= 2.1906	50%	= 10.629	5%	= 23.529
	90%	= 3.3942	25%	= 15.395	1%	= 30.733
7	MEAN	= 9.9256	S.D.	= 5.7561	P(N>=r)=	.77692
	99%	= .83514	75%	= 5.5464	10%	= 17.569
	95%	= 1.9426	50%	= 9.2591	5%	= 20.349
	90%	= 2.9789	25%	= 13.404	1%	= 26.364
8	MEAN	= 8.7518	S.D.	= 5.0416	P(N>=r)=	.73724
	99%	= .76745	75%	= 4.8993	10%	= 15.471
	95%	= 1.7477	50%	= 8.1713	5%	= 17.881
	90%	= 2.6541	25%	= 11.829	1%	= 23.034
9	MEAN	= 7.7999	S.D.	= 4.4695	P(N>=r)=	.69765
	99%	= .71128	75%	= 4.3753	10%	= 13.776
	95%	= 1.5895	50%	= 7.2827	5%	= 15.899
	90%	= 2.3921	25%	= 10.544	1%	= 20.399
10	MEAN	= 7.0094	S.D.	= 3.9989	P(N>=r)=	.65824
	99%	= .66359	75%	= 3.9409	10%	= 12.370
	95%	= 1.4579	50%	= 6.5407	5%	= 14.265
	90%	= 2.1753	25%	= 9.4721	1%	= 18.252
11	MEAN	= 6.3402	S.D.	= 3.6037	P(N>=r)=	.61907
	99%	= .62228	75%	= 3.5734	10%	= 11.182
	95%	= 1.3459	50%	= 5.9098	5%	= 12.890
	90%	= 1.9920	25%	= 8.5613	1%	= 16.464
12	MEAN	= 5.7647	S.D.	= 3.2667	P(N>=r)=	.58021
	99%	= .58584	75%	= 3.2571	10%	= 10.162
	95%	= 1.2488	50%	= 5.3655	5%	= 11.714
	90%	= 1.8338	25%	= 7.7762	1%	= 14.948
13	MEAN	= 5.2634	S.D.	= 2.9755	P(N>=r)=	.54175
	99%	= .55311	75%	= 2.9806	10%	= 9.2763
	95%	= 1.1630	50%	= 4.8900	5%	= 10.695
	90%	= 1.6950	25%	= 7.0912	1%	= 13.643
14	MEAN	= 4.8219	S.D.	= 2.7214	P(N>=r)=	.50371
	99%	= .52321	75%	= 2.7358	10%	= 8.4983
	95%	= 1.0859	50%	= 4.4703	5%	= 9.8035
	90%	= 1.5711	25%	= 6.4878	1%	= 12.508
15	MEAN	= 4.4297	S.D.	= 2.4979	P(N>=r)=	.46613

	99%	= .49551	75%	= 2.5171	10%	= 7.8093
	95%	= 1.0156	50%	= 4.0971	5%	= 9.0154
	90%	= 1.4591	25%	= 5.9521	1%	= 11.510
16	MEAN	= 4.0791	S.D.	= 2.2999	P(N>=r)	= .42901
	99%	= .46957	75%	= 2.3202	10%	= 7.1951
	95%	= .95093	50%	= 3.7632	5%	= 8.3141
	90%	= 1.3571	25%	= 5.4735	1%	= 10.626
17	MEAN	= 3.7642	S.D.	= 2.1235	P(N>=r)	= .39236
	99%	= .44515	75%	= 2.1422	10%	= 6.6447
	95%	= .89112	50%	= 3.4632	5%	= 7.6864
	90%	= 1.2636	25%	= 5.0441	1%	= 9.8369
18	MEAN	= 3.4804	S.D.	= 1.9656	P(N>=r)	= .35624
	99%	= .42214	75%	= 1.9811	10%	= 6.1495
	95%	= .83572	50%	= 3.1932	5%	= 7.1222
	90%	= 1.1779	25%	= 4.6576	1%	= 9.1297
19	MEAN	= 3.2243	S.D.	= 1.8236	P(N>=r)	= .32071
	99%	= .40051	75%	= 1.8353	10%	= 5.7027
	95%	= .78450	50%	= 2.9499	5%	= 6.6133
	90%	= 1.0994	25%	= 4.3091	1%	= 8.4929
20	MEAN	= 2.9929	S.D.	= 1.6954	P(N>=r)	= .28592
	99%	= .38027	75%	= 1.7035	10%	= 5.2988
	95%	= .73733	50%	= 2.7306	5%	= 6.1531
	90%	= 1.0276	25%	= 3.9944	1%	= 7.9176
21	MEAN	= 2.7839	S.D.	= 1.5795	P(N>=r)	= .25211
	99%	= .36144	75%	= 1.5847	10%	= 4.9331
	95%	= .69407	50%	= 2.5333	5%	= 5.7362
	90%	= .96238	25%	= 3.7103	1%	= 7.3965
22	MEAN	= 2.5952	S.D.	= 1.4743	P(N>=r)	= .21954
	99%	= .34402	75%	= 1.4778	10%	= 4.6019
	95%	= .65461	50%	= 2.3558	5%	= 5.3581
	90%	= .90324	25%	= 3.4538	1%	= 6.9233
23	MEAN	= 2.4249	S.D.	= 1.3788	P(N>=r)	= .18856
	99%	= .32799	75%	= 1.3818	10%	= 4.3018
	95%	= .61875	50%	= 2.1964	5%	= 5.0150
	90%	= .84983	25%	= 3.2223	1%	= 6.4932
24	MEAN	= 2.2714	S.D.	= 1.2920	P(N>=r)	= .15951
	99%	= .31331	75%	= 1.2959	10%	= 4.0298
	95%	= .58627	50%	= 2.0535	5%	= 4.7033
	90%	= .80173	25%	= 3.0135	1%	= 6.1017
25	MEAN	= 2.1331	S.D.	= 1.2129	P(N>=r)	= .13274
	99%	= .29991	75%	= 1.2190	10%	= 3.7834
	95%	= .55693	50%	= 1.9253	5%	= 4.4202
	90%	= .75849	25%	= 2.8253	1%	= 5.7449
26	MEAN	= 2.0084	S.D.	= 1.1409	P(N>=r)	= .10852
	99%	= .28770	75%	= 1.1502	10%	= 3.5600
	95%	= .53047	50%	= 1.8105	5%	= 4.1630
	90%	= .71966	25%	= 2.6557	1%	= 5.4196
27	MEAN	= 1.8960	S.D.	= 1.0754	P(N>=r)	= .87079E-01

	99%	= .27660	75%	= 1.0887	10%	= 3.3576
	95%	= .50661	50%	= 1.7077	5%	= 3.9292
	90%	= .68480	25%	= 2.5028	1%	= 5.1227
28	MEAN	= 1.7947	S.D.	= 1.0156	P(N>=r)	= .68508E-01
	99%	= .26649	75%	= 1.0337	10%	= 3.1741
	95%	= .48509	50%	= 1.6155	5%	= 3.7165
	90%	= .65348	25%	= 2.3650	1%	= 4.8515
29	MEAN	= 1.7032	S.D.	= .96108	P(N>=r)	= .52799E-01
	99%	= .25730	75%	= .98435	10%	= 3.0076
	95%	= .46567	50%	= 1.5328	5%	= 3.5231
	90%	= .62531	25%	= 2.2407	1%	= 4.6037

E) The mean of the potential = 184.13

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5D19501
PLAY	Northern Rocky Mountain Trench Sifton Structural Gas
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	WED, FEB 1, 1995, 11:42 AM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Adequate Play Conditions	(19)	.90
	Overall Play Level Risk	=	.90
PROSPECT LEVEL	Adequate Prospect Conditions	(20)	.25
	Overall Prospect Level Risk	=	.25
EXPLORATION RISK:		=	.22

B) No. of Prospects Distribution

Minimum	=	15
Maximum	=	50
Mean	=	29.19
S.D.	=	10.39

Frequency	No. of Prospects
99.00	15
95	16
90	17
80	19
75	20
60	23
50	25
40	30

25	38
20	40
10	45
5	48
1	50
0	50

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	26
Mean	=	6.57
S.D.	=	3.97

Frequency	No. of Pools
89.82	0
80	3
75	4
60	5
50	6
40	7
25	9
20	10
10	12
5	14
1	16
0	26

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5D19501
PLAY	Northern Rocky Mountain Trench Sifton Structural Gas
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	FRI, FEB 17, 1995, 3:49 PM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary	mu = 1.9577	MEAN = 22.293	
Statistics	sig. sq= 2.2931	S.D. = 66.526	
Upper	99.99% = .25377E-01	60.00% = 4.8264	15.00% = 34.029
Percentiles	99.00% = .20909	55.00% = 5.8559	10.00% = 49.323
	95.00% = .58682	50.00% = 7.0833	8.00% = 59.467
	90.00% = 1.0173	45.00% = 8.5680	6.00% = 74.598
	85.00% = 1.4745	40.00% = 10.396	5.00% = 85.501
	80.00% = 1.9804	35.00% = 12.695	4.00% = 100.36
	75.00% = 2.5507	30.00% = 15.671	2.00% = 158.81
	70.00% = 3.2016	25.00% = 19.670	1.00% = 239.97
	65.00% = 3.9521	20.00% = 25.335	.01% = 1977.1

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 26
Expectation = 6.57
Standard Deviation= 3.97

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 90.716	S.D. = 157.44	P(N>=r)= .89817
	99% = 3.1401	75% = 25.139	10% = 193.49
	95% = 8.3354	50% = 50.284	5% = 291.91
	90% = 12.926	25% = 100.63	1% = 659.95
2	MEAN = 30.829	S.D. = 33.932	P(N>=r)= .88694
	99% = 1.0403	75% = 10.806	10% = 65.630
	95% = 3.2179	50% = 21.209	5% = 89.548
	90% = 5.3004	25% = 38.919	1% = 161.60
3	MEAN = 16.761	S.D. = 16.786	P(N>=r)= .85347

	99%	= .50426	75%	= 5.8914	10%	= 35.980
	95%	= 1.5765	50%	= 12.011	5%	= 47.687
	90%	= 2.7067	25%	= 21.997	1%	= 79.988
4	MEAN	= 10.790	S.D.	= 10.544	P(N>=r)	= .78840
	99%	= .32004	75%	= 3.6799	10%	= 23.441
	95%	= .95027	50%	= 7.7772	5%	= 30.714
	90%	= 1.6362	25%	= 14.436	1%	= 49.843
5	MEAN	= 7.6737	S.D.	= 7.4069	P(N>=r)	= .69458
	99%	= .23900	75%	= 2.5762	10%	= 16.786
	95%	= .67428	50%	= 5.5339	5%	= 21.860
	90%	= 1.1444	25%	= 10.367	1%	= 34.817
6	MEAN	= 5.8357	S.D.	= 5.5499	P(N>=r)	= .58577
	99%	= .19663	75%	= 1.9736	10%	= 12.765
	95%	= .53351	50%	= 4.2282	5%	= 16.547
	90%	= .89024	25%	= 7.9163	1%	= 26.020
7	MEAN	= 4.6377	S.D.	= 4.3309	P(N>=r)	= .47756
	99%	= .17103	75%	= 1.6055	10%	= 10.093
	95%	= .45047	50%	= 3.3897	5%	= 13.031
	90%	= .73991	25%	= 6.2959	1%	= 20.297
8	MEAN	= 3.7858	S.D.	= 3.4712	P(N>=r)	= .37991
	99%	= .15287	75%	= 1.3486	10%	= 8.1805
	95%	= .39288	50%	= 2.7934	5%	= 10.528
	90%	= .63606	25%	= 5.1331	1%	= 16.286
9	MEAN	= 3.1401	S.D.	= 2.8350	P(N>=r)	= .29603
	99%	= .13792	75%	= 1.1484	10%	= 6.7394
	95%	= .34668	50%	= 2.3349	5%	= 8.6546
	90%	= .55378	25%	= 4.2483	1%	= 13.327
10	MEAN	= 2.6340	S.D.	= 2.3498	P(N>=r)	= .22529
	99%	= .12465	75%	= .98432	10%	= 5.6211
	95%	= .30687	50%	= 1.9692	5%	= 7.2091
	90%	= .48418	25%	= 3.5545	1%	= 11.071
11	MEAN	= 2.2323	S.D.	= 1.9727	P(N>=r)	= .16626
	99%	= .11286	75%	= .84927	10%	= 4.7410
	95%	= .27251	50%	= 1.6757	5%	= 6.0759
	90%	= .42517	25%	= 3.0047	1%	= 9.3164
12	MEAN	= 1.9128	S.D.	= 1.6760	P(N>=r)	= .11798
	99%	= .10265	75%	= .73950	10%	= 4.0439
	95%	= .24351	50%	= 1.4411	5%	= 5.1794
	90%	= .37610	25%	= 2.5682	1%	= 7.9335
13	MEAN	= 1.6581	S.D.	= 1.4402	P(N>=r)	= .79896E-01
	99%	= .94000E-01	75%	= .65113	10%	= 3.4888
	95%	= .21947	50%	= 1.2541	5%	= 4.4652
	90%	= .33590	25%	= 2.2210	1%	= 6.8324
14	MEAN	= 1.4541	S.D.	= 1.2511	P(N>=r)	= .51334E-01
	99%	= .86738E-01	75%	= .58008	10%	= 3.0441
	95%	= .19967	50%	= 1.1048	5%	= 3.8921
	90%	= .30314	25%	= 1.9437	1%	= 5.9474

E) The mean of the potential = 146.36

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5A29501
PLAY	Whitehorse Takwahoni Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	MON, FEB 27, 1995, 10:44 AM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk	=	1.00
PROSPECT LEVEL	Presence of Closure	(1)	.50
	Presence of Reservoir Facies	(2)	.50
	Adequate Seal	(4)	.50
	Adequate Maturation	(7)	.90
	Adequate Preservation	(8)	.33
	Overall Prospect Level Risk	=	.04
EXPLORATION RISK:		=	.04

B) No. of Prospects Distribution

Minimum = 40
Maximum = 750
Mean = 383.82
S.D. = 206.94

Frequency	No. of Prospects
99.00	40
95	68
90	102
80	170
75	205
60	307
50	375

40	450
25	563
20	600
10	675
5	713
1	743
0	750

C) <u>No. of Pools Distribution</u>

Minimum	=	0
Maximum	=	51
Mean	=	14.25
S.D.	=	8.53

Frequency	No. of Pools
98.94	0
95	2
90	3
80	6
75	7
60	11
50	14
40	16
25	21
20	22
10	26
5	29
1	34
0	51

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5A29501
PLAY	Whitehorse Takwahoni Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	MON, FEB 27, 1995, 11:32 AM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = 8.0427	MEAN = 5671.7	
	sig. sq= 1.2010	S.D. = 8645.5	
Upper Percentiles	99.99% = 52.826	60.00% = 2356.9	15.00% = 9687.4
	99.00% = 243.05	55.00% = 2710.9	10.00% = 12673.
	95.00% = 512.92	50.00% = 3111.1	8.00% = 14510.
	90.00% = 763.77	45.00% = 3570.5	6.00% = 17097.
	85.00% = 999.14	40.00% = 4106.7	5.00% = 18871.
	80.00% = 1236.9	35.00% = 4745.8	4.00% = 21191.
	75.00% = 1485.6	30.00% = 5527.2	2.00% = 29539.
	70.00% = 1751.2	25.00% = 6515.4	1.00% = 39824.
	65.00% = 2039.5	20.00% = 7825.0	.01% = .18322E+06

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 51
Expectation = 14.25
Standard Deviation= 8.53

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 23393.	S.D. = 21114.	P(N>=r)= .98944
	99% = 1553.9	75% = 11052.	10% = 44910.
	95% = 4170.4	50% = 18165.	5% = 59235.
	90% = 6348.8	25% = 29000.	1% = .10319E+06
2	MEAN = 12606.	S.D. = 8486.4	P(N>=r)= .96449
	99% = 863.75	75% = 6783.8	10% = 23006.
	95% = 2340.3	50% = 11038.	5% = 28113.
	90% = 3703.9	25% = 16441.	1% = 41315.
3	MEAN = 9035.2	S.D. = 5613.8	P(N>=r)= .93020

	99%	= 642.32	75%	= 4995.9	10%	= 16209.
	95%	= 1677.0	50%	= 8195.9	5%	= 19298.
	90%	= 2666.1	25%	= 11978.	1%	= 26707.
4	MEAN	= 7134.8	S.D.	= 4277.1	P(N>=r)	= .89211
	99%	= 533.75	75%	= 3982.3	10%	= 12696.
	95%	= 1341.3	50%	= 6574.1	5%	= 14919.
	90%	= 2115.4	25%	= 9535.6	1%	= 20029.
5	MEAN	= 5915.3	S.D.	= 3476.0	P(N>=r)	= .85295
	99%	= 465.69	75%	= 3315.4	10%	= 10479.
	95%	= 1132.3	50%	= 5494.0	5%	= 12220.
	90%	= 1766.7	25%	= 7942.7	1%	= 16111.
6	MEAN	= 5050.3	S.D.	= 2930.7	P(N>=r)	= .81360
	99%	= 416.83	75%	= 2836.9	10%	= 8923.3
	95%	= 985.64	50%	= 4710.1	5%	= 10356.
	90%	= 1521.1	25%	= 6800.4	1%	= 13493.
7	MEAN	= 4397.4	S.D.	= 2530.0	P(N>=r)	= .77425
	99%	= 379.11	75%	= 2474.1	10%	= 7756.9
	95%	= 875.20	50%	= 4109.5	5%	= 8973.5
	90%	= 1336.9	25%	= 5931.2	1%	= 11599.
8	MEAN	= 3883.5	S.D.	= 2220.1	P(N>=r)	= .73495
	99%	= 348.71	75%	= 2188.4	10%	= 6842.7
	95%	= 788.29	50%	= 3631.9	5%	= 7899.4
	90%	= 1192.6	25%	= 5242.2	1%	= 10154.
9	MEAN	= 3466.2	S.D.	= 1971.7	P(N>=r)	= .69576
	99%	= 323.46	75%	= 1956.6	10%	= 6102.6
	95%	= 717.67	50%	= 3241.2	5%	= 7035.6
	90%	= 1076.0	25%	= 4679.8	1%	= 9008.5
10	MEAN	= 3119.2	S.D.	= 1767.2	P(N>=r)	= .65674
	99%	= 301.99	75%	= 1764.2	10%	= 5488.4
	95%	= 658.80	50%	= 2914.6	5%	= 6322.7
	90%	= 979.41	25%	= 4210.0	1%	= 8074.5
11	MEAN	= 2825.2	S.D.	= 1595.3	P(N>=r)	= .61795
	99%	= 283.36	75%	= 1601.2	10%	= 4969.0
	95%	= 608.65	50%	= 2636.7	5%	= 5722.4
	90%	= 897.57	25%	= 3810.6	1%	= 7295.8
12	MEAN	= 2572.2	S.D.	= 1448.6	P(N>=r)	= .57946
	99%	= 266.90	75%	= 1460.8	10%	= 4522.8
	95%	= 565.08	50%	= 2396.8	5%	= 5208.7
	90%	= 826.89	25%	= 3466.0	1%	= 6634.9
13	MEAN	= 2351.7	S.D.	= 1321.7	P(N>=r)	= .54133
	99%	= 252.11	75%	= 1338.1	10%	= 4134.9
	95%	= 526.54	50%	= 2187.1	5%	= 4763.4
	90%	= 764.78	25%	= 3165.3	1%	= 6065.9
14	MEAN	= 2157.5	S.D.	= 1211.0	P(N>=r)	= .50360
	99%	= 238.59	75%	= 1229.5	10%	= 3794.0
	95%	= 491.92	50%	= 2002.1	5%	= 4373.1
	90%	= 709.38	25%	= 2900.3	1%	= 5570.3
15	MEAN	= 1985.0	S.D.	= 1113.5	P(N>=r)	= .46629

	99%	= 226.08	75%	= 1132.5	10%	= 3492.0
	95%	= 460.41	50%	= 1837.6	5%	= 4028.2
	90%	= 659.40	25%	= 2664.9	1%	= 5134.4
16	MEAN	= 1830.8	S.D.	= 1027.0	P(N>=r)	= .42943
	99%	= 214.39	75%	= 1045.3	10%	= 3222.8
	95%	= 431.48	50%	= 1690.5	5%	= 3721.1
	90%	= 613.92	25%	= 2454.7	1%	= 4748.0
17	MEAN	= 1692.2	S.D.	= 949.98	P(N>=r)	= .39303
	99%	= 203.42	75%	= 966.57	10%	= 2981.4
	95%	= 404.78	50%	= 1558.4	5%	= 3446.1
	90%	= 572.36	25%	= 2266.1	1%	= 4403.2
18	MEAN	= 1567.5	S.D.	= 880.91	P(N>=r)	= .35716
	99%	= 193.12	75%	= 895.40	10%	= 2764.2
	95%	= 380.12	50%	= 1439.5	5%	= 3198.9
	90%	= 534.31	25%	= 2096.3	1%	= 4093.8
19	MEAN	= 1454.8	S.D.	= 818.76	P(N>=r)	= .32191
	99%	= 183.45	75%	= 831.04	10%	= 2568.1
	95%	= 357.37	50%	= 1332.4	5%	= 2975.7
	90%	= 499.52	25%	= 1943.1	1%	= 3815.1
20	MEAN	= 1353.1	S.D.	= 762.64	P(N>=r)	= .28743
	99%	= 174.43	75%	= 772.91	10%	= 2390.7
	95%	= 336.44	50%	= 1235.9	5%	= 2773.8
	90%	= 467.78	25%	= 1804.8	1%	= 3563.2
21	MEAN	= 1261.1	S.D.	= 711.81	P(N>=r)	= .25395
	99%	= 166.05	75%	= 720.48	10%	= 2230.1
	95%	= 317.27	50%	= 1149.0	5%	= 2590.8
	90%	= 438.91	25%	= 1679.8	1%	= 3334.8
22	MEAN	= 1178.0	S.D.	= 665.67	P(N>=r)	= .22174
	99%	= 158.29	75%	= 673.30	10%	= 2084.5
	95%	= 299.78	50%	= 1070.8	5%	= 2424.7
	90%	= 412.75	25%	= 1566.9	1%	= 3127.2
23	MEAN	= 1103.0	S.D.	= 623.73	P(N>=r)	= .19111
	99%	= 151.16	75%	= 630.91	10%	= 1952.4
	95%	= 283.88	50%	= 1000.4	5%	= 2273.8
	90%	= 389.10	25%	= 1464.9	1%	= 2938.3
24	MEAN	= 1035.2	S.D.	= 585.54	P(N>=r)	= .16239
	99%	= 144.62	75%	= 592.88	10%	= 1832.5
	95%	= 269.46	50%	= 937.27	5%	= 2136.6
	90%	= 367.78	25%	= 1372.7	1%	= 2766.2
25	MEAN	= 974.06	S.D.	= 550.74	P(N>=r)	= .13589
	99%	= 138.64	75%	= 558.80	10%	= 1723.8
	95%	= 256.42	50%	= 880.56	5%	= 2011.8
	90%	= 348.58	25%	= 1289.5	1%	= 2609.2
26	MEAN	= 918.84	S.D.	= 519.00	P(N>=r)	= .11188
	99%	= 133.19	75%	= 528.25	10%	= 1625.0
	95%	= 244.63	50%	= 829.66	5%	= 1898.2
	90%	= 331.31	25%	= 1214.4	1%	= 2465.9
27	MEAN	= 868.98	S.D.	= 490.04	P(N>=r)	= .90532E-01

	99%	= 128.22	75%	= 500.88	10%	= 1535.4
	95%	= 233.98	50%	= 783.96	5%	= 1794.7
	90%	= 315.76	25%	= 1146.6	1%	= 2334.8
28	MEAN	= 823.92	S.D.	= 463.59	P(N>=r)	= .71948E-01
	99%	= 123.69	75%	= 476.31	10%	= 1454.0
	95%	= 224.35	50%	= 742.89	5%	= 1700.5
	90%	= 301.77	25%	= 1085.4	1%	= 2214.9
29	MEAN	= 783.17	S.D.	= 439.43	P(N>=r)	= .56114E-01
	99%	= 119.56	75%	= 454.24	10%	= 1380.0
	95%	= 215.64	50%	= 705.96	5%	= 1614.6
	90%	= 289.15	25%	= 1030.0	1%	= 2105.1

E) The mean of the potential = 80715.

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5A49501
PLAY	Whitehorse Inklin Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	MON, FEB 27, 1995, 1:50 PM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk	=	1.00
PROSPECT LEVEL	Presence of Closure	(1)	.50
	Presence of Reservoir Facies	(2)	.50
	Adequate Seal	(4)	.50
	Adequate Maturation	(7)	.75
	Adequate Preservation	(8)	.33
	Overall Prospect Level Risk	=	.03
EXPLORATION RISK:		=	.03

B) No. of Prospects Distribution

Minimum = 60
Maximum = 1250
Mean = 637.67
S.D. = 346.83

Frequency	No. of Prospects
99.00	60
95	107
90	164
80	280
75	337
60	510
50	625

40	750
25	938
20	1000
10	1125
5	1188
1	1238
0	1250

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	63
Mean	=	19.73
S.D.	=	11.59

Frequency	No. of Pools
99.44	0
99	1
95	3
90	5
80	8
75	10
60	15
50	19
40	23
25	29
20	31
10	36
5	39
1	45
0	63

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5A49501
PLAY	Whitehorse Inklin Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	MON, FEB 27, 1995, 2:21 PM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = 6.3969	MEAN = 1119.9
	sig. sq= 1.2481	S.D. = 1764.9

Upper Percentiles	99.99% = 9.4134	60.00% = 452.10	15.00% = 1909.9
	99.00% = 44.612	55.00% = 521.41	10.00% = 2511.5
	95.00% = 95.521	50.00% = 600.00	8.00% = 2883.2
	90.00% = 143.34	45.00% = 690.43	6.00% = 3408.0
	85.00% = 188.49	40.00% = 796.29	5.00% = 3768.8
	80.00% = 234.32	35.00% = 922.79	4.00% = 4241.8
	75.00% = 282.42	30.00% = 1077.9	2.00% = 5951.1
	70.00% = 333.98	25.00% = 1274.7	1.00% = 8069.7
	65.00% = 390.12	20.00% = 1536.4	.01% = 38243.

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 63
Expectation = 19.73
Standard Deviation= 11.59

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 5459.9	S.D. = 4808.2	P(N>=r)= .99436
	99% = 393.41	75% = 2657.2	10% = 10355.
	95% = 1038.3	50% = 4285.7	5% = 13604.
	90% = 1558.9	25% = 6747.2	1% = 23587.
2	MEAN = 2999.4	S.D. = 1950.9	P(N>=r)= .97930
	99% = 208.47	75% = 1667.0	10% = 5388.2
	95% = 583.96	50% = 2659.2	5% = 6546.8
	90% = 923.28	25% = 3895.8	1% = 9539.7
3	MEAN = 2178.1	S.D. = 1306.6	P(N>=r)= .95673

	99%	= 149.67	75%	= 1243.2	10%	= 3843.2
	95%	= 413.48	50%	= 2004.1	5%	= 4545.3
	90%	= 665.45	25%	= 2877.5	1%	= 6226.1
4	MEAN	= 1739.0	S.D.	= 1007.3	P(N>=r)	= .93037
	99%	= 122.41	75%	= 1000.3	10%	= 3043.0
	95%	= 328.13	50%	= 1627.8	5%	= 3549.7
	90%	= 528.09	25%	= 2318.3	1%	= 4710.4
5	MEAN	= 1456.4	S.D.	= 827.64	P(N>=r)	= .90270
	99%	= 106.21	75%	= 839.68	10%	= 2537.2
	95%	= 276.21	50%	= 1375.9	5%	= 2935.1
	90%	= 441.64	25%	= 1952.7	1%	= 3820.3
6	MEAN	= 1255.4	S.D.	= 705.12	P(N>=r)	= .87472
	99%	= 94.930	75%	= 723.89	10%	= 2181.4
	95%	= 240.30	50%	= 1192.2	5%	= 2509.8
	90%	= 381.07	25%	= 1689.7	1%	= 3224.7
7	MEAN	= 1103.2	S.D.	= 614.89	P(N>=r)	= .84668
	99%	= 86.360	75%	= 635.71	10%	= 1914.2
	95%	= 213.48	50%	= 1050.8	5%	= 2194.0
	90%	= 335.70	25%	= 1489.0	1%	= 2793.3
8	MEAN	= 982.96	S.D.	= 544.95	P(N>=r)	= .81865
	99%	= 79.516	75%	= 566.00	10%	= 1704.3
	95%	= 192.49	50%	= 937.92	5%	= 1948.0
	90%	= 300.22	25%	= 1329.4	1%	= 2463.6
9	MEAN	= 885.11	S.D.	= 488.72	P(N>=r)	= .79062
	99%	= 73.869	75%	= 509.34	10%	= 1533.9
	95%	= 175.50	50%	= 845.22	5%	= 1749.9
	90%	= 271.59	25%	= 1198.8	1%	= 2201.9
10	MEAN	= 803.57	S.D.	= 442.26	P(N>=r)	= .76260
	99%	= 69.096	75%	= 462.26	10%	= 1392.2
	95%	= 161.40	50%	= 767.51	5%	= 1585.9
	90%	= 247.93	25%	= 1089.4	1%	= 1988.0
11	MEAN	= 734.36	S.D.	= 403.07	P(N>=r)	= .73459
	99%	= 64.986	75%	= 422.45	10%	= 1272.1
	95%	= 149.48	50%	= 701.24	5%	= 1447.6
	90%	= 227.99	25%	= 996.07	1%	= 1809.4
12	MEAN	= 674.74	S.D.	= 369.44	P(N>=r)	= .70661
	99%	= 61.392	75%	= 388.30	10%	= 1168.6
	95%	= 139.22	50%	= 643.95	5%	= 1328.9
	90%	= 210.93	25%	= 915.36	1%	= 1657.4
13	MEAN	= 622.73	S.D.	= 340.21	P(N>=r)	= .67867
	99%	= 58.212	75%	= 358.62	10%	= 1078.3
	95%	= 130.28	50%	= 593.85	5%	= 1225.7
	90%	= 196.12	25%	= 844.70	1%	= 1526.3
14	MEAN	= 576.87	S.D.	= 314.50	P(N>=r)	= .65080
	99%	= 55.367	75%	= 332.56	10%	= 998.79
	95%	= 122.41	50%	= 549.60	5%	= 1135.0
	90%	= 183.13	25%	= 782.20	1%	= 1411.7
15	MEAN	= 536.08	S.D.	= 291.69	P(N>=r)	= .62301

	99%	= 52.798	75%	= 309.43	10%	= 928.01
	95%	= 115.39	50%	= 510.17	5%	= 1054.5
	90%	= 171.60	25%	= 726.46	1%	= 1310.6
16	MEAN	= 499.50	S.D.	= 271.28	P(N>=r)	= .59534
	99%	= 50.456	75%	= 288.73	10%	= 864.55
	95%	= 109.07	50%	= 474.76	5%	= 982.53
	90%	= 161.27	25%	= 676.36	1%	= 1220.6
17	MEAN	= 466.47	S.D.	= 252.91	P(N>=r)	= .56780
	99%	= 48.302	75%	= 270.05	10%	= 807.26
	95%	= 103.33	50%	= 442.76	5%	= 917.65
	90%	= 151.92	25%	= 631.06	1%	= 1139.9
18	MEAN	= 436.45	S.D.	= 236.28	P(N>=r)	= .54042
	99%	= 46.303	75%	= 253.07	10%	= 755.26
	95%	= 98.066	50%	= 413.65	5%	= 858.84
	90%	= 143.40	25%	= 589.88	1%	= 1067.1
19	MEAN	= 409.04	S.D.	= 221.15	P(N>=r)	= .51321
	99%	= 44.433	75%	= 237.54	10%	= 707.81
	95%	= 93.202	50%	= 387.05	5%	= 805.27
	90%	= 135.56	25%	= 552.23	1%	= 1000.9
20	MEAN	= 383.88	S.D.	= 207.33	P(N>=r)	= .48619
	99%	= 42.672	75%	= 223.27	10%	= 664.33
	95%	= 88.676	50%	= 362.64	5%	= 756.26
	90%	= 128.31	25%	= 517.67	1%	= 940.55
21	MEAN	= 360.70	S.D.	= 194.65	P(N>=r)	= .45937
	99%	= 41.003	75%	= 210.08	10%	= 624.29
	95%	= 84.441	50%	= 340.13	5%	= 711.21
	90%	= 121.57	25%	= 485.82	1%	= 885.23
22	MEAN	= 339.27	S.D.	= 182.98	P(N>=r)	= .43275
	99%	= 39.416	75%	= 197.85	10%	= 587.25
	95%	= 80.461	50%	= 319.33	5%	= 669.63
	90%	= 115.27	25%	= 456.39	1%	= 834.34
23	MEAN	= 319.40	S.D.	= 172.21	P(N>=r)	= .40635
	99%	= 37.901	75%	= 186.48	10%	= 552.99
	95%	= 76.707	50%	= 300.04	5%	= 631.09
	90%	= 109.37	25%	= 429.11	1%	= 787.39
24	MEAN	= 300.93	S.D.	= 162.25	P(N>=r)	= .38018
	99%	= 36.451	75%	= 175.88	10%	= 521.23
	95%	= 73.158	50%	= 282.12	5%	= 595.29
	90%	= 103.82	25%	= 403.77	1%	= 743.87
25	MEAN	= 283.72	S.D.	= 153.01	P(N>=r)	= .35429
	99%	= 35.061	75%	= 165.97	10%	= 491.68
	95%	= 69.794	50%	= 265.43	5%	= 562.01
	90%	= 98.593	25%	= 380.19	1%	= 703.41
26	MEAN	= 267.67	S.D.	= 144.42	P(N>=r)	= .32869
	99%	= 33.725	75%	= 156.69	10%	= 464.13
	95%	= 66.598	50%	= 249.87	5%	= 531.06
	90%	= 93.658	25%	= 358.22	1%	= 665.76
27	MEAN	= 252.67	S.D.	= 136.44	P(N>=r)	= .30343

	99%	= 32.439	75%	= 147.99	10%	= 438.41
	95%	= 63.557	50%	= 235.34	5%	= 502.23
	90%	= 88.992	25%	= 337.71	1%	= 630.85
28	MEAN	= 238.65	S.D.	= 129.00	P(N>=r)	= .27858
	99%	= 31.200	75%	= 139.82	10%	= 414.38
	95%	= 60.661	50%	= 221.78	5%	= 475.32
	90%	= 84.576	25%	= 318.57	1%	= 598.44
29	MEAN	= 225.54	S.D.	= 122.07	P(N>=r)	= .25418
	99%	= 30.006	75%	= 132.17	10%	= 391.92
	95%	= 57.903	50%	= 209.12	5%	= 450.16
	90%	= 80.398	25%	= 300.69	1%	= 567.92
30	MEAN	= 213.29	S.D.	= 115.59	P(N>=r)	= .23033
	99%	= 28.859	75%	= 125.00	10%	= 370.93
	95%	= 55.281	50%	= 197.31	5%	= 426.59
	90%	= 76.450	25%	= 284.00	1%	= 539.07
31	MEAN	= 201.85	S.D.	= 109.55	P(N>=r)	= .20711
	99%	= 27.759	75%	= 118.30	10%	= 351.30
	95%	= 52.794	50%	= 186.31	5%	= 404.53
	90%	= 72.730	25%	= 268.43	1%	= 512.02
32	MEAN	= 191.17	S.D.	= 103.91	P(N>=r)	= .18465
	99%	= 26.709	75%	= 112.06	10%	= 332.97
	95%	= 50.446	50%	= 176.08	5%	= 383.89
	90%	= 69.235	25%	= 253.92	1%	= 486.83
33	MEAN	= 181.23	S.D.	= 98.632	P(N>=r)	= .16306
	99%	= 25.711	75%	= 106.25	10%	= 315.85
	95%	= 48.236	50%	= 166.58	5%	= 364.60
	90%	= 65.966	25%	= 240.42	1%	= 463.19
34	MEAN	= 171.99	S.D.	= 93.703	P(N>=r)	= .14251
	99%	= 24.768	75%	= 100.87	10%	= 299.89
	95%	= 46.167	50%	= 157.79	5%	= 346.57
	90%	= 62.918	25%	= 227.87	1%	= 441.20
35	MEAN	= 163.41	S.D.	= 89.095	P(N>=r)	= .12314
	99%	= 23.880	75%	= 95.897	10%	= 285.01
	95%	= 44.236	50%	= 149.66	5%	= 329.74
	90%	= 60.088	25%	= 216.22	1%	= 420.64
36	MEAN	= 155.46	S.D.	= 84.791	P(N>=r)	= .10510
	99%	= 23.047	75%	= 91.313	10%	= 271.16
	95%	= 42.442	50%	= 142.17	5%	= 314.03
	90%	= 57.468	25%	= 205.43	1%	= 401.37
37	MEAN	= 148.10	S.D.	= 80.769	P(N>=r)	= .88531E-01
	99%	= 22.270	75%	= 87.095	10%	= 258.28
	95%	= 40.778	50%	= 135.26	5%	= 299.39
	90%	= 55.048	25%	= 195.44	1%	= 383.33
38	MEAN	= 141.29	S.D.	= 77.013	P(N>=r)	= .73531E-01
	99%	= 21.545	75%	= 83.218	10%	= 246.30
	95%	= 39.239	50%	= 128.91	5%	= 285.74
	90%	= 52.817	25%	= 186.20	1%	= 366.44
39	MEAN	= 135.00	S.D.	= 73.507	P(N>=r)	= .60170E-01

99%	= 20.870	75%	= 79.659	10%	= 235.18
95%	= 37.818	50%	= 123.06	5%	= 273.02
90%	= 50.762	25%	= 177.66	1%	= 350.63

E) The mean of the potential = 22069.

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5A19501
PLAY	Whitehorse Lewes River Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	WED, FEB 1, 1995, 11:17 AM

A) Risks

	GEOLOGICAL FACTOR			MARGINAL PROBABILITY
PLAY LEVEL	Presence of Porosity	(3)		.50
	Overall Play Level Risk		=	.50
PROSPECT LEVEL	Presence of Closure	(1)		.50
	Presence of Reservoir Facies	(2)		.80
	Adequate Seal	(4)		.50
	Adequate Timing	(5)		.50
	Adequate Source	(6)		.80
	Adequate Maturation	(7)		.90
	Adequate Preservation	(8)		.33
	Overall Prospect Level Risk		=	.02
EXPLORATION RISK:			=	.01

B) No. of Prospects Distribution

Minimum	=	80
Maximum	=	1600
Mean	=	816.89
S.D.	=	443.01

Frequency	No. of Prospects
99.00	80
95	139
90	213
80	360
75	433

60	654
50	800
40	960
25	1200
20	1280
10	1440
5	1520
1	1584
0	1600

C) No. of Pools Distribution

Minimum = 0
Maximum = 61
Mean = 9.70
S.D. = 12.61

Frequency	No. of Pools
49.72	0
40	8
25	19
20	22
10	30
5	35
1	42
0	61

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5A19501
PLAY	Whitehorse Lewes River Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	ph
Remarks	Intermontane Oil & Gas Assessment Project ph
Run date	TUE, FEB 28, 1995, 11:14 AM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu	= 8.6523	MEAN	= 10533.		
	sig. sq	= 1.2200	S.D.	= 16275.		
Upper Percentiles	99.99%	= 94.118	60.00%	= 4326.4	15.00%	= 17981.
	99.00%	= 438.25	55.00%	= 4981.6	10.00%	= 23572.
	95.00%	= 930.31	50.00%	= 5723.4	8.00%	= 27018.
	90.00%	= 1389.6	45.00%	= 6575.5	6.00%	= 31876.
	85.00%	= 1821.7	40.00%	= 7571.5	5.00%	= 35211.
	80.00%	= 2259.1	35.00%	= 8759.7	4.00%	= 39577.
	75.00%	= 2717.1	30.00%	= 10214.	2.00%	= 55312.
	70.00%	= 3207.0	25.00%	= 12056.	1.00%	= 74745.
	65.00%	= 3739.5	20.00%	= 14500.	.01%	= .34804E+06

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 61
Expectation = 9.70
Standard Deviation= 12.61

D) Pool Sizes By Rank

Pool Rank			Distribution			
1	MEAN	= 50289.	S.D.	= 43669.	P(N>=r)	= .49723
	99%	= 3766.6	75%	= 24707.	10%	= 95042.
	95%	= 9780.9	50%	= 39662.	5%	= .12453E+06
	90%	= 14592.	25%	= 62180.	1%	= .21474E+06
2	MEAN	= 27784.	S.D.	= 17898.	P(N>=r)	= .48974
	99%	= 2002.7	75%	= 15546.	10%	= 49739.
	95%	= 5523.3	50%	= 24694.	5%	= 60331.
	90%	= 8673.5	25%	= 36062.	1%	= 87608.
3	MEAN	= 20226.	S.D.	= 12036.	P(N>=r)	= .47838

	99%	= 1438.0	75%	= 11611.	10%	= 35576.
	95%	= 3914.7	50%	= 18643.	5%	= 42017.
	90%	= 6259.5	25%	= 26696.	1%	= 57399.
4	MEAN	= 16175.	S.D.	= 9301.3	P(N>=r)	= .46502
	99%	= 1176.4	75%	= 9354.1	10%	= 28221.
	95%	= 3109.2	50%	= 15162.	5%	= 32881.
	90%	= 4972.7	25%	= 21542.	1%	= 43533.
5	MEAN	= 13564.	S.D.	= 7655.4	P(N>=r)	= .45092
	99%	= 1021.5	75%	= 7860.9	10%	= 23563.
	95%	= 2620.3	50%	= 12830.	5%	= 27230.
	90%	= 4163.8	25%	= 18166.	1%	= 35370.
6	MEAN	= 11704.	S.D.	= 6530.4	P(N>=r)	= .43664
	99%	= 913.89	75%	= 6784.1	10%	= 20282.
	95%	= 2282.5	50%	= 11127.	5%	= 23312.
	90%	= 3597.2	25%	= 15736.	1%	= 29899.
7	MEAN	= 10295.	S.D.	= 5700.4	P(N>=r)	= .42232
	99%	= 832.17	75%	= 5963.6	10%	= 17814.
	95%	= 2030.1	50%	= 9815.7	5%	= 20400.
	90%	= 3172.6	25%	= 13878.	1%	= 25929.
8	MEAN	= 9180.2	S.D.	= 5056.2	P(N>=r)	= .40799
	99%	= 766.85	75%	= 5314.3	10%	= 15873.
	95%	= 1832.3	50%	= 8767.2	5%	= 18129.
	90%	= 2840.2	25%	= 12400.	1%	= 22891.
9	MEAN	= 8272.2	S.D.	= 4537.7	P(N>=r)	= .39367
	99%	= 712.89	75%	= 4786.0	10%	= 14296.
	95%	= 1672.1	50%	= 7905.7	5%	= 16297.
	90%	= 2571.8	25%	= 11188.	1%	= 20476.
10	MEAN	= 7514.9	S.D.	= 4108.8	P(N>=r)	= .37936
	99%	= 667.24	75%	= 4346.8	10%	= 12984.
	95%	= 1539.1	50%	= 7182.9	5%	= 14780.
	90%	= 2349.6	25%	= 10173.	1%	= 18501.
11	MEAN	= 6871.6	S.D.	= 3746.6	P(N>=r)	= .36506
	99%	= 627.90	75%	= 3975.2	10%	= 11870.
	95%	= 1426.4	50%	= 6566.1	5%	= 13498.
	90%	= 2162.4	25%	= 9306.1	1%	= 16850.
12	MEAN	= 6316.9	S.D.	= 3435.7	P(N>=r)	= .35077
	99%	= 593.48	75%	= 3656.1	10%	= 10910.
	95%	= 1329.4	50%	= 6032.5	5%	= 12398.
	90%	= 2002.0	25%	= 8555.9	1%	= 15444.
13	MEAN	= 5832.7	S.D.	= 3165.1	P(N>=r)	= .33651
	99%	= 563.01	75%	= 3378.7	10%	= 10072.
	95%	= 1244.9	50%	= 5565.5	5%	= 11441.
	90%	= 1862.7	25%	= 7898.6	1%	= 14230.
14	MEAN	= 5405.6	S.D.	= 2927.0	P(N>=r)	= .32229
	99%	= 535.74	75%	= 3134.7	10%	= 9332.5
	95%	= 1170.3	50%	= 5152.8	5%	= 10599.
	90%	= 1740.4	25%	= 7316.9	1%	= 13168.
15	MEAN	= 5025.3	S.D.	= 2715.6	P(N>=r)	= .30812

	99%	= 511.09	75%	= 2918.1	10%	= 8674.3
	95%	= 1103.8	50%	= 4784.7	5%	= 9851.6
	90%	= 1631.7	25%	= 6797.7	1%	= 12231.
16	MEAN	= 4684.0	S.D.	= 2526.4	P(N>=r)	= .29402
	99%	= 488.60	75%	= 2723.9	10%	= 8083.9
	95%	= 1043.8	50%	= 4453.9	5%	= 9182.2
	90%	= 1534.2	25%	= 6330.8	1%	= 11396.
17	MEAN	= 4375.6	S.D.	= 2356.0	P(N>=r)	= .27999
	99%	= 467.88	75%	= 2548.5	10%	= 7550.6
	95%	= 989.29	50%	= 4154.7	5%	= 8578.8
	90%	= 1445.9	25%	= 5908.4	1%	= 10647.
18	MEAN	= 4095.1	S.D.	= 2201.7	P(N>=r)	= .26606
	99%	= 448.62	75%	= 2388.9	10%	= 7066.2
	95%	= 939.18	50%	= 3882.5	5%	= 8031.5
	90%	= 1365.2	25%	= 5524.2	1%	= 9969.8
19	MEAN	= 3838.8	S.D.	= 2061.3	P(N>=r)	= .25223
	99%	= 430.56	75%	= 2242.7	10%	= 6624.1
	95%	= 892.77	50%	= 3633.5	5%	= 7532.7
	90%	= 1290.8	25%	= 5172.8	1%	= 9354.8
20	MEAN	= 3603.4	S.D.	= 1932.9	P(N>=r)	= .23849
	99%	= 413.51	75%	= 2108.1	10%	= 6218.6
	95%	= 849.49	50%	= 3404.8	5%	= 7075.9
	90%	= 1221.9	25%	= 4850.0	1%	= 8793.3
21	MEAN	= 3386.5	S.D.	= 1815.2	P(N>=r)	= .22486
	99%	= 397.32	75%	= 1983.8	10%	= 5845.0
	95%	= 808.92	50%	= 3194.0	5%	= 6656.3
	90%	= 1157.7	25%	= 4552.5	1%	= 8278.5
22	MEAN	= 3185.9	S.D.	= 1706.9	P(N>=r)	= .21135
	99%	= 381.91	75%	= 1868.4	10%	= 5499.7
	95%	= 770.76	50%	= 2999.2	5%	= 6268.6
	90%	= 1097.7	25%	= 4277.6	1%	= 7804.9
23	MEAN	= 2999.8	S.D.	= 1606.9	P(N>=r)	= .19795
	99%	= 367.18	75%	= 1761.2	10%	= 5180.2
	95%	= 734.75	50%	= 2818.5	5%	= 5909.1
	90%	= 1041.5	25%	= 4022.8	1%	= 7367.8
24	MEAN	= 2827.0	S.D.	= 1514.3	P(N>=r)	= .18468
	99%	= 353.09	75%	= 1661.2	10%	= 4883.8
	95%	= 700.71	50%	= 2650.7	5%	= 5575.2
	90%	= 988.63	25%	= 3786.1	1%	= 6962.3
25	MEAN	= 2666.0	S.D.	= 1428.5	P(N>=r)	= .17156
	99%	= 339.59	75%	= 1567.9	10%	= 4608.0
	95%	= 668.47	50%	= 2494.5	5%	= 5265.2
	90%	= 938.90	25%	= 3565.9	1%	= 6585.3
26	MEAN	= 2515.9	S.D.	= 1348.7	P(N>=r)	= .15860
	99%	= 326.63	75%	= 1480.6	10%	= 4350.9
	95%	= 637.88	50%	= 2349.0	5%	= 4976.9
	90%	= 892.00	25%	= 3360.8	1%	= 6234.8
27	MEAN	= 2375.7	S.D.	= 1274.5	P(N>=r)	= .14584

	99%	= 314.18	75%	= 1398.8	10%	= 4111.0
	95%	= 608.83	50%	= 2213.3	5%	= 4708.2
	90%	= 847.74	25%	= 3169.4	1%	= 5910.4
28	MEAN	= 2244.7	S.D.	= 1205.4	P(N>=r)	= .13332
	99%	= 302.22	75%	= 1322.3	10%	= 3886.9
	95%	= 581.23	50%	= 2086.7	5%	= 4457.2
	90%	= 805.93	25%	= 2990.9	1%	= 5607.6
29	MEAN	= 2122.4	S.D.	= 1140.9	P(N>=r)	= .12106
	99%	= 290.73	75%	= 1250.6	10%	= 3677.6
	95%	= 555.00	50%	= 1968.7	5%	= 4222.4
	90%	= 766.46	25%	= 2824.2	1%	= 5321.1
30	MEAN	= 2008.1	S.D.	= 1080.7	P(N>=r)	= .10911
	99%	= 279.71	75%	= 1183.6	10%	= 3481.9
	95%	= 530.13	50%	= 1858.6	5%	= 4002.7
	90%	= 729.24	25%	= 2668.7	1%	= 5053.9
31	MEAN	= 1901.4	S.D.	= 1024.6	P(N>=r)	= .97543E-01
	99%	= 269.18	75%	= 1121.0	10%	= 3299.1
	95%	= 506.60	50%	= 1756.2	5%	= 3797.2
	90%	= 694.24	25%	= 2523.8	1%	= 4802.0
32	MEAN	= 1802.0	S.D.	= 972.10	P(N>=r)	= .86406E-01
	99%	= 259.14	75%	= 1062.7	10%	= 3128.4
	95%	= 484.41	50%	= 1661.0	5%	= 3605.0
	90%	= 661.41	25%	= 2388.8	1%	= 4567.0
33	MEAN	= 1709.5	S.D.	= 923.08	P(N>=r)	= .75774E-01
	99%	= 249.62	75%	= 1008.6	10%	= 2969.2
	95%	= 463.57	50%	= 1572.7	5%	= 3425.5
	90%	= 630.73	25%	= 2263.2	1%	= 4347.9
34	MEAN	= 1623.5	S.D.	= 877.28	P(N>=r)	= .65721E-01
	99%	= 240.63	75%	= 958.46	10%	= 2820.7
	95%	= 444.07	50%	= 1491.0	5%	= 3257.8
	90%	= 602.17	25%	= 2146.6	1%	= 4143.4
35	MEAN	= 1543.8	S.D.	= 834.50	P(N>=r)	= .56322E-01
	99%	= 232.18	75%	= 912.17	10%	= 2682.4
	95%	= 425.90	50%	= 1415.6	5%	= 3101.2
	90%	= 575.66	25%	= 2038.4	1%	= 3952.3

E) The mean of the potential = .10193E+06

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5A59501
PLAY	Whitehorse Tantalus Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	MON, FEB 27, 1995, 3:53 PM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk	=	1.00
PROSPECT LEVEL	Presence of Closure	(1)	.90
	Presence of Reservoir Facies	(2)	.80
	Adequate Seal	(4)	.90
	Adequate Timing	(5)	.50
	Adequate Source	(6)	.80
	Adequate Preservation	(8)	.33
	Overall Prospect Level Risk	=	.09
EXPLORATION RISK:		=	.09

B) No. of Prospects Distribution

Minimum	=	25
Maximum	=	100
Mean	=	56.62
S.D.	=	22.08

Frequency	No. of Prospects
99.00	25
95	28
90	30
80	35
75	38
60	45
50	50

40	60
25	75
20	80
10	90
5	95
1	99
0	100

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	22
Mean	=	4.84
S.D.	=	2.83

Frequency	No. of Pools
97.77	0
95	1
90	2
80	2
75	3
60	4
50	4
40	5
25	7
20	7
10	9
5	10
1	13
0	22

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5A59501
PLAY	Whitehorse Tantalus Structural Gas Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	TUE, FEB 28, 1995, 8:16 AM

A) Basic Information

TYPE OF RESOURCE =Gas In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = 4.1733	MEAN = 280.84	
	sig. sq= 2.9290	S.D. = 1181.9	
Upper Percentiles	99.99% = .11174	60.00% = 42.085	15.00% = 382.63
	99.00% = 1.2115	55.00% = 52.363	10.00% = 582.06
	95.00% = 3.8892	50.00% = 64.928	8.00% = 719.08
	90.00% = 7.2425	45.00% = 80.506	6.00% = 929.06
	85.00% = 11.017	40.00% = 100.17	5.00% = 1083.9
	80.00% = 15.377	35.00% = 125.55	4.00% = 1299.2
	75.00% = 20.469	30.00% = 159.29	2.00% = 2182.3
	70.00% = 26.464	25.00% = 205.95	1.00% = 3479.6
	65.00% = 33.576	20.00% = 274.15	.01% = 37728.

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 22
Expectation = 4.84
Standard Deviation= 2.83

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 953.86	S.D. = 2482.0	P(N>=r)= .97771
	99% = 8.0240	75% = 159.67	10% = 2080.4
	95% = 32.968	50% = 396.56	5% = 3396.2
	90% = 62.845	25% = 942.72	1% = 8875.2
2	MEAN = 251.83	S.D. = 378.14	P(N>=r)= .90522
	99% = 2.9342	75% = 56.315	10% = 581.17
	95% = 11.045	50% = 138.83	5% = 849.75
	90% = 21.326	25% = 303.11	1% = 1729.7
3	MEAN = 123.80	S.D. = 162.75	P(N>=r)= .78241

	99%	= 1.7491	75%	= 29.226	10%	= 289.03
	95%	= 5.9617	50%	= 72.560	5%	= 408.84
	90%	= 11.172	25%	= 156.40	1%	= 766.51
4	MEAN	= 75.722	S.D.	= 93.799	P(N>=r)	= .63463
	99%	= 1.2742	75%	= 18.614	10%	= 177.11
	95%	= 4.0524	50%	= 45.652	5%	= 246.69
	90%	= 7.3536	25%	= 97.492	1%	= 444.62
5	MEAN	= 51.871	S.D.	= 61.823	P(N>=r)	= .48901
	99%	= 1.0206	75%	= 13.330	10%	= 120.91
	95%	= 3.0895	50%	= 31.958	5%	= 166.83
	90%	= 5.4589	25%	= 67.374	1%	= 293.79
6	MEAN	= 37.993	S.D.	= 43.974	P(N>=r)	= .36113
	99%	= .85679	75%	= 10.199	10%	= 88.042
	95%	= 2.4968	50%	= 23.848	5%	= 120.69
	90%	= 4.3166	25%	= 49.559	1%	= 209.33
7	MEAN	= 29.077	S.D.	= 32.866	P(N>=r)	= .25611
	99%	= .73789	75%	= 8.1213	10%	= 66.936
	95%	= 2.0841	50%	= 18.547	5%	= 91.305
	90%	= 3.5378	25%	= 38.003	1%	= 156.70
8	MEAN	= 22.987	S.D.	= 25.464	P(N>=r)	= .17384
	99%	= .64647	75%	= 6.6533	10%	= 52.557
	95%	= 1.7780	50%	= 14.871	5%	= 71.409
	90%	= 2.9717	25%	= 30.070	1%	= 121.59
9	MEAN	= 18.661	S.D.	= 20.298	P(N>=r)	= .11234
	99%	= .57454	75%	= 5.5801	10%	= 42.375
	95%	= 1.5445	50%	= 12.232	5%	= 57.372
	90%	= 2.5472	25%	= 24.422	1%	= 97.059
10	MEAN	= 15.501	S.D.	= 16.569	P(N>=r)	= .68764E-01
	99%	= .51728	75%	= 4.7781	10%	= 34.955
	95%	= 1.3636	50%	= 10.290	5%	= 47.164
	90%	= 2.2231	25%	= 20.293	1%	= 79.324

E) The mean of the potential = 1359.2

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5A69501
PLAY	Whitehorse Tantalus Structural Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	TUE, FEB 28, 1995, 9:04 AM

A) Risks

	GEOLOGICAL FACTOR			MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk		=	1.00
PROSPECT LEVEL	Presence of Closure	(1)		.90
	Presence of Reservoir Facies	(2)		.80
	Adequate Seal	(4)		.70
	Adequate Timing	(5)		.50
	Adequate Source	(6)		.80
	Adequate Preservation	(8)		.33
	Overall Prospect Level Risk		=	.07
EXPLORATION RISK:			=	.07

B) No. of Prospects Distribution

Minimum	=	1
Maximum	=	10
Mean	=	7.21
S.D.	=	2.74

Frequency	No. of Prospects
99.00	1
95	2
90	3
80	4
75	5
60	7
50	8

40	9
25	9
20	10
10	10
5	10
1	10
0	10

C) No. of Pools Distribution

Minimum = 0
Maximum = 6
Mean = .48
S.D. = .69

Frequency	No. of Pools
37.99	0
25	1
20	1
10	1
5	2
1	3
0	6

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5A69501
PLAY	Whitehorse Tantalus Structural Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	TUE, FEB 28, 1995, 9:23 AM

A) Basic Information

TYPE OF RESOURCE =Oil In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary Statistics	mu = .86504 sig. sq= .88394	MEAN = 3.6951 S.D. = 4.4039	
Upper Percentiles	99.99% = .71969E-01	60.00% = 1.8717	15.00% = 6.2932
	99.00% = .26656	55.00% = 2.1104	10.00% = 7.9243
	95.00% = .50590	50.00% = 2.3751	8.00% = 8.9001
	90.00% = .71187	45.00% = 2.6730	6.00% = 10.245
	85.00% = .89637	40.00% = 3.0139	5.00% = 11.151
	80.00% = 1.0765	35.00% = 3.4120	4.00% = 12.317
	75.00% = 1.2597	30.00% = 3.8887	2.00% = 16.378
	70.00% = 1.4506	25.00% = 4.4780	1.00% = 21.163
	65.00% = 1.6533	20.00% = 5.2400	.01% = 78.382

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 6
Expectation = .48
Standard Deviation= .69

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 4.1537	S.D. = 4.7694	P(N>=r)= .37994
	99% = .29170	75% = 1.4480	10% = 8.8575
	95% = .56565	50% = 2.7395	5% = 12.319
	90% = .80556	25% = 5.1003	1% = 22.934
2	MEAN = 2.0386	S.D. = 1.7310	P(N>=r)= .85386E-01
	99% = .22256	75% = .91034	10% = 4.0661
	95% = .40343	50% = 1.5584	5% = 5.2751
	90% = .54994	25% = 2.6053	1% = 8.5229

E) The mean of the potential = 1.7522

PETRIMES MODULE MPRO

NO. OF POOLS DISTRIBUTION AND RISKS
****

UAI	C5A39501
PLAY	Whitehorse Takwahoni Structural Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	MON, FEB 27, 1995, 1:14 PM

A) Risks

	GEOLOGICAL FACTOR		MARGINAL PROBABILITY
PLAY LEVEL	Overall Play Level Risk	=	1.00
PROSPECT LEVEL	Presence of Closure	(1)	.50
	Presence of Reservoir Facies	(2)	.50
	Adequate Seal	(4)	.50
	Adequate Maturation	(7)	.90
	Adequate Preservation	(8)	.33
	Overall Prospect Level Risk	=	.04
EXPLORATION RISK:		=	.04

B) No. of Prospects Distribution

Minimum = 10
Maximum = 150
Mean = 77.67
S.D. = 40.81

Frequency	No. of Prospects
99.00	10
95	16
90	22
80	36
75	42
60	62
50	75

40	90
25	113
20	120
10	135
5	143
1	149
0	150

C) No. of Pools Distribution

Minimum	=	0
Maximum	=	17
Mean	=	2.88
S.D.	=	2.25

Frequency	No. of Pools
86.11	0
80	1
75	1
60	2
50	2
40	3
25	4
20	5
10	6
5	7
1	9
0	17

PETRIMES MODULE PSRK

INDIVIDUAL POOL SIZES BY RANK
WHERE N IS A RANDOM VARIABLE
****

UAI	C5A39501
PLAY	Whitehorse Takwahoni Structural Oil Play
Assessor	Peter Hannigan
Geologist	Peter Hannigan
Operator	PH
Remarks	Intermontane Oil & Gas Assessment Project PH
Run date	MON, FEB 27, 1995, 1:29 PM

A) Basic Information

TYPE OF RESOURCE =Oil In Place
SYSTEM OF MEASUREMENT =S.I.
UNIT OF MEASUREMENT =M cu m (19)

B) Lognormal Pool Size Distribution

Summary	mu = .86886	MEAN = 4.6011			
Statistics	sig. sq= 1.3149	S.D. = 7.5943			
Upper	99.99% = .33519E-01	60.00% = 1.7831	15.00% = 7.8249		
Percentiles	99.00% = .16551	55.00% = 2.0643	10.00% = 10.365		
	95.00% = .36159	50.00% = 2.3842	8.00% = 11.942		
	90.00% = .54845	45.00% = 2.7537	6.00% = 14.178		
	85.00% = .72645	40.00% = 3.1879	5.00% = 15.721		
	80.00% = .90828	35.00% = 3.7088	4.00% = 17.749		
	75.00% = 1.1001	30.00% = 4.3500	2.00% = 25.125		
	70.00% = 1.3068	25.00% = 5.1670	1.00% = 34.344		
	65.00% = 1.5327	20.00% = 6.2584	.01% = 169.59		

C) No. of Pools Distribution

Lower Support = 0
Upper Support = 17
Expectation = 2.88
Standard Deviation= 2.25

D) Pool Sizes By Rank

Pool Rank		Distribution	
1	MEAN = 9.3263	S.D. = 11.945	P(N>=r)= .86114
	99% = .34025	75% = 2.9530	10% = 20.066
	95% = .87714	50% = 5.9591	5% = 28.408
	90% = 1.4230	25% = 11.338	1% = 55.664
2	MEAN = 4.0267	S.D. = 3.8102	P(N>=r)= .67701
	99% = .21978	75% = 1.5437	10% = 8.4158
	95% = .50804	50% = 2.9711	5% = 11.049
	90% = .78482	25% = 5.2549	1% = 18.293
3	MEAN = 2.5434	S.D. = 2.1844	P(N>=r)= .49972

	99%	= .17090	75%	= 1.0469	10%	= 5.2217
	95%	= .37169	50%	= 1.9551	5%	= 6.6901
	90%	= .55576	25%	= 3.3665	1%	= 10.462
4	MEAN	= 1.8382	S.D.	= 1.4976	P(N>=r)	= .34604
	99%	= .14274	75%	= .79260	10%	= 3.7220
	95%	= .29797	50%	= 1.4426	5%	= 4.7123
	90%	= .43532	25%	= 2.4399	1%	= 7.1681
5	MEAN	= 1.4298	S.D.	= 1.1215	P(N>=r)	= .22335
	99%	= .12415	75%	= .63987	10%	= 2.8590
	95%	= .25153	50%	= 1.1385	5%	= 3.5926
	90%	= .36113	25%	= 1.8963	1%	= 5.3749
6	MEAN	= 1.1672	S.D.	= .88688	P(N>=r)	= .13368
	99%	= .11098	75%	= .53944	10%	= 2.3061
	95%	= .21974	50%	= .94082	5%	= 2.8812
	90%	= .31125	25%	= 1.5449	1%	= 4.2604
7	MEAN	= .98674	S.D.	= .72865	P(N>=r)	= .73982E-01
	99%	= .10119	75%	= .46921	10%	= 1.9271
	95%	= .19674	50%	= .80409	5%	= 2.3958
	90%	= .27569	25%	= 1.3030	1%	= 3.5094

E) The mean of the potential = 13.213

FIGURE CAPTIONS

Map 1: Bowser/Whitehorse Oil & Gas Assessment - Cretaceous/Paleogene Gas Plays (Bowser Skeena Structural, Sustut Upper Cretaceous Structural, Whitehorse Tantalus Structural, Northern Rocky Mountain Trench Sifton Structural)

Map 2: Bowser/Whitehorse Oil & Gas Assessment - Cretaceous Oil Plays (Bowser Skeena Structural, Sustut Upper Cretaceous Structural, Whitehorse Tantalus Structural)

Map 3: Bowser/Whitehorse Oil & Gas Assessment - Jurassic Plays (Bowser Mid-Jurassic-Lower Cretaceous Structural (Gas), Whitehorse Takwahoni Structural & Stratigraphic (Oil & Gas), Whitehorse Inklin Structural (Gas))

Map 4: Bowser/Whitehorse Oil & Gas Assessment - Permian & Triassic Plays (Whitehorse Lewes River Structural & Stratigraphic (Gas), Whitehorse Taku Fractured Carbonate (Gas))

Map 5: Bowser/Whitehorse Oil & Gas Assessment - Cenozoic Plays (Whitehorse Cenozoic Stratigraphic Gas)

Map 6: Bowser/Whitehorse Oil & Gas Assessment - Hydrocarbon Potential Map

Figure 1: Field size by rank diagram of Bowser Skeena Structural Gas Play

Figure 2: Field size by rank diagram of Bowser Skeena Structural Oil Play

Figure 3: Field size by rank diagram of Bowser Mid-Jurassic-Lower Cretaceous Structural Gas Play

Figure 4: Field size by rank diagram of Sustut Upper Cretaceous Structural Gas Play

Figure 5: Field size by rank diagram of Sustut Upper Cretaceous Structural Oil Play

Figure 6: Field size by rank diagram of Northern Rocky Mountain Trench Sifton Structural Gas Play

Figure 7: Field size by rank diagram of Whitehorse Takwahoni Structural Gas Play

Bowser Skeena Structural Gas Play, Bowser Basin
British Columbia, Canada

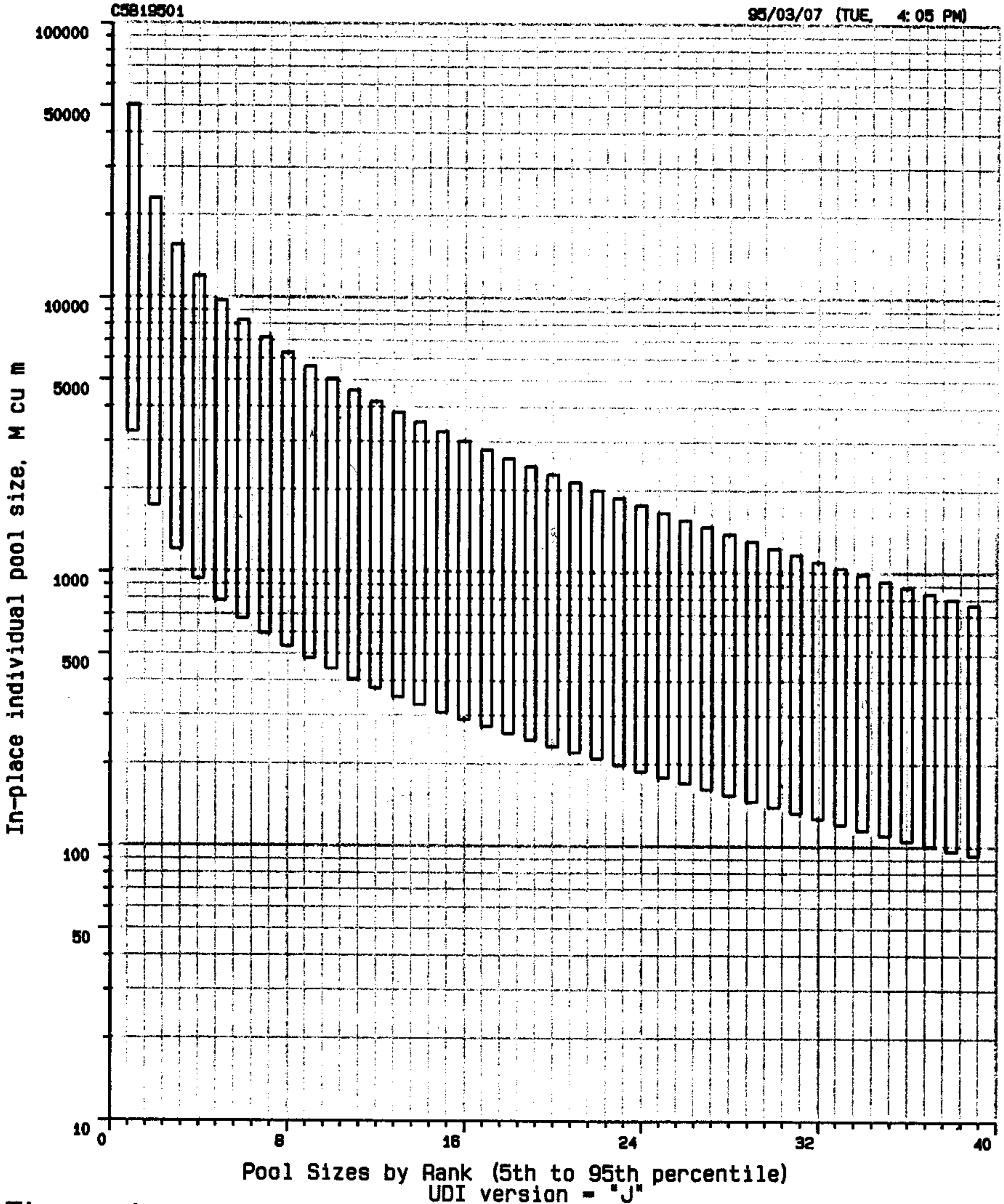


Figure 1

CPSD E(N) = 19.416487 Mu = 7.507377

E(T) = 71909.523438 Sigma sq. = 1.419330

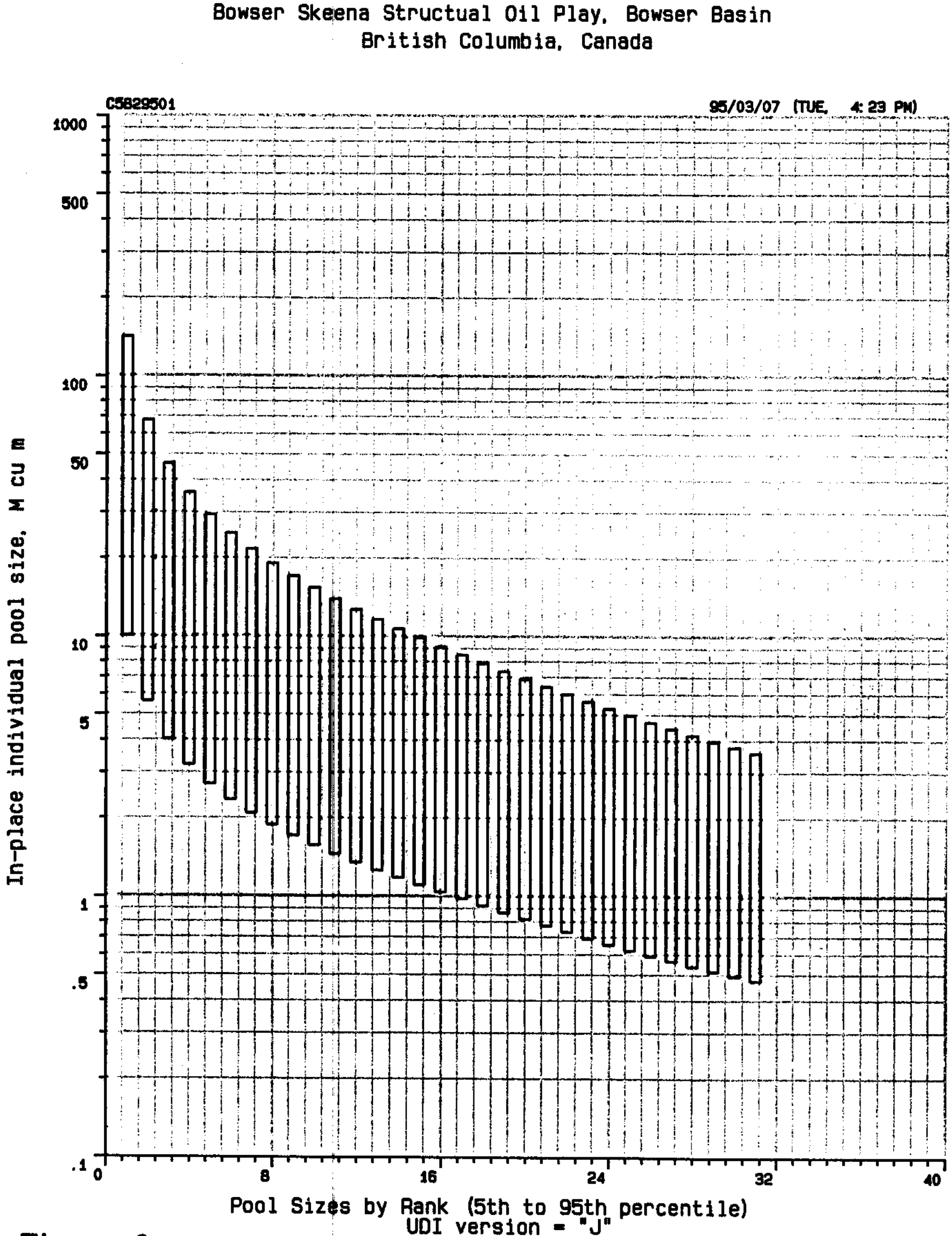


Figure 2

E[N] = 15.536951
CPSD Mu = 1.948763
E[T] = 201.247818
Sigma sq. = 1.225105

Bowser Mid-Jurassic - Lower Cretaceous Structural Gas, Bowse
British Columbia, Canada

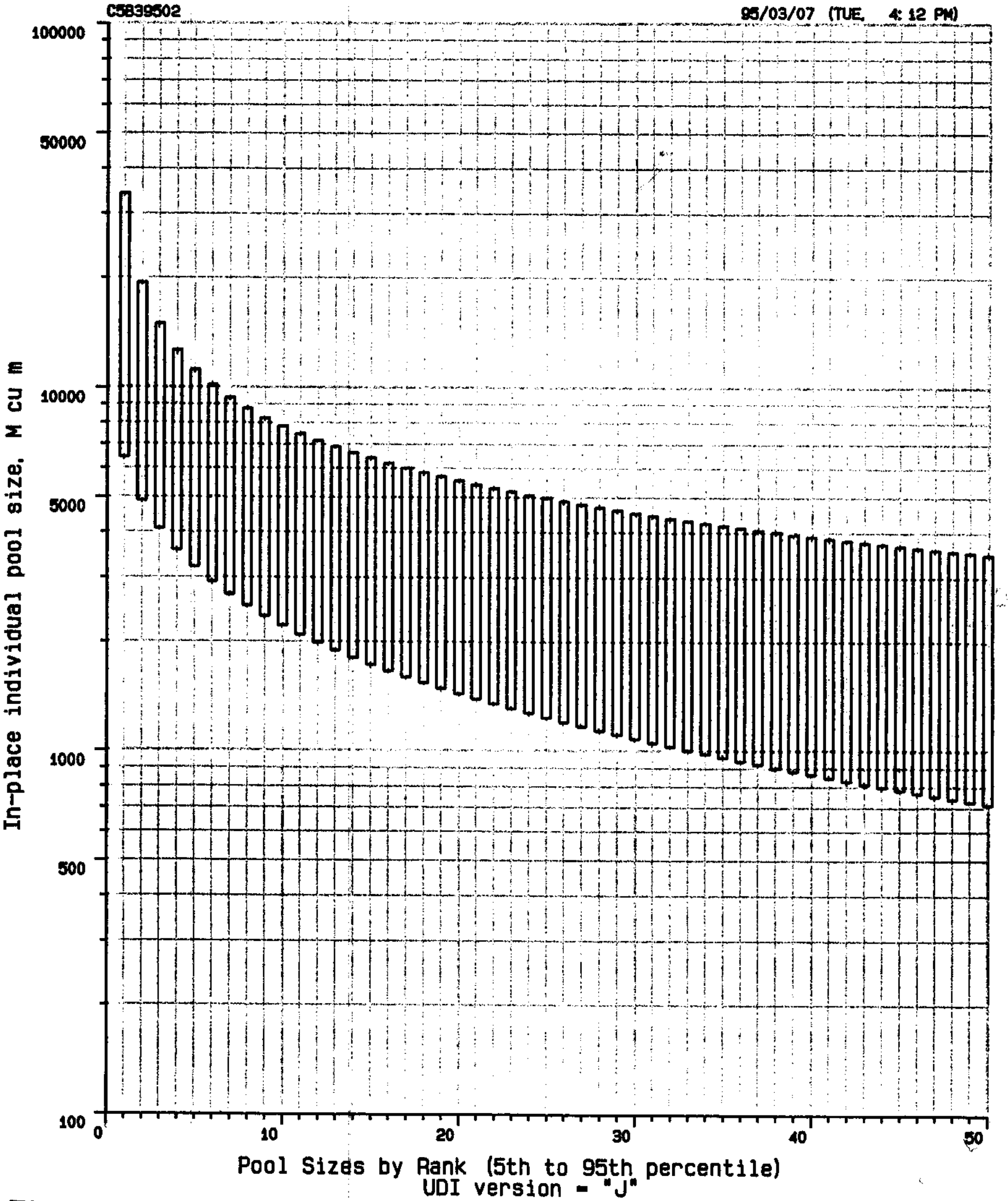


Figure 3

E(N) = 173.442871
CPSD Mu = 5.599698

E(T) = 98883.523438
Sigma sq. = 1.492303

Sustut Upper Cretaceous Structural Gas Play, Sustut Basin
British Columbia, Canada

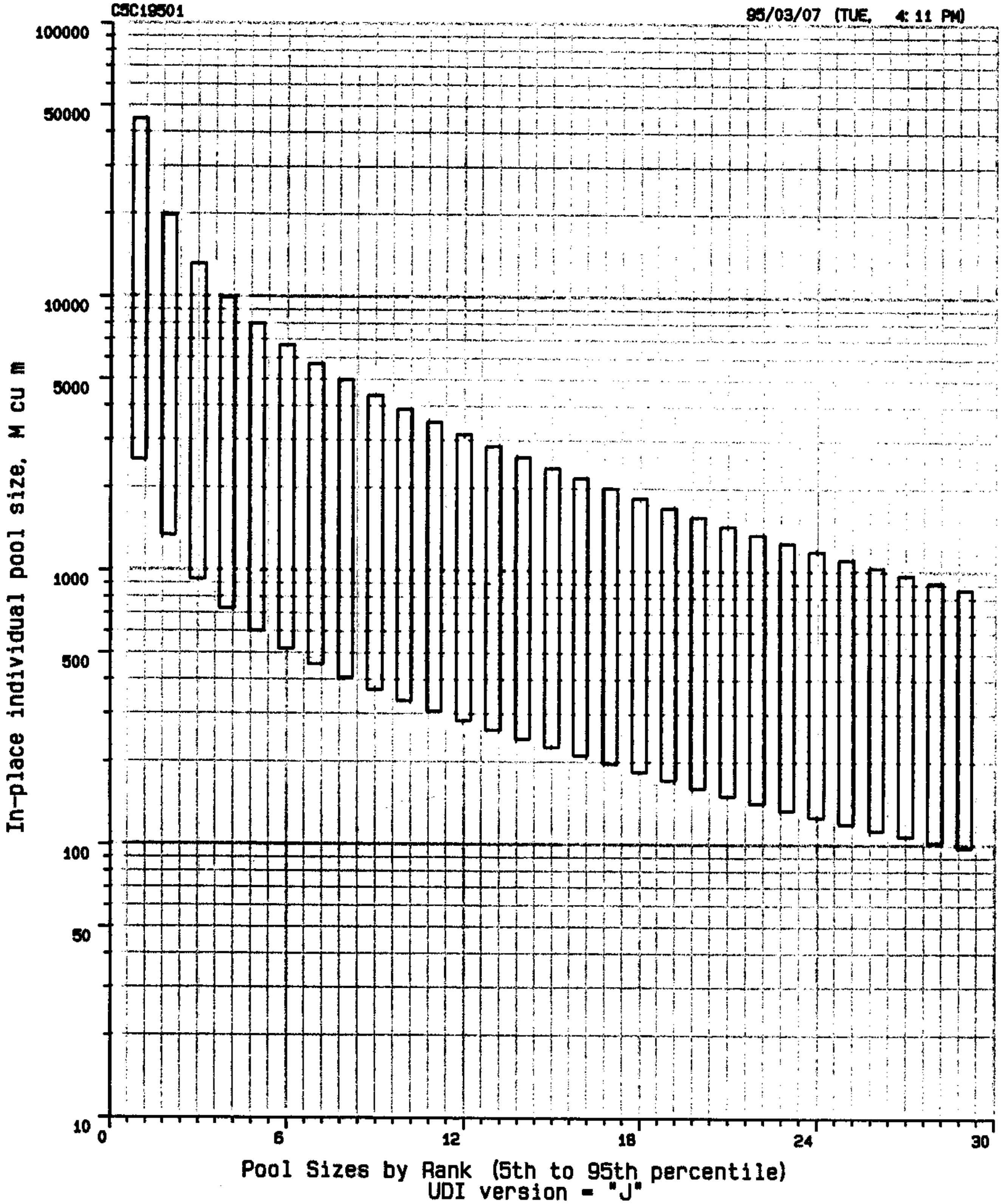


Figure 4

CPSO E(N) = 14.230968 Mu = 7.507377

E(T) = 52704.800781 Sigma sq. = 1.419330

Sustut Upper Cretaceous Structural Oil Play, Sustut Basin
British Columbia, Canada

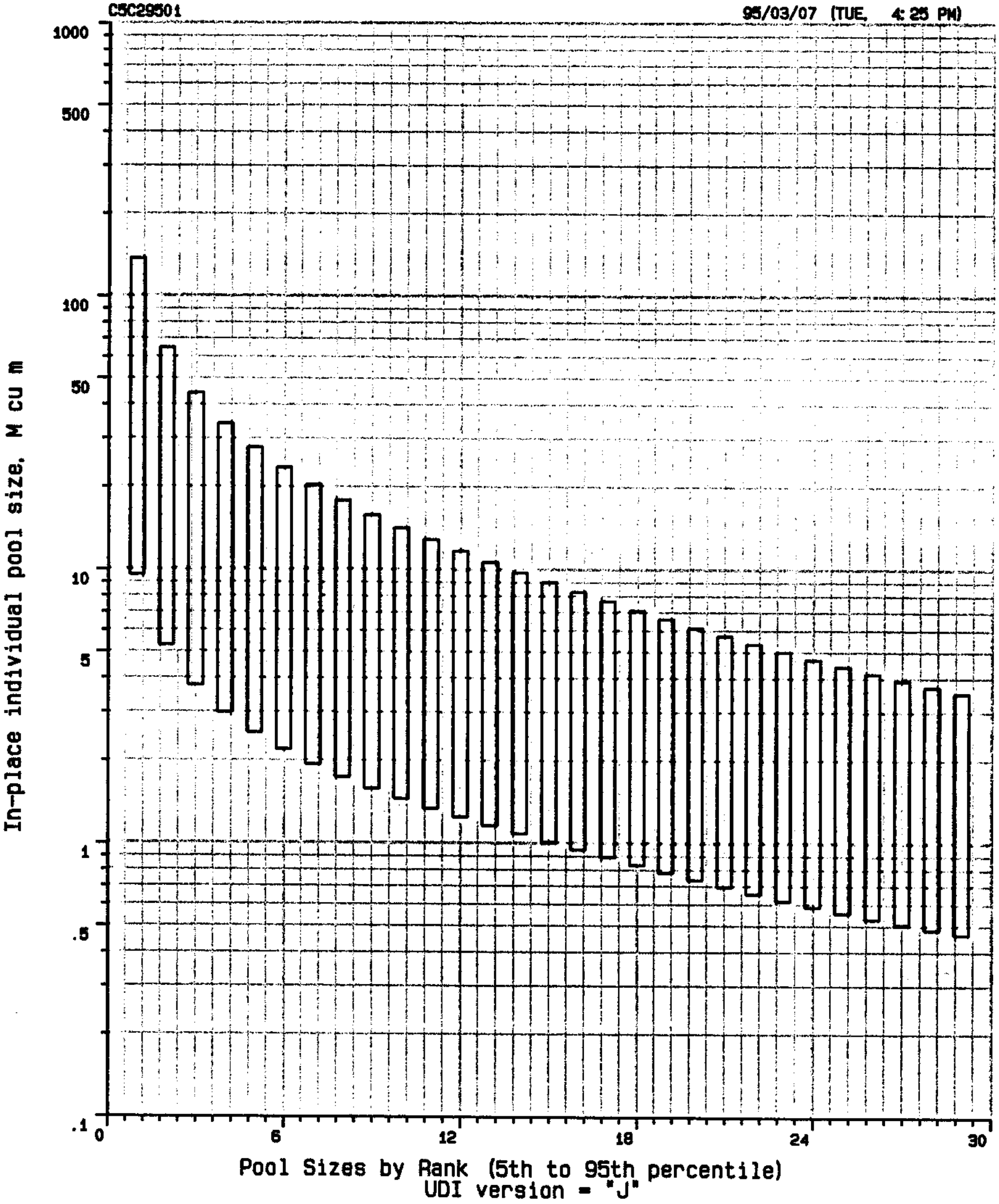


Figure 5

CPSD E(N) = 14.230968 Mu = 1.948763
E(T) = 184.331604 Sigma sq. = 1.225105

Northern Rocky Mountain Trench Sifton Structural Gas, Northe
British Columbia, Canada

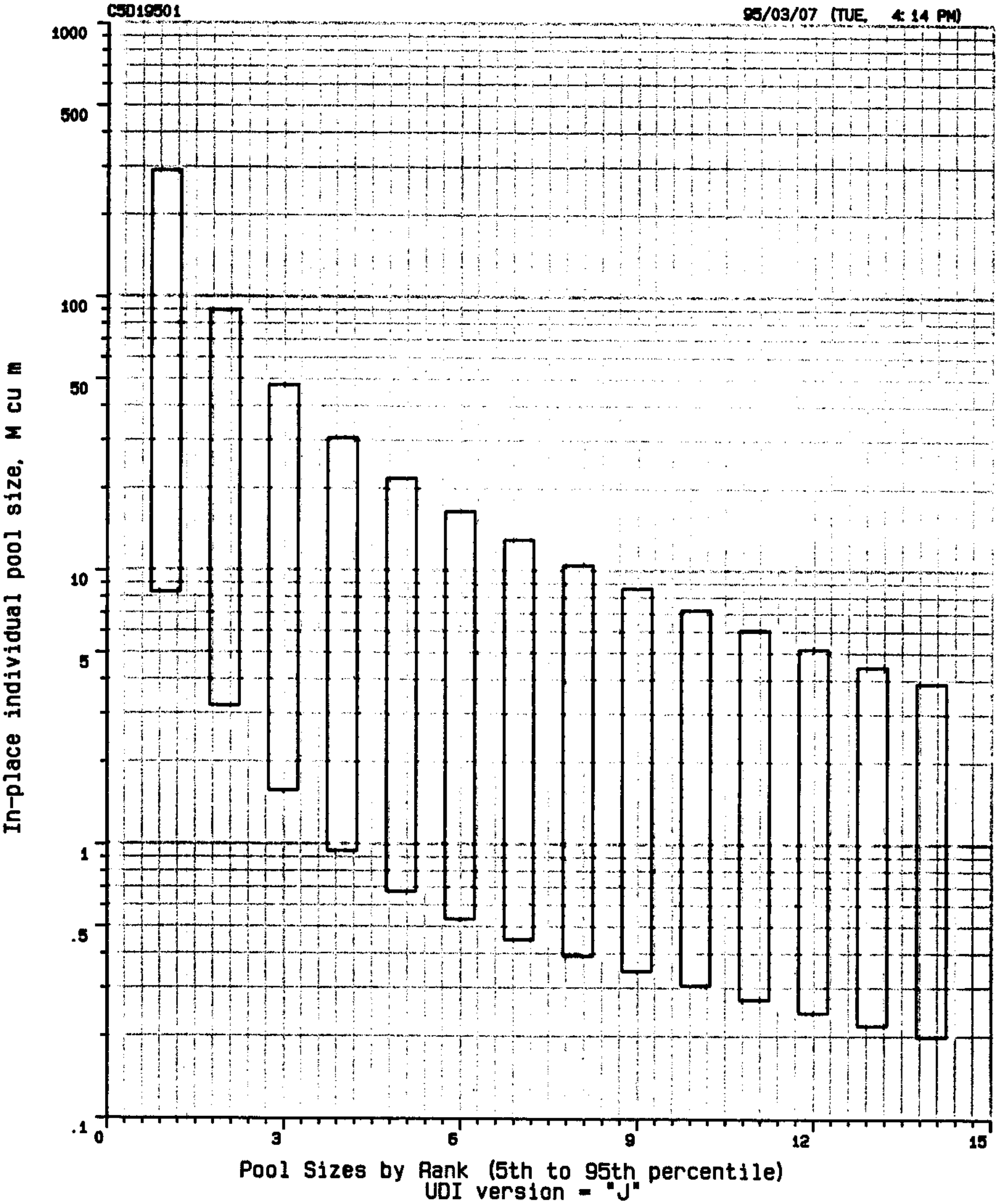
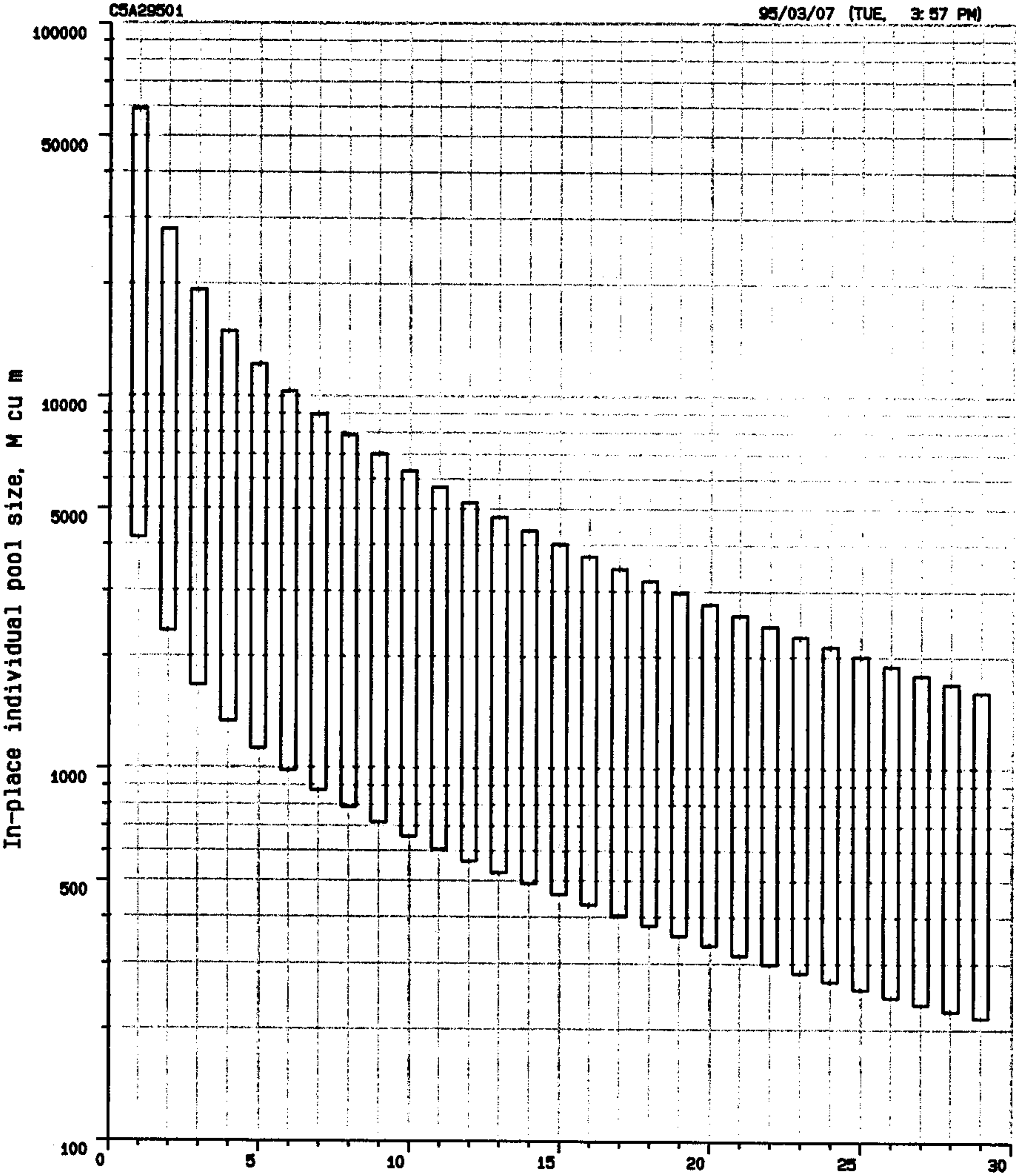


Figure 6

E[N] = 6.568875
CPSD Mu = 1.957745
E[T] = 146.440643
Sigma sq. = 2.293066

Whitehorse Takwahoni Structural Gas Play, Whitehorse Trough
British Columbia, Canada



Pool Sizes by Rank (5th to 95th percentile)
UDI version = "J"

Figure 7

CPSD E(N) = 14.249317
Mu = 8.042735

E(T) = 80818.476563
Sigma sq. = 1.201033

Whitehorse Inklin Structural Gas Play, Whitehorse Trough
British Columbia, Canada

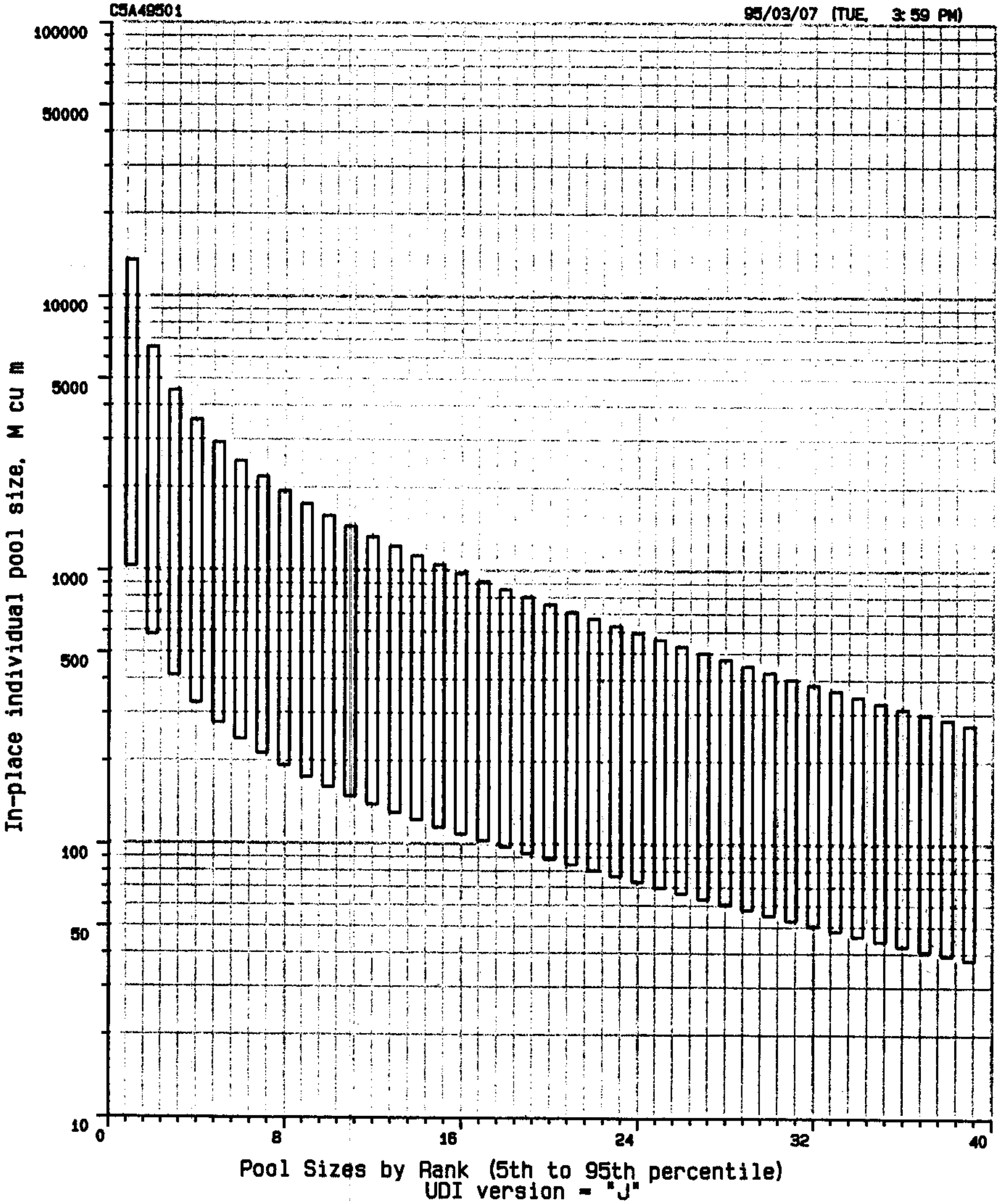


Figure 8

CPSO E(N) = 19.727917
Mu = 6.396930

E(T) = 22092.726563
Sigma sq. = 1.248079

Whitehorse Lewes River Structural Gas Play, Whitehorse Troug
British Columbia, Canada

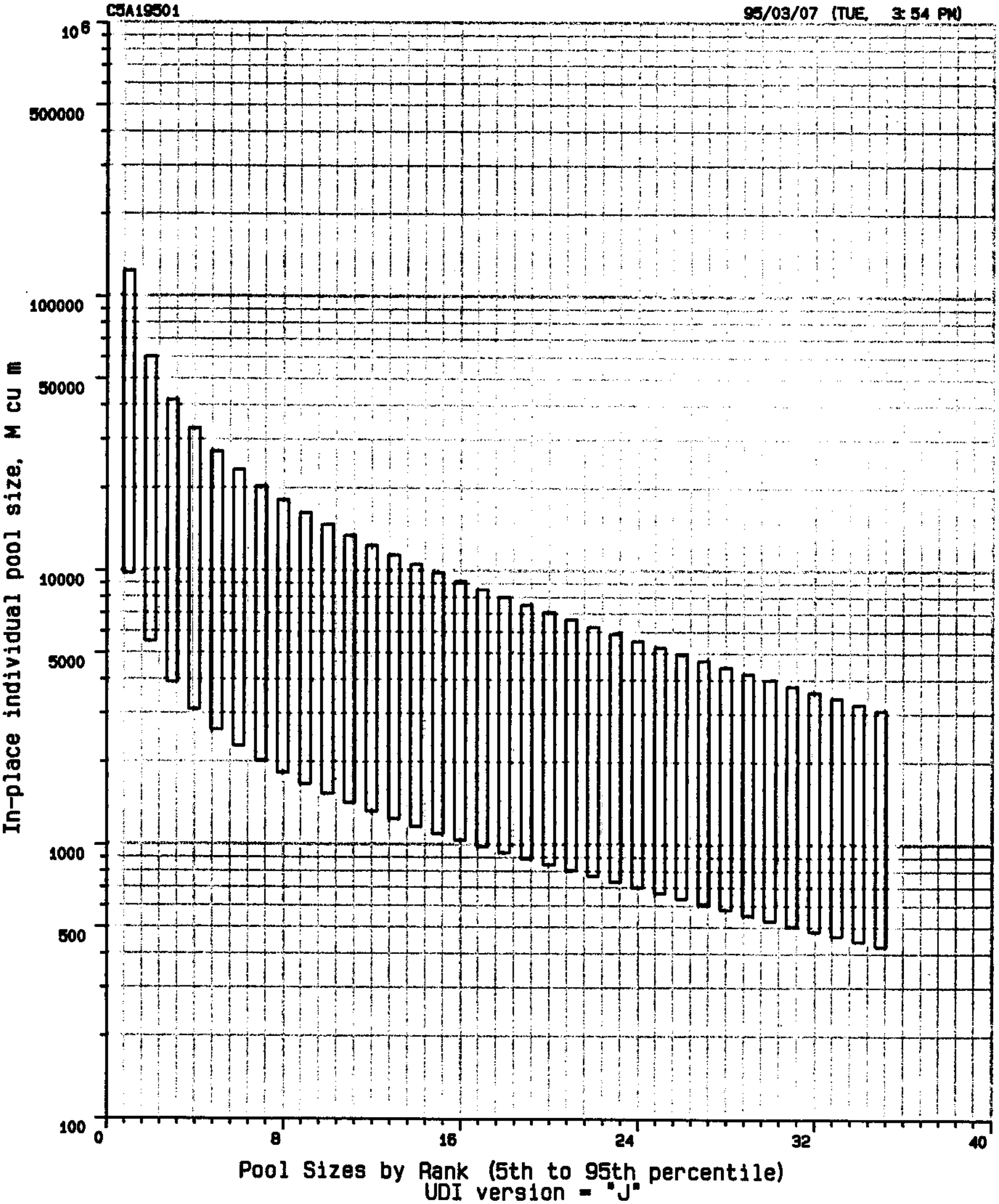


Figure 9

CPSD E(N) = 9.704713
Mu = 8.652313

E(T) = 102223.734375
Sigma sq. = 1.219989

Whitehorse Tantalus Structural Gas Play, Whitehorse Trough
British Columbia, Canada

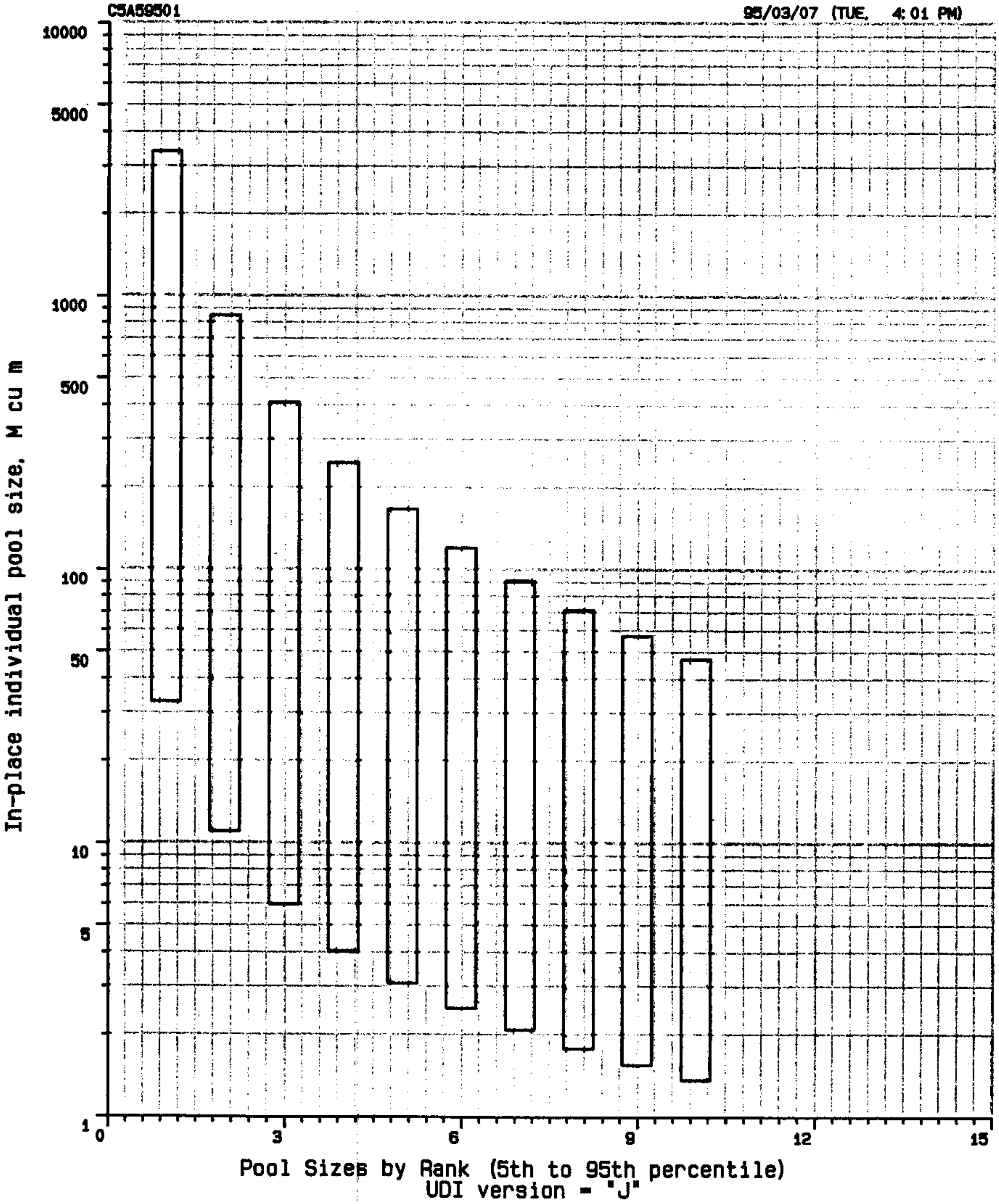


Figure 10

CPSD E(N) = 4.843048 Mu = 4.173272

E(T) = 1360.127930 Sigma sq. = 2.929036

Whitehorse Tantalus Structural Oil Play, Whitehorse Trough
British Columbia, Canada

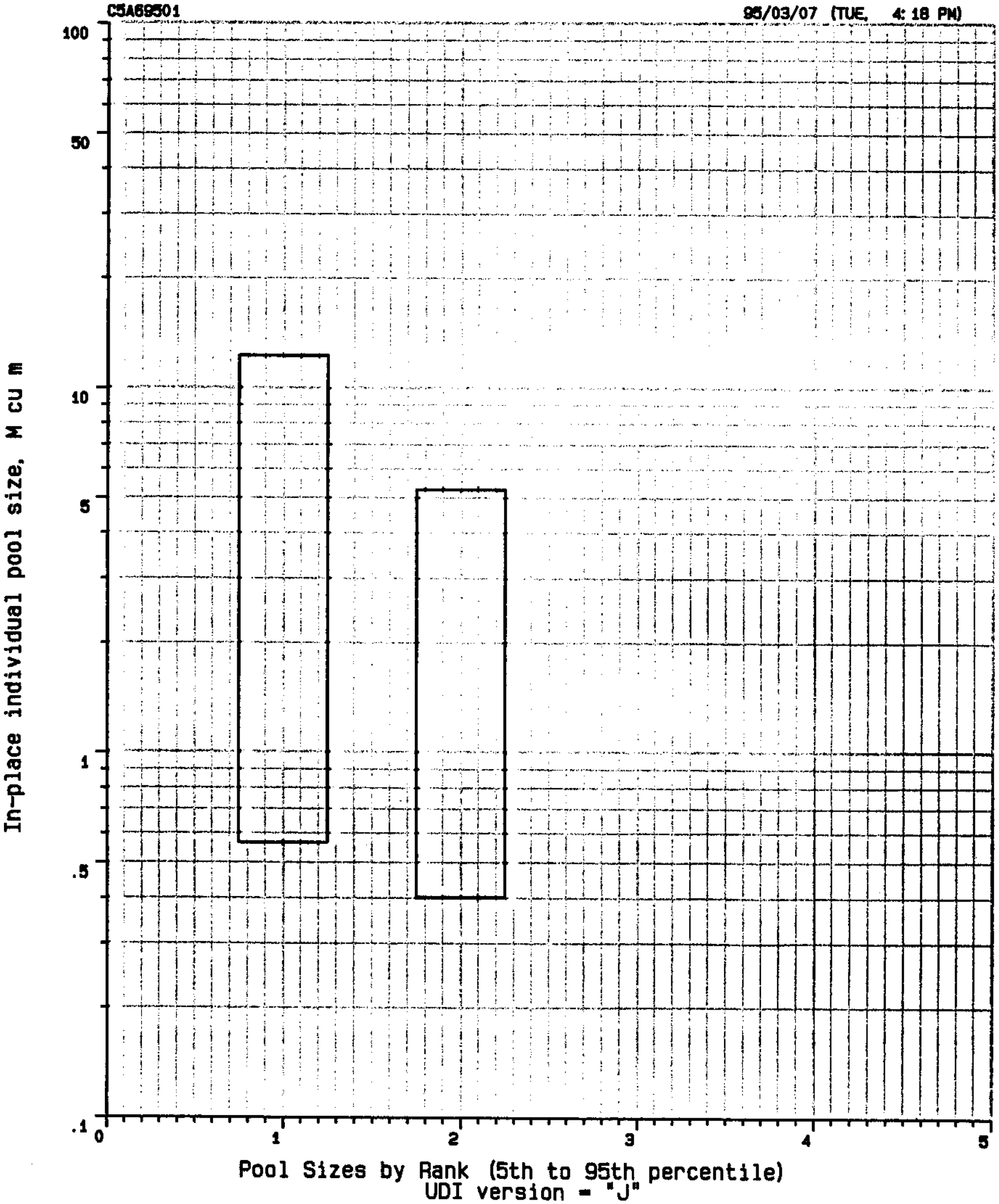


Figure 11

CPSD E(N) = .479667 MU = .885040

E(T) = 1.772425 Sigma sq. = .883945

Whitehorse Takwahoni Structural Oil Play, Whitehorse Trough
British Columbia, Canada

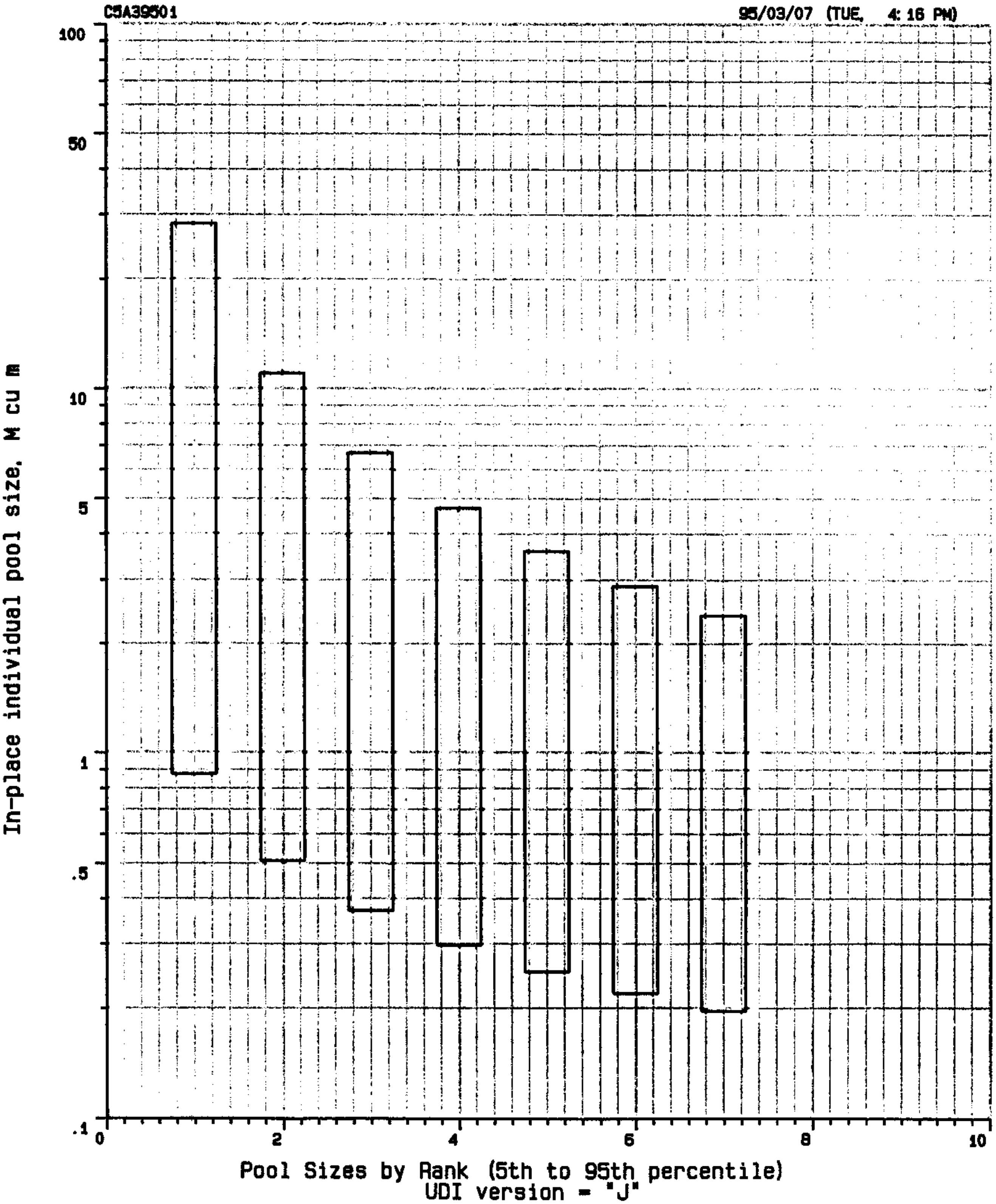
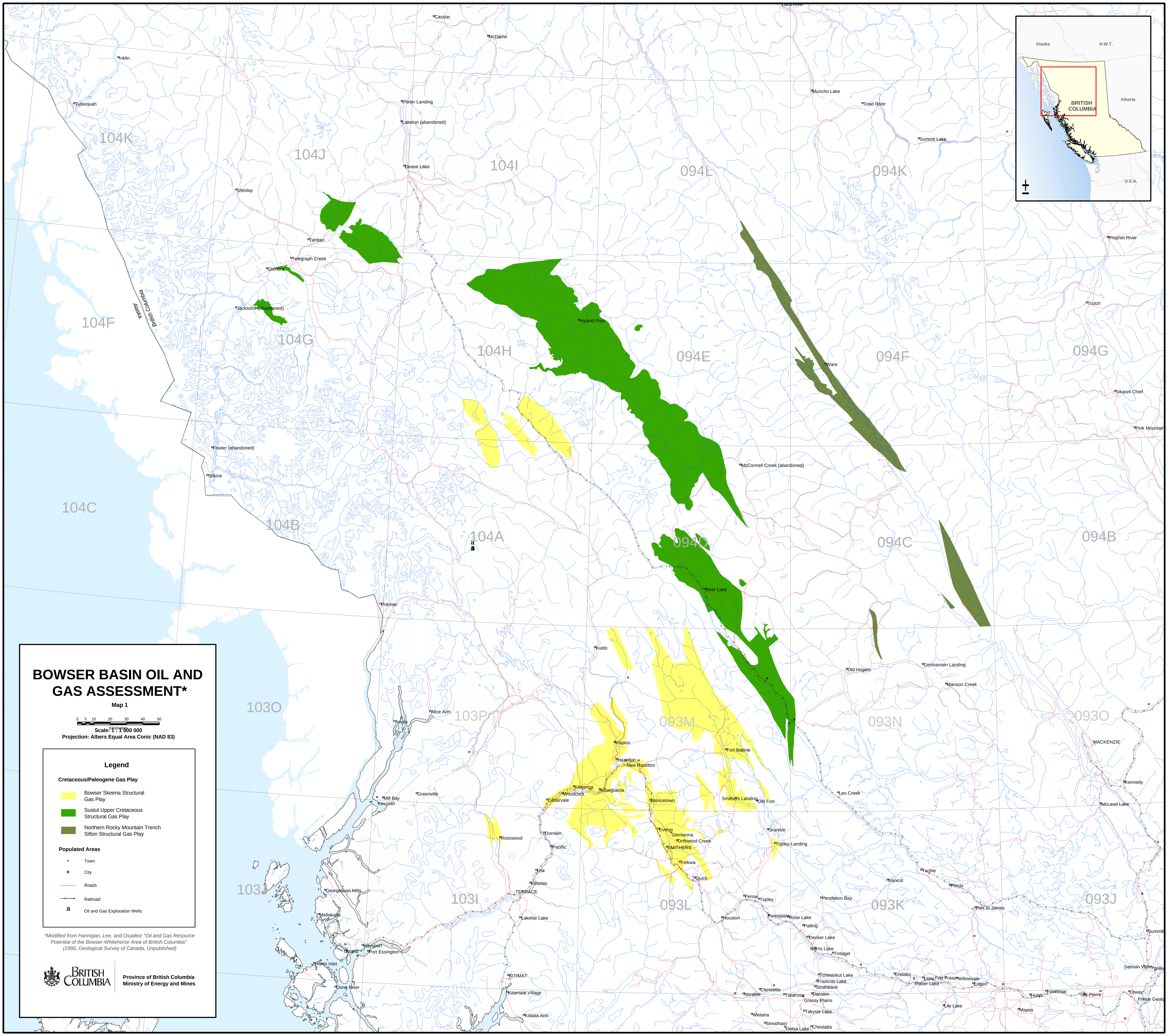


Figure 12

CPSD E[N] = 2.883499
Mu = .868864

E[T] = 13.267272
Sigma sq. = 1.314864


BOWSER BASIN OIL AND GAS ASSESSMENT*
Map 1
0 5 10 20 30 40 50
Kilometers
Scale: 1 : 1 000 000
Projection: Albers Equal Area Conic (NAD 83)
Legend
Cretaceous/Paleogene Gas Play
Bowser Skeena Structural Gas Play
Sustut Upper Cretaceous Structural Gas Play
Northern Rocky Mountain Trench Sifton Structural Gas Play
Populated Areas
Town
City
Roads
Railroad
Oil and Gas Exploration Wells
*Modified from Hannigan, Lee, and Osadetz "Oil and Gas Resource Potential of the Bowser-Whitehorse Area of British Columbia" (1995, Geological Survey of Canada, Unpublished)
British Columbia
Province of British Columbia
Ministry of Energy and Mines
Alaska
N.W.T.
Alberta
BRITISH COLUMBIA
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103O
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103J
103I
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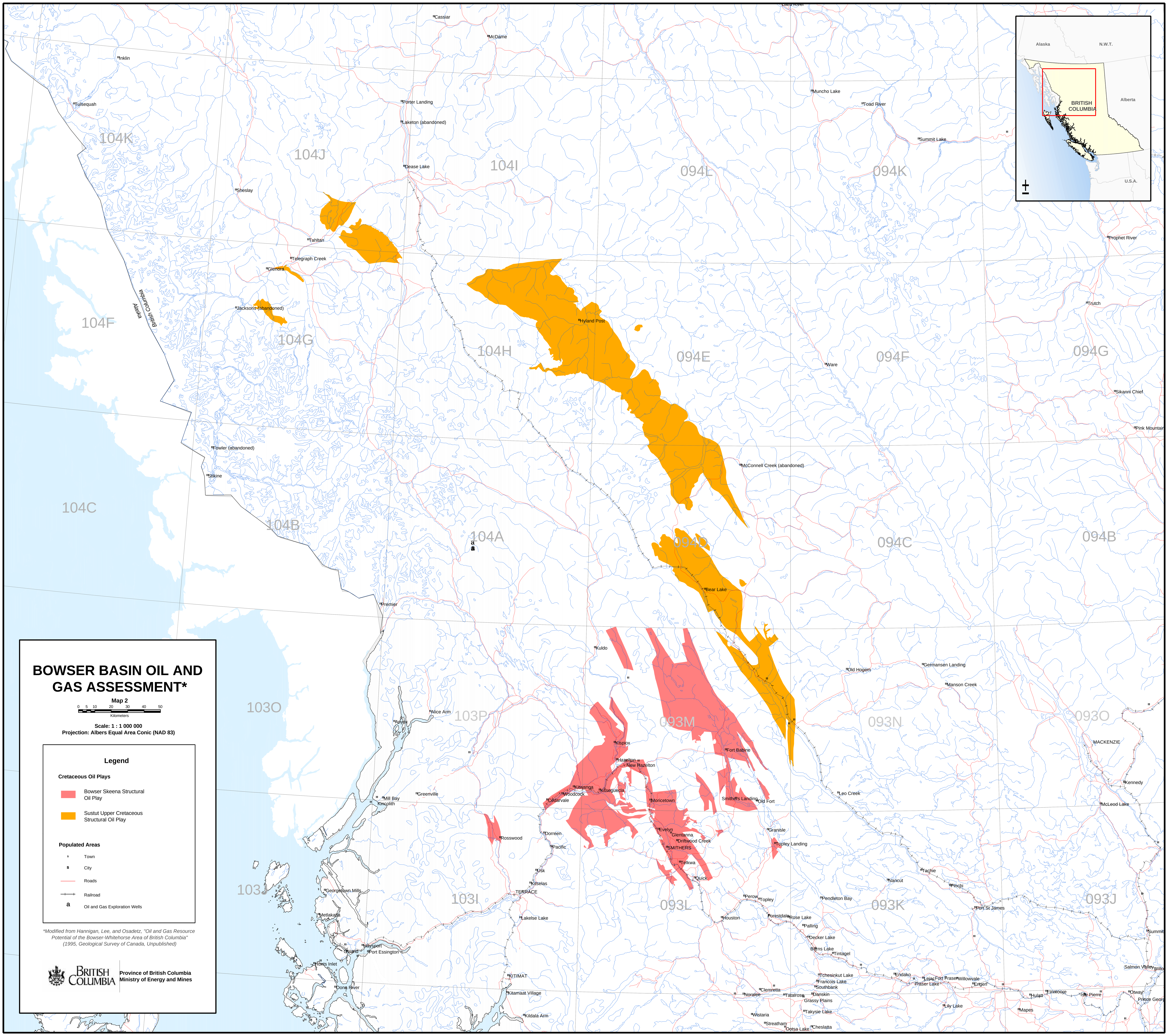
093K
093J
British Columbia
Cassiar
McDame
Inklin
Tulsequah
Porter Landing
Laketon (abandoned)
Muncho Lake
Toad River
Summit Lake
Dease Lake
Sheslay
Tahltan
Telegraph Creek
Glenora
Jacksons (abandoned)
Hyland Post
Ware
Prophet River
Trutch
Sikanni Chief
Fowler (abandoned)
Stikine
McConnell Creek (abandoned)
Bear Lake
Premier
Kuldo
Old Hogem
Germansen Landing
Manson Creek
Alice Arm
Kispiox
Fort Babine
Hazelton
New Hazelton
MACKENZIE
Kitwanga
Woodcock
Kitseguecla
Cedarvale
Moricetown
Smithers Landing
Old Fort
Leo Creek
Kennedy
McLeod Lake
Mill Bay
Kincolith
Greenville
Dorreen
Rosswood
Pacific
Evelyn
Glentanna
Driftwood Creek
SMITHERS
Granisle
Topley Landing
Telkwa
Quick
Usk
Kitselas
TERRACE
Tachie
Nancut
Pinchi
Georgetown Mills
Metlakatla
Lakelse Lake
Houston
Topley
Pendleton Bay
Fort St James
Forestdale
Rose Lake
Palling
Decker Lake
Burns Lake
Tintagel
Port Essington
KITIMAT
Kitamaat Village
Kildala Arm
Dona River
Endako
Fraser Lake
Fort Fraser
Willowvale
Engen
Tchesinkut Lake
Francois Lake
Southbank
Danskin
Grassy Plains
Takysie Lake
Noralee
Clemretta
Wistaria
Streatham
Ootsa Lake
Cheslatta
Lily Lake
Mapes
Hulatt
Salmon Valley
Summit



BOWSER BASIN OIL AND GAS ASSESSMENT*
Map 2
0 5 10 20 30 40 50
Kilometers
Scale: 1 : 1 000 000
Projection: Albers Equal Area Conic (NAD 83)
Legend
Cretaceous Oil Plays
Bowser Skeena Structural Oil Play
Sustut Upper Cretaceous Structural Oil Play
Populated Areas
Town
City
Roads
Railroad
a
Oil and Gas Exploration Wells
*Modified from Hannigan, Lee, and Osadetz, "Oil and Gas Resource Potential of the Bowser-Whitehorse Area of British Columbia" (1995, Geological Survey of Canada, Unpublished)
BRITISH COLUMBIA
Province of British Columbia
Ministry of Energy and Mines
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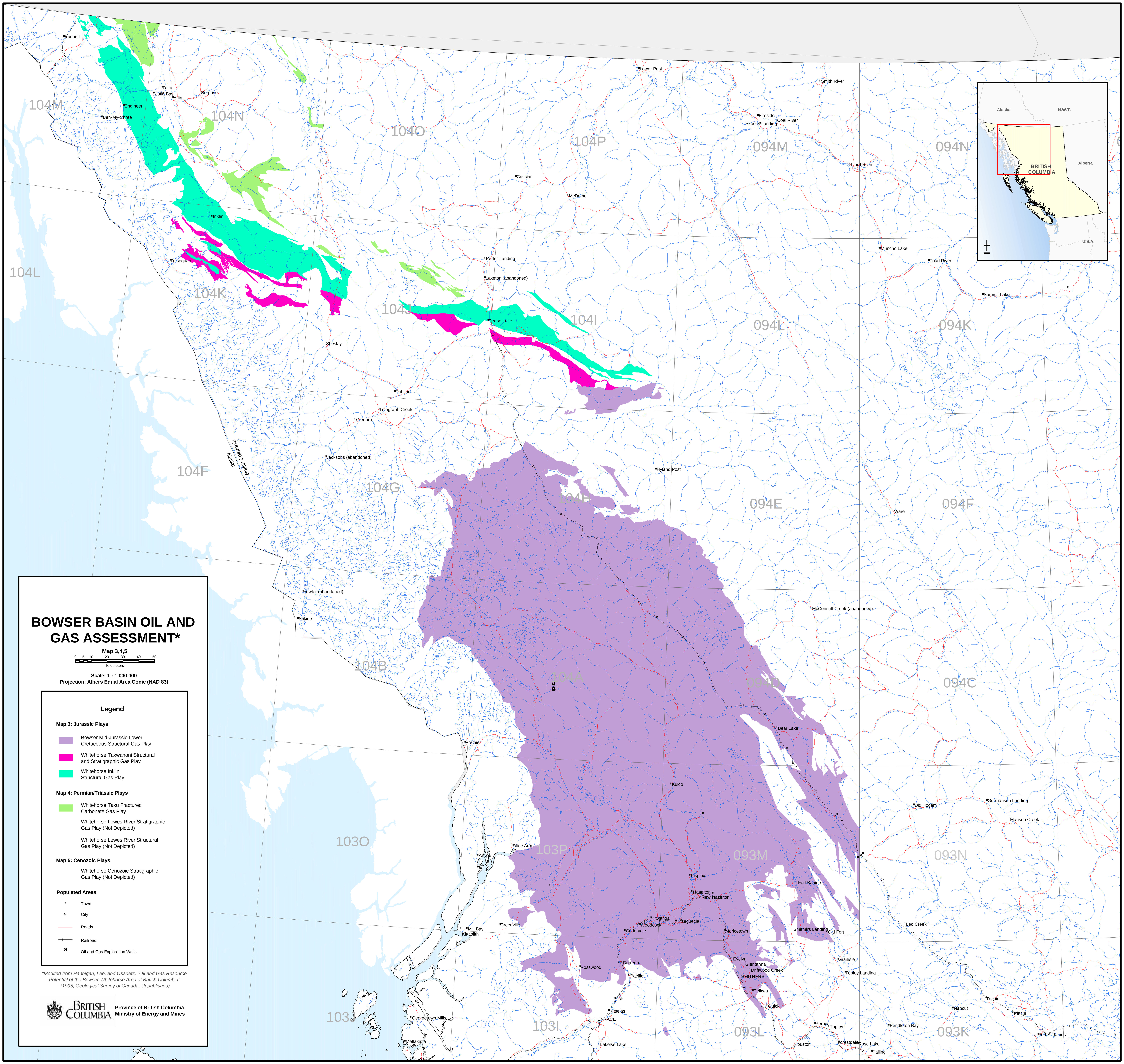
BOWSER BASIN OIL AND GAS ASSESSMENT*
Map 3,4,5
0 5 10 20 30 40 50
Kilometers
Scale: 1 : 1 000 000
Projection: Albers Equal Area Conic (NAD 83)
Legend
Map 3: Jurassic Plays
Bowser Mid-Jurassic Lower Cretaceous Structural Gas Play
Whitehorse Takwahoni Structural and Stratigraphic Gas Play
Whitehorse Inklin Structural Gas Play
Map 4: Permian/Triassic Plays
Whitehorse Taku Fractured Carbonate Gas Play
Whitehorse Lewes River Stratigraphic Gas Play (Not Depicted)
Whitehorse Lewes River Structural Gas Play (Not Depicted)
Map 5: Cenozoic Plays
Whitehorse Cenozoic Stratigraphic Gas Play (Not Depicted)
Populated Areas
Town
City
Roads
Railroad
Oil and Gas Exploration Wells
*Modifed from Hannigan, Lee, and Osadetz, "Oil and Gas Resource Potential of the Bowser-Whitehorse Area of British Columbia" (1995, Geological Survey of Canada, Unpublished)
BRITISH COLUMBIA
Province of British Columbia
Ministry of Energy and Mines
Alaska
N.W.T.
BRITISH COLUMBIA
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094E
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093M
093N
103J
103I
093L
093K
British Columbia
Alaska
Lower Post
Smith River
Fireside
Coal River
Skooks Landing
Liard River
Bennett
Taku
Scotia Bay
Atlin
Surprise
Engineer
Ben-My-Chree
Cassiar
McDame
Inklin
Tulsequah
Muncho Lake
Toad River
Porter Landing
Laketon (abandoned)
Summit Lake
Dease Lake
Sheslay
Tahltan
Telegraph Creek
Glenora
Jacksons (abandoned)
Hyland Post
Ware
Fowler (abandoned)
Stikine
McConnell Creek (abandoned)
Bear Lake
Premier
Kuldo
Old Hogem
Germansen Landing
Manson Creek
Alice Arm
Anyox
Kispiox
Fort Babine
Hazelton
New Hazelton
Kitwanga
Woodcock
Kitseguecla
Cedarvale
Moricetown
Greenville
Mill Bay
Kincolith
Smithers Landing
Old Fort
Leo Creek
Rosswood
Dorreen
Pacific
Evelyn
Glentanna
Driftwood Creek
SMITHERS
Granisle
Topley Landing
Telkwa
Usk
Quick
Kitselas
TERRACE
Georgetown Mills
Metlakatla
Lakelse Lake
Houston
Perow
Topley
Forestdale
Rose Lake
Palling
Pendleton Bay
Tachie
Nancut
Pinchi
Fort St James

MAP 6

BOWSER/WHITEHORSE OIL & GAS ASSESSMENT

HYDROCARBON POTENTIAL MAP