# PETROLEUM RESOURCE ASSESSMENT OF THE KANDIK BASIN, YUKON TERRITORY, CANADA

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# FOREWORD

A study of the petroleum resources of the Yukon portion of the Kandik Basin was undertaken by the Geological Survey of Canada (Calgary) in response to a request from the Government of Yukon. Assessment of petroleum resource potential is important for forming regulatory policies for these resources and for providing a basis for planning and issuing exploration rights.

# EXECUTIVE SUMMARY

This study was undertaken by the Geological Survey of Canada with assistance from Greg Cave and Tim Bird on behalf of the Yukon Government as part of its ongoing oil and gas resources management program. The objective of the study was to investigate the petroleum resource potential of the Kandik Basin in the Yukon. A quantitative analysis was designed to give a numerical estimate of resources that could exist in the study area. In the absence of defined pools with established reserves, probability distribution of reservoir parameters and marginal play risk factors are used to generate a range of hydrocarbon potential estimates indicating uncertainties involved in analysis of frontier conceptual exploration plays.

The Kandik Basin is a structural depression containing Paleozoic-Mesozoic sediments that straddles the Yukon-Alaska border. The basin constitutes a fragment of cratonic North America that underwent compression forming a fold and thrust belt with southeastern vergence. The foreland rocks are unconformably overlain by an Upper Cretaceous/Tertiary nonmarine sequence. The quantitative hydrocarbon assessments were derived using the Geological Survey of Canada's (PETRIMES) assessment methodology system. The assessments included analyses of 5 conceptual plays, each of which incorporated the calculation or estimation of field size parametric data, numbers of prospects and exploration risks. Median estimates for total oil and gas potentials for all Kandik plays are 54 million $m^3$ of in-place oil and 38 billion $m^3$ of in-place gas. There are no discovered reserves in the Kandik Basin, but 3 gas fields larger than 3000 million $m^3$ (100 BCF) of gas are predicted. No oil pools greater than 160 million $m^3$ (1 billion barrels) are predicted in the oil plays. Significant gas potential is predicted for the Mesozoic and Paleozoic marine structural plays even though risk factors are substantial in the plays. Estimates for oil potential are less optimistic.

Resource estimates are quoted initially for the entire area. After numerical analysis, the total resource for the Yukon area is estimated proportionately by area and sedimentary volume, and separate cases are proposed based on location of the largest predicted field. The portion of the resource estimated to exist in the Yukon is 25.5 million $m^3$ oil and 24,145 million $m^3$ gas in the case where the largest pool exists on the Yukon side of the border. The portion of the resource estimated to exist in the Yukon is 11.3 million $m^3$ oil and 15,340 million $m^3$ gas in the case where the largest pool is located on the Alaska side of the border.

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# INTRODUCTION

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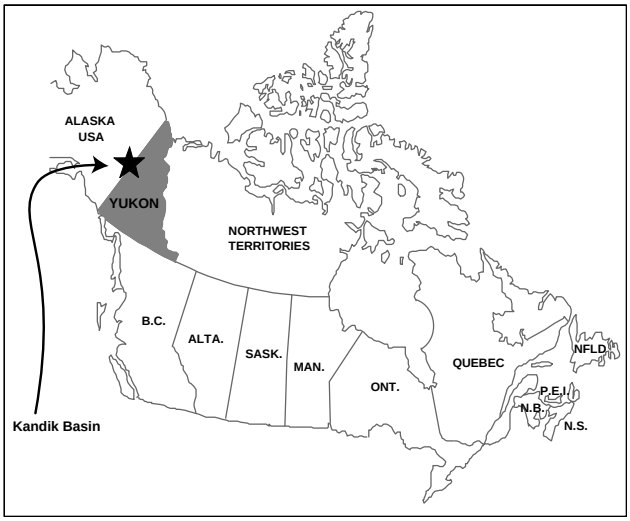
***Figure 1.*** *Kandik Basin location map.*




Regional petroleum resource assessments have been prepared periodically for various sedimentary basins in Canada by the Geological Survey of Canada. These studies incorporate systematic basin analysis with subsequent statistical resource evaluations (Podruski, *et al.*, 1988; Wade, *et al.*, 1989; Sinclair, *et al.*, 1992; Reinson, *et al.*, 1993; Bird, *et al.*, 1994; Dixon, *et al.*, 1994). This report summarizes the assessment of oil and gas potential of Kandik Basin in northwest Yukon and east-central Alaska.

This report provides an overview of the petroleum geology of Kandik sedimentary basin and presents quantitative estimates of the oil and gas resources contained therein. This geological and resource framework will assist government agencies in evaluating land-use issues, and petroleum industry companies in pursuing future exploration opportunities.

## ACKNOWLEDGMENTS

The authors would like to specially acknowledge the efforts of the United States Geological Survey as part of their petroleum resource assessment.

## TERMINOLOGY

The terminology and procedures used in this report follow those outlined in Reinson, *et al.* (1993) and are summarized below.

*Oil* is defined as any naturally occurring liquid that, at the conditions under which it is measured or estimated, is primarily composed of hydrocarbon molecules and is readily producible from a borehole.

*Natural gas* is defined as any gas (at standard pressure and temperature, 101.33 kPa and 15°C) of natural origin comprised mostly of hydrocarbon molecules producible from a borehole (Potential Gas Committee, 1990). Natural gas may contain significant amounts of non-hydrocarbon gas such as $H_2S$, $CO_2$ or He. In this study, non-hydrocarbon gas was not considered due to lack of information on gas compositions in these basins.

*Raw gas* is unprocessed natural gas, containing methane, inert and acid gases, impurities and other hydrocarbons, some of which can be recovered as liquids. *Sales gas* or

*marketable gas* is natural gas that meets specifications for end use. This usually requires processing that removes acid gases, impurities and hydrocarbon liquids. *Non-associated gas* is natural gas that is not in contact with oil in a reservoir. *Associated gas* is natural gas that occurs in oil reservoirs as free gas. *Solution gas* is natural gas that is dissolved in crude oil in reservoirs. In this report, insufficient information is available in order to differentiate non-associated, associated, and solution gas. All gas figures reported represent initial raw gas volumes.

*Resource* indicates all hydrocarbon accumulations known or inferred to exist. *Resource, resource endowment* and *endowment* are synonymous and can be used interchangeably. *Reserves* are that portion of the resource that has been discovered, while *potential* represent the portion of the resource that is not discovered but is inferred to exist. The terms *potential* and *undiscovered resources* are synonymous and may be used interchangeably.

*Gas-in-place* indicates the gas volume found in the ground, regardless of what portion is recoverable. *Initial in-place volume* is the gross volume of raw gas, before production. *Recoverable in-place volume* represents the volume expected to be recovered with current technology and costs. These definitions can be applied to oil volumes as well.

A *prospect* is defined as an untested exploration target within a single stratigraphic interval; it may or may not contain hydrocarbons. A prospect is not synonymous with an undiscovered pool. An undiscovered pool is a prospect that contains hydrocarbons but has not been tested as yet. A *pool* is defined as a discovered accumulation of oil or gas, typically within a single stratigraphic interval, that is separate, hydrodynamically or otherwise, from another hydrocarbon accumulation. A *field* consists of one or more oil and/or gas pools within a single structure or trap. Similar to most frontier regions, the assessment of Kandik petroleum resources is based on estimates of field rather than pool sizes. A *play* is defined as a family of pools and/or prospects that share a common history of hydrocarbon generation, migration, reservoir development and trap configuration.

Plays are grouped into two categories; *established* and *conceptual* plays. *Established plays* are demonstrated to exist due to the discovery of pools with established reserves. *Conceptual plays* are those that have no discoveries or reserves, but which geological analyses indicate may exist. Established plays are categorized further into *mature* and *immature* plays depending on the adequacy of play data for statistical analysis. Mature plays are those plays that have sufficient numbers of discoveries within the discovery sequence so that the *discovery process model* of the PETRIMES assessment procedure is of practical use (Lee and Tzeng, 1989; Lee and Wang, 1990; Lee, 1993). Immature plays do not have a sufficient number of discoveries with established reserves to properly apply the model. Conceptual play analysis was applied exclusively in this study due to the lack of any discovered pools with established reserves.

## METHOD AND CONTENT

This report incorporates two essential components: geological basin analysis and statistical assessment. Basin analysis fundamentally describes and characterizes the exploration play. Fields and prospects in a play form a natural geological population that can be delimited areally. Once a play is defined, a numerical and statistical resource assessment is undertaken using field or prospect data from that specific play.

## METHODOLOGY

The analysis of the Kandik area began with the compilation and synthesis of information on regional geology and hydrocarbon occurrence. This included a survey of National Energy Board (NEB) files and a search of pertinent publications. The NEB files contain information submitted as part of exploration agreements and often contain seismic lines and maps, sometimes with geological interpretation supplied by the operator.

The aim of this data compilation and literature survey was to analyze the basin in order to provide background for the definition of models for possible hydrocarbon occurrence. Models for hydrocarbon entrapment (play types) in the study area were developed by examining hydrocarbon systems, and where possible, using analogous discovered reservoirs to extrapolate play parameters.

Play definition and estimation of reservoir parameters formed the input for a systematic statistical analysis which allowed a quantitative analysis of undiscovered resources.

### GEOLOGICAL PLAY DEFINITION

Definition of play type and play area is essential in the geological basin analysis that precedes any numerical resource evaluation procedure. A properly defined play will possess a single population of pools and/or prospects that satisfies the assumption that geological parameters within a play can be approximated by a family of lognormal distributions. A mixed population derived from an improperly defined play adds uncertainty to the resource estimate. Pools and/or prospects in a specific play form a natural geological population which is characterized by one or more of the following: age, depositional model, structural style, trapping mechanism, geometry, and diagenesis. Prospects or areas within a basin or region can be assigned to specific plays on the basis of a commonality of some or all of these geological elements.

### COMPILATION OF PLAY DATA

Since conceptual plays have no defined pools or discoveries, probability distributions of reservoir parameters such as prospect area, reservoir thickness, porosity, trap fill, and hydrocarbon fraction are needed. Prospect size can then be calculated using the standard “pool”- size equation. Seismic, well, and outcrop data prove particularly useful in identifying the limits for sizes of prospect area and reservoir thickness as well as porosity limits. Geochemical data are useful in identifying prospective areas as well as the composition of the hydrocarbon accumulations, i.e. oil-vs.-gas proneness. Research in similar hydrocarbon-bearing basins is also important in order to provide reasonable constraints on reservoir parameters as well as contributing further information on other aspects of petroleum geology that may prove useful for the study.

### CONCEPTUAL PLAY ANALYSIS

There are several methods for estimating the quantity of hydrocarbons that may exist in a play, region or basin (White and Gehman, 1979; Masters, 1984; Rice, 1986; Lee, 1993). Petroleum assessments undertaken by the Geological Survey of Canada are currently based on probabilistic methods (Lee and Wang , 1990) that are developed in the Petroleum Exploration and Resource Evaluation System, PETRIMES (Lee and Tzeng, 1989). The conceptual hydrocarbon plays defined in the Kandik region were analysed by applying a subjective probability approach to the reservoir parameters. The lognormal option in PETRIMES was utilized since experience indicates that geological

populations of pool parameters can be adequately represented by lognormal distributions.

Conceptual resource assessments in the frontier regions use field-size estimates rather than pool-size predictions as derived from mature and immature play analysis. A field consists of one or more oil/gas pools or prospects in a single structure or trap. Probability distributions of oil and gas field sizes are computed by combining probability distributions of reservoir parameters, including prospect area, reservoir thickness, porosity, trap fill, hydrocarbon fraction, oil shrinkage, and gas expansion.

Probability distributions of oil and gas field sizes were combined with estimates of numbers of prospects (from seismic and play area mapping) and exploration risks to calculate play potential and to estimate sizes of undiscovered fields.

Exploration risks at a play or prospect level are determined on the basis of the presence or adequacy of geological factors necessary for the formation of petroleum accumulations. Essential factors are reservoir, seal, source rock, timing of hydrocarbon generation, trap closure and preservation. Appropriate marginal probabilities are assigned to each geological parameter to obtain risk factors. The Kandik plays have high probabilities of existing (low risk). Within each play, certain prospect-level risks are high and these are assigned appropriate risk factors. Exploration risk is an estimate, incorporating all risk factors, of the percentage of prospects within a play that are expected to contain hydrocarbon accumulations.

Due to the nature of conceptual assessment results, and since no discovered pool sizes can be used to constrain sizes of undiscovered accumulations, the uncertainty of oil and gas play potential and pool size estimates for a given range of probabilities is necessarily greater than the limits derived by discovery process analysis used in assessing mature plays.

## EXPLORATION HISTORY

Petroleum exploration in Kandik Basin began in 1970 with the drilling of the INC Husky Amoco Black-fly YT M-55 well near the eastern margin of the basin (Inexco Oil Company, 1970) (Figure 2). The well location was centred on Black-fly Dome exposing Permian Jungle Creek sandstone. Presumably, the well was located according to geological surface mapping. In the winter of 1971, Inexco conducted a reflection and refraction seismic survey in the area (Inexco Oil Company, 1971). Approximately 180 line-kilometres of seismic data were acquired for three areas along the eastern margin of the basin (Figure 2). Inexco Husky *et al.* Porcupine YT G-31 was spudded in December, 1971 in Hart Lake carbonates in a thrusted domal structure on the northeast margin of the basin (Inexco Oil Company, 1972a). The most recent well drilled in Canada occurred in 1972 (Inexco *et al.* Mallard YT O-18) on a thrust-faulted anticline with Hart River carbonates exposed at surface (Inexco Oil Company, 1972b). None of these wells encountered hydrocarbons.

In Alaska, one well was drilled in 1976 in Kandik Basin (Louisiana Land and Exploration Doyon No. 1). It penetrates Lower Cretaceous sediments that have been repeated as thin thrust plates downhole (Johnsson et al., 1993). In 1977, two additional wells were drilled to the north in the Yukon Flats region (Louisiana Land and Exploration Numbers 2 and 3) (Figure 2). This region is not considered to be part of the Kandik Basin assessment area.

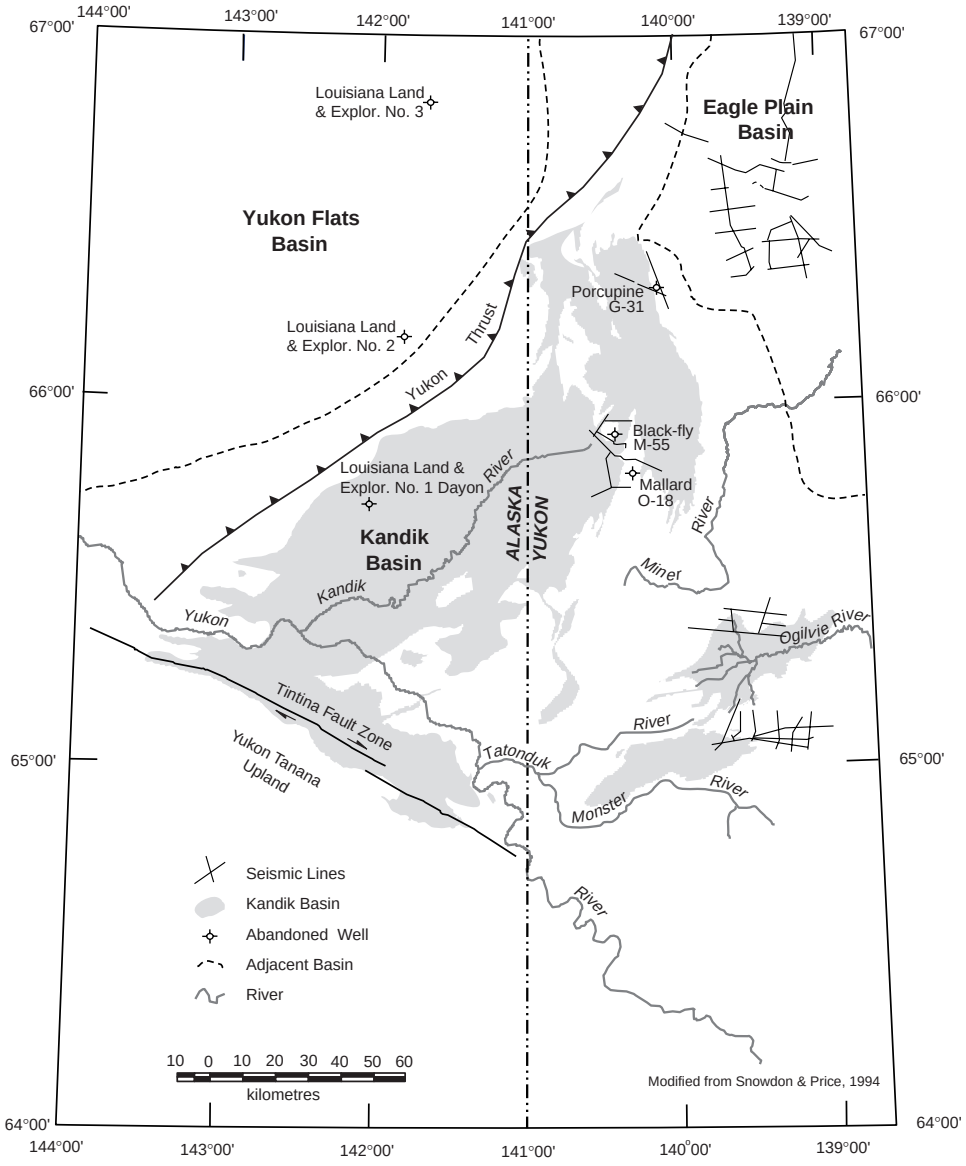



***Figure 2.*** *Location of Kandik Basin, wells and seismic lines, and adjacent basins.*

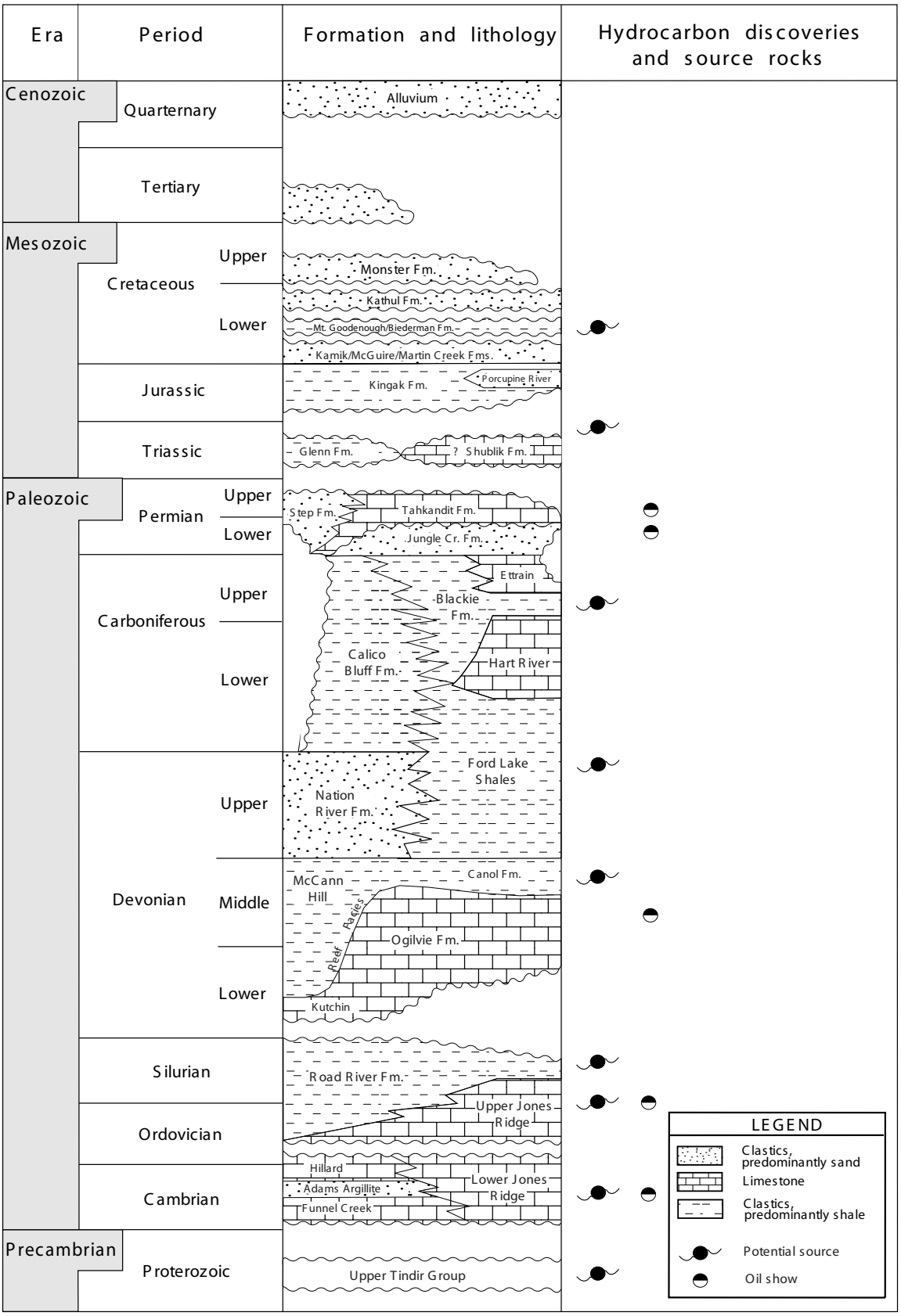



Figure 3. Stratigraphic Column for the Kandik Basin

Modified from Northern Oil & Gas Directorate, 1995

# REGIONAL GEOLOGY

The Kandik Basin is a structural depression containing Paleozoic-Mesozoic sediments that straddles the Yukon-Alaska border 907 kilometres southeast of Prudhoe Bay, Alaska and 650 kilometres north-northwest of Whitehorse. The basin is elongated to the southwest so the largest portion of the basin is located in Alaska (60%). The basin is delimited by the Mesozoic sediment cover (Northern Oil and Gas Directorate, 1995) and is surrounded by outcrops of Paleozoic and Precambrian sediments (Brabb and Churkin, 1969; Norris, 1984; Dover, 1992) (Figure 2). Kandik Basin is a fragment of cratonic North America that underwent compression forming a fold and thrust belt with southeastern vergence (Norris, 1984; Dover, 1992). Paleozoic to Triassic strata southeast of Glenn Creek fault is interpreted to represent a subsiding margin sequence (Brabb and Churkin, 1969; Howell, 1996). West of the fault, poorly exposed Paleozoic rocks were thrust upon a continuous sequence of Middle Jurassic to Lower Cretaceous clastic rocks interpreted as a foreland basin fill (Johnsson *et al.*, 1993; Howell, 1996). The foreland rocks are unconformably overlain by an Upper Cretaceous/Tertiary nonmarine sequence (unnamed in Alaska, Monster Formation in the Yukon) (Brabb and Churkin, 1969; Norris, 1985, 1997; Ricketts, 1988; Dover, 1992; Johnsson *et al.*, 1993; Howell, 1996). The basin is interpreted to have formed as a structurally controlled depositional site in Albian time and was a precursor of the early Late Cretaceous Columbian orogeny (Norris, 1997). Subsequent Laramide-related compressional tectonic episodes produced the structures required for trapping of generated hydrocarbons. To the south, the Kandik rocks are bounded by the translational Tintina Fault separating crystalline igneous and metamorphic strata from basin-related sediments.

There are over 11 kilometres of Paleozoic to Recent strata contained in Kandik Basin surrounded by Precambrian to Permian outcrop belts on the basin margins (Northern Oil and Gas Directorate, 1995) (Figures 3 and 4). The Upper Proterozoic Tindir Group consists of several hundred metres of marlstones, diamictites, quartzites and siliceous carbonates (Dover, 1992; Northern Oil and Gas Directorate, 1995). Unconformably overlying these strata are numerous Paleozoic carbonate/shale cycles (Figure 4). Dolomitic limestones of the Cambrian to mid-Ordovician Jones Ridge Formation and Ordovician-Silurian Road River shales constitute the first cycle. The second cycle consists of Devonian platform carbonates of the Ogilvie Formation and cherts and argillites of the McCann Hill Formation in Alaska and Canol Shale in the Yukon. Clastic sedimentation dominated in Late Devonian time on the Paleozoic shelf with a “coarse” sandstone-rich facies represented by the Nation River Formation in the west and Ford Lake shales to the east. Carbonate/shale cyclical sedimentation resumed in Mississippian time with deposition of interbedded shale and limestone of the Calico Bluff Formation in Alaska and carbonates of the Hart River Formation in the eastern portion of the basin. Conformably overlying the Calico Bluff/Hart River package is another cycle represented by Lower to Upper Carboniferous Blackie clastics and Ettrain carbonates. The Blackie/Ettrain cycle is overlain by Permian Jungle Creek sandstones and Upper Permian carbonates of the Takhandit Formation. The Takhandit Formation grades westward into limey clastics and conglomerates of the Step Formation. A major unconformity separates Takhandit strata from its overlying Triassic Shublik limestone in the Yukon which correlates with the Glenn Formation ‘oil shales’ in Alaska. A thick succession of shales constituting the Kingak Formation of Jurassic age overlies the Shublik/Glenn package. Recurrent Cretaceous clastic wedges overlie Kingak shales.

These clastic wedges are separated by unconformities. The wedges include sandstones and siltstones of the Martin Creek/Keenan, McGuire, Kamik/Keenan, Mount Goodenough/Biederman, and Kathul formations. Unconformably overlying these Lower Cretaceous marine clastic wedges is an Upper Cretaceous nonmarine conglomeratic sandstone and grit known as the Monster Formation in the Yukon (unnamed in Alaska). This area was unglaciated during Pleistocene time. Quaternary to Recent alluvial sediments occur along river valleys in the area.

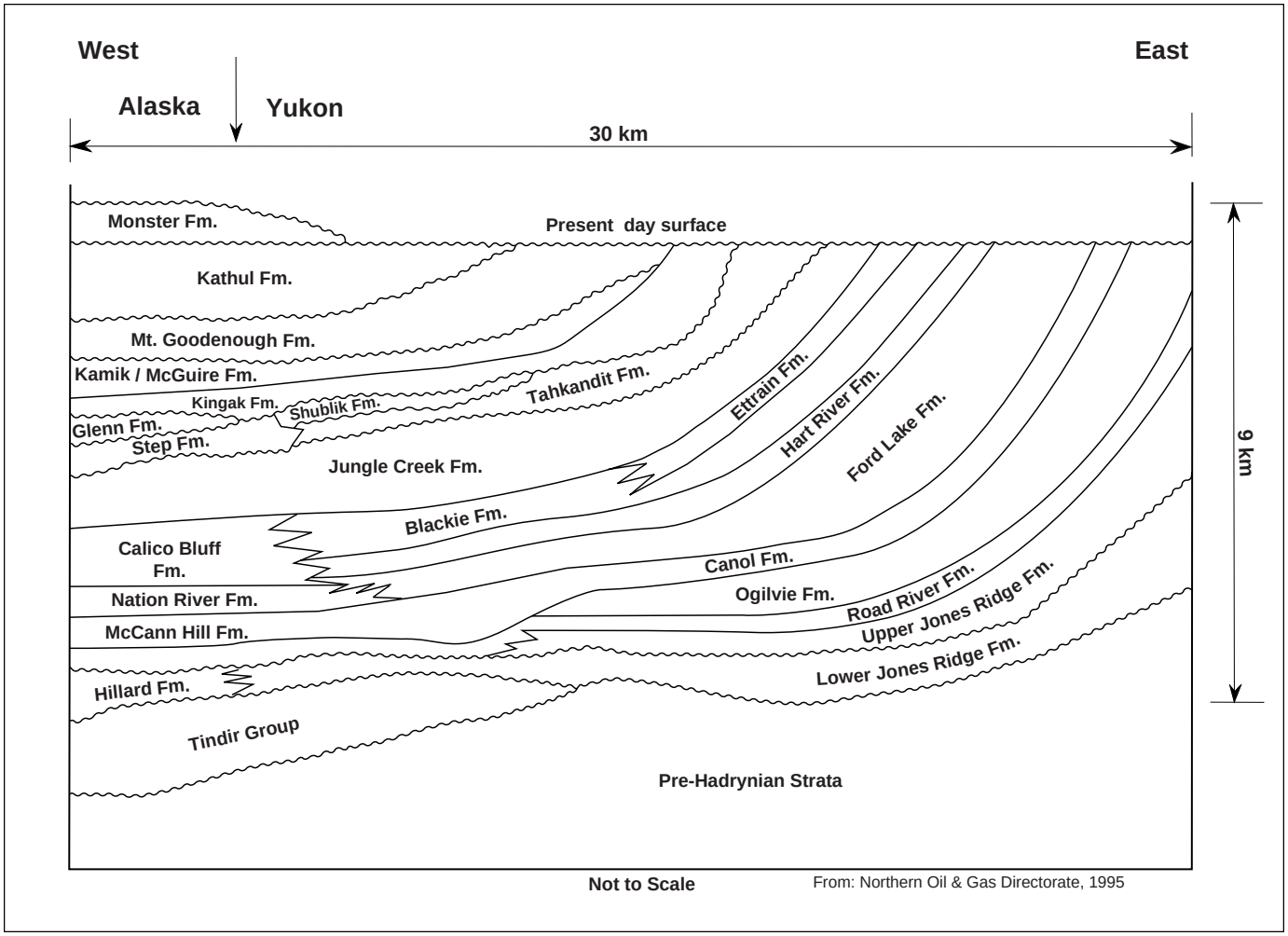



***Figure 4.*** *Schematic stratigraphic cross-section, Kandik Basin.*

# PETROLEUM GEOLOGY

## RESERVOIRS

### *Upper Proterozoic*

The Upper Proterozoic Tindir Group contains interbeds of red and green shales, deep-water diamictites, sandstones, and carbonates. The several hundred metre thick unit may have sufficient fracture porosity in order to preserve hydrocarbons.

### *Cambro-Ordovician*

The Cambro-Ordovician Jones Ridge Formation consists of a light-coloured thick-bedded to massive lower carbonate member overlain by a bioclastic limestone (Fritz, 1997). Approximate thickness is 915 metres. In Alaska, the Jones Ridge Formation is equivalent to strata that has been divided into three formations; the unfossiliferous Funnel Creek Formation consisting of light-coloured limestone similar to Jones Ridge carbonates, overlain by the Adams argillite, in turn overlain by Hillard Limestone comprised of breccia and limestone. Thicknesses for the Alaskan succession vary from 135 to 745 metres (Fritz, 1997). The limestones often show good porosity in outcrop. The limestones are commonly oolitic to pisolitic. Vuggy, intercrystalline and fracture porosity have been observed in drill cuttings. These units are variably dolomitic. A core cut in the formation gave very low porosity and permeability (Inexco Oil Company, 1972a).

### *Devonian*

In the Devonian System, the Ogilvie Formation has been identified as a reservoir. This carbonate shelf deposit has a reefal facies to the west in Alaska. Coral-stromatoporoid buildups of bioclastic limestone have good porosity in outcrop along the Porcupine River in Alaska. Thicknesses vary from 60 to 1100 metres throughout the region. Fracture and vuggy porosity was reported in well cuttings in the Porcupine G-31 well. A core cut in the interval revealed very low porosity and permeability (Inexco Oil Company, 1972a).

### *Carboniferous*

The oldest Carboniferous carbonate succession, known as the Hart River Formation progrades, over Ford Lake shales in the Kandik region and was deposited in shelf, slope and basin environments. Thinly laminated spicule packstone, with interbeds of sandstone and shale of the thin Hart River succession, exhibits secondary fracture porosity in parts. The Upper Carboniferous Ettrain carbonate sequence is mainly cherty ooid lime grainstones and skeletal packstone (Richards *et al.*, 1997). It was deposited on a shelf margin and upper slope environment in the Kandik region. Vuggy and intercrystralline porosity has been observed in the bioclastic dolomitic Ettrain carbonates in the Black-fly M-55 well. The Carboniferous succession varies in thickness from 450 to 1270 metres in Canada.

### *Permian*

The lower Permian Jungle Creek Formation, consisting of terrigenous clastics and subordinate sandy to silty limestone, varies in thickness from 425 to 703 metres. This succession was deposited in a shoreline to offshore setting (Richards *et al.*, 1997). Fracture porosity and minor intercrystalline porosity were observed in well cuttings

(Black-fly M-55) in dolomitic and cherty shale, sandstone and limestone. During Late Permian time, massive, cliff-forming coarse-grained bioclastic limestones of the Takhandit Formation were deposited. The formation is dominated by offshore shelf and slope facies although basal shoreline deposits occur to the west (Richards *et al.*, 1997). The Takhandit strata grades westward into shallow marine cherty conglomerates and quartzites of the Step Formation. Potential for reservoir development exists in these late Permian deposits. Thicknesses vary from 30 to 725 metres in the Kandik region.

***Cretaceous***

Massive, ridge-forming fine-grained sandstones of the late Cretaceous Martin Creek Formation/Keenan quartzite may have reservoir potential due to its interpreted shoreface/nearshore depositional environment in eastern Kandik Basin (Dixon, 1997). No porosity, however, was observed in outcrop. Estimated thicknesses vary from 150 to 300 metres (Dover, 1992). The thick monotonous conglomerate and sandstone succession known as the Albian Kathul Formation or Graywacke may have reservoir potential in parts. This marine succession, interpreted as occurring as submarine fans in the Kandik region (Dixon, 1997), has thicknesses ranging from 450 to 1000 metres.

The upper Cretaceous Monster Formation (unnamed Upper Cretaceous/Tertiary in Alaska) is a poorly sorted nonmarine succession that infills piggy-back basins in the fold and thrust belt. It is a heterogeneous mixture of conglomerate, sandstone, mudstone and thin coals that have highly variable thicknesses along strike with lateral pinchouts. The probable aggregate thickness is 1980 metres (Howell, 1996). The strata is reported to be porous in Alaska (Howell, 1996). Depositional environments for this succession range from coastal fan to braided fluvial systems (Ricketts, 1988; Dover, 1992; Dixon, 1997).

## SEALS

Regional top seal is provided by shales of the Mount Goodenough, McGuire, Kingak and Ford Lake formations for both Cretaceous and Paleozoic reservoirs. Lateral seals are attained at carbonate/shale facies transitions in Ogilvie/McCann and Ettrain/Blackie sequences. Another possible facies transition lateral seal could occur at the sandstone/shale zone represented by the Nation River and Ford Lake formations, respectively. Canol and Road River shales could act as top seals for Middle Devonian reservoirs. Deep-seated erosion along crests of anticlines may affect the integrity of traps by removing seals. Numerous interbedded shales and siltstones within the Late Cretaceous Monster Formation may provide adequate lateral and top seals for stratigraphic and structural trapping configurations for the formation.

## TRAPS

A variety of structural and stratigraphic hydrocarbon traps occur in Lower Cretaceous to Upper Devonian and Upper Proterozoic strata. Numerous and varied stratigraphic and small structural trap configurations are anticipated in Late Cretaceous strata. Traps involving Upper Proterozoic to Lower Cretaceous reservoirs include anticlinal culminations, drag folds on thrust faults, combined structural/unconformity, overthrust traps and duplex structures. Late Cretaceous traps include simple compressional anticlines, normal and reverse fault traps, faulted anticlines, and lateral stratigraphic pinchouts.

Based on outcrop mapping information (Brabb and Churkin, 1969; Norris, 1985; Dover, 1992), and related extrapolations into areas of limited outcrop, the number of structural

and stratigraphic traps within the region could number into the hundreds. The largest area of closure recognized in pre-Mid-Cretaceous strata is 75 $km^2$, while the largest structure affecting Late Cretaceous reservoirs has an area of closure of 21 $km^2$.

## SOURCE ROCKS

An excellent hydrocarbon source rock has been identified in the organic-rich "oil-shales" of the Triassic lower Glenn Formation. The Glenn shale locally contains up to 10% total organic carbon (TOC) (Howell, 1996). This formation is equivalent to the petroliferous Shublik shale on Alaska's north slope. The Glenn Formation and equivalents are interpreted to have been deposited over a broad shelf region that covered a large portion of northern Alaska. The prospective hydrocarbon region in Kandik Basin is not limited by source rock distribution. Numerous other mid-Devonian to Lower Cretaceous source rocks have been identified; the kerogen-rich shales of the Canol, upper Road River and Mount Goodenough formations, and organic-rich carbonates of the Tindir Group, Jones Ridge Formation and cherty shale of the McCann Hill Formation.

A Rock-eval analysis was performed on the three Canadian wells penetrating the Paleozoic succession on the eastern margins of the basin (Snowdon and Price, 1994, Appendix I). The low TOC contents in the Paleozoic sections, with the exception of selected Ford Lake intervals, reflect the high maturity as well as the original organic content of the rocks. This is consistent with the Doyon No. 1 well in Alaska where thermal maturity data indicates overmature strata (Johnsson, et al., 1993). This thermal maturity data likely indicate that reservoirs are likely to contain gas rather than oil. Type III kerogens predominate in these rocks which indicates gas-prone source material (Snowdon and Price, 1994, Appendix I). However, a restricted area of Kandik Basin, at distances of 45 to 70 kilometres away from the wells, may have oil potential due to the presence of bitumen and oil staining in Paleozoic porous strata (Hite, 1997). Residual oil and gas potential is expected in the Mesozoic and Tertiary sections over part of the Kandik Basin in Yukon and Alaska. The thermogenic source for both oil and gas upper Cretaceous/Tertiary rocks is likely the Glenn Formation and biogenic gas could be derived from interlayered lignitic coal seams.

## TIMING OF HYDROCARBON GENERATION

Trap development in Paleozoic and Mesozoic rocks most likely occurred during the Laramide orogeny, which encompasses the main and latest stage of compressional folding and thrusting. These traps developed subsequent to the primary hydrocarbon charge and migration episode. This poses a potential risk for the preservation of hydrocarbons in pre-mid-Cretaceous strata in Kandik Basin. However, trap formation is inferred to postdate hydrocarbon generation in other hydrocarbon-bearing settings such as the foothills of the Canadian Cordillera. Although this timing problem may not significantly detract from the potential in Kandik Basin, it does increase the prospect risk. Secondary hydrocarbon generation can be achieved by overthrusting, inducing continued burial of source material in subthrust positions.

Folded structures in Late Cretaceous/Tertiary rocks developed subsequent to the primary hydrocarbon generation episode. However, Late Cretaceous to Eocene normal block faulting as well as Laramide compressional structures may trap secondarily derived hydrocarbons.

## HYDROCARBON SHOWS

Oil staining has been observed in outcrop in local porous zones of the Takhandit limestones, Jungle Creek calcareous sandstones, Ogilvie carbonates and Jones Ridge carbonates in the Alaska portion of the basin (Northern Oil and Gas Directorate, 1995). Reported oil shows in the Doyon well in Alaska (Northern Oil and Gas Directorate, 1995) is not confirmed by the USGS which indicates no oil or gas shows in the well (Howell, 1996).

# PETROLEUM ASSESSMENT

The Kandik petroleum assessment was undertaken in order to provide quantitative estimates of total oil and gas potential and possible sizes of undiscovered fields in the region. Petroleum assessments of basins or regions are usually based on analyses of a number of exploration plays. The Kandik assessment was divided into three exploration plays based on petroleum geological considerations such as structural style, dominant reservoir lithology and thermal maturity. Six conceptual oil and gas plays were identified in Kandik Basin, of which all plays have an oil and gas component.

## Kandik Tertiary/Upper Cretaceous

# NONMARINE OIL AND GAS PLAY

### *Play definition*

This play encompasses all oil and gas prospects involved in small anticlinal structures and fault traps as well as stratigraphic traps within the Tertiary/Upper Cretaceous succession in Kandik Basin (Monster Formation in the Yukon). In the Yukon, the Monster Formation is located in two principal areas near the western margin of the Taiga-Nahoni Fold Belt (Ricketts, 1988). The eastern exposure is a east-trending synclinorium known as the Monster Synclinorium, located adjacent to the Monster River (Figure 5). The western exposure is a recumbent syncline in the footwall of the Yukon Thrust (Ricketts, 1988 and Figure 5). In Alaska, the unnamed succession is found in the southwestern portion of the basin adjacent to the Tintina fault zone and south of the Yukon River (Figure 5). Another depositional remnant is found to the northeast adjacent to the Alaska/Yukon boundary. Thermal maturity characteristics indicate oil and gas possibilities in the play. About 35% of the play area is located in the Yukon.

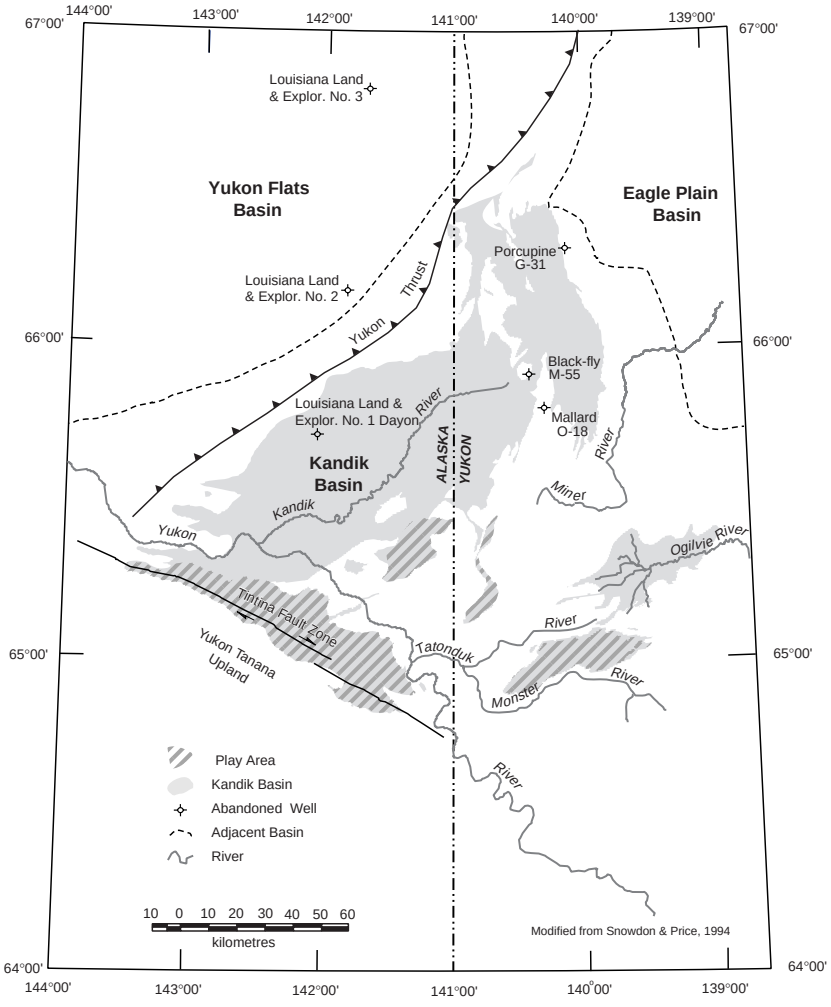



***Figure 5.*** *Kandik Tertiary/Upper Cretaceous, nonmarine oil and gas play.*

### *Geology*

Potential hydrocarbon traps involve Tertiary/Upper Cretaceous fluvial strata onlapping crests of anticlines and filling piggy-back basins in the fold and thrust belt. The reservoirs consist of a heterogeneous mixture of conglomerate, sandstone and mudstone with thin horizons of coal. The thicknesses of reservoir-quality clastics are highly variable with lateral pinchouts. The reservoirs are characterized by numerous stratigraphic traps and small structural configurations, such as simple compressional anticlines, normal and reverse fault traps, and faulted anticlines. The dominant source rock in the area is the Triassic Glenn shale which commonly has TOC contents of 10%. The nonmarine strata itself is immature, while underlying rocks are thermally mature. The prolific petroleum source rocks are in the oil-generating window. Interbedded coal may provide biogenic gas possibilities. The nonmarine strata is relatively porous in part, averaging about 12%.

### *Exploration risks*

All of the Kandik plays are believed to have a high probability of existing (ie. low play risk). However, within each play, risks associated with individual prospects are evaluated in order to derive an exploration risk associated with each play. An important prospect-level risk in all Kandik plays is timing of trap formation with respect to hydrocarbon generation. In many cases, individual prospects have been unroofed by erosion compromising the entrapment structure and seal integrity of the individual trap. The fact that the Monster Formation and equivalents outcrop in the play area also adds to the risk for seal and closure. The prospect-level risk in the nonmarine play for reservoir facies is low with existence of reservoir considered to be certain (marginal probability: 1.0) (Appendix 2). The probability of charge by source rocks is considered to be high on a prospect level (0.8) (Appendix 2).

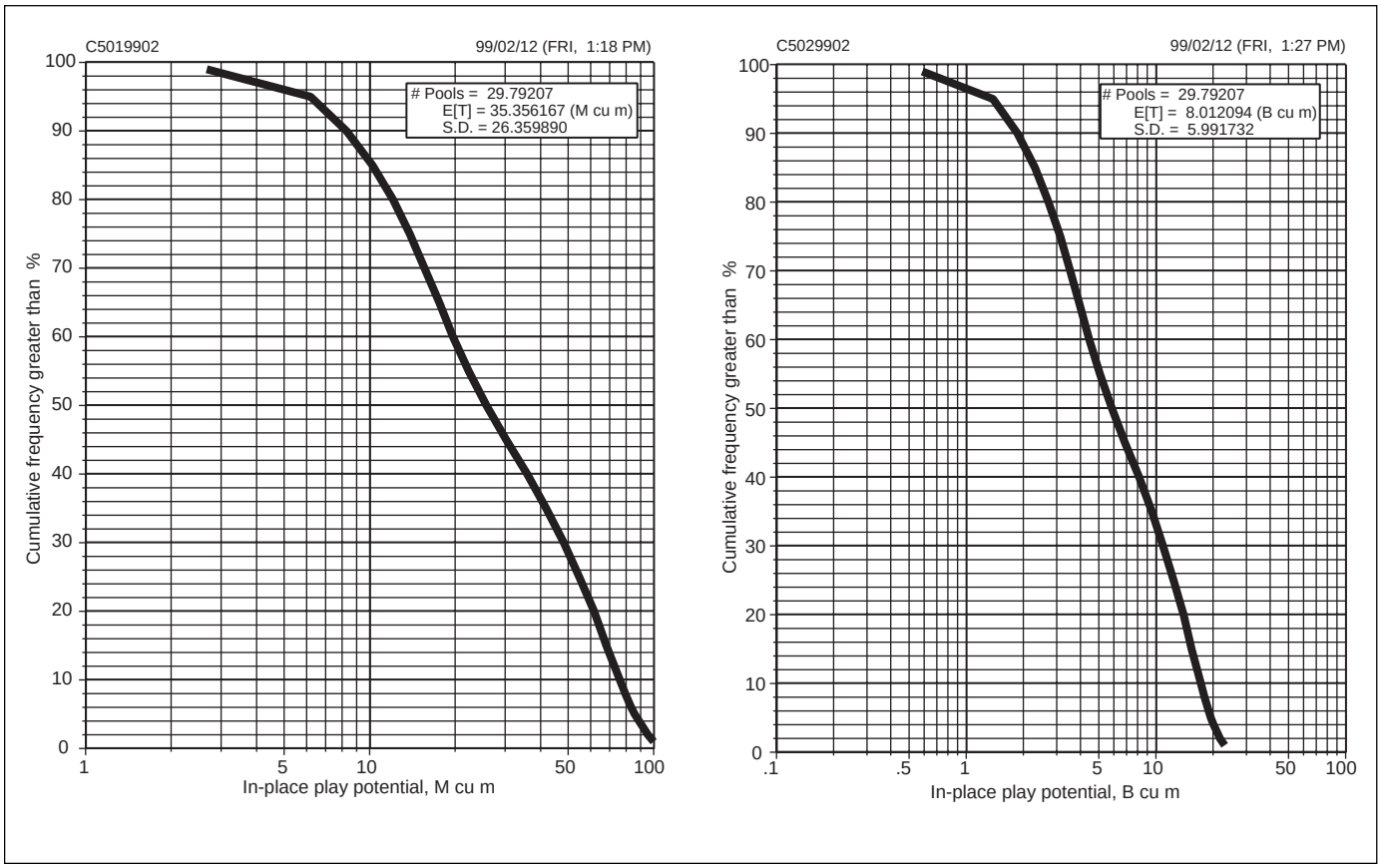
***Table 1.*** *Oil and gas potential in Kandik Basin.*

| Play name | Expected no. of fields (mean) | Median play potential (in-place) (million $m^3$) | Mean play potential (in-place) (million $m^3$) | Median of largest field size (in-place) (million $m^3$) |
|---|---|---|---|---|
| OIL PLAYS | | | | |
| Tertiary/Upper Cretaceous nonmarine | 30 | 26 | 35 | 3.6 |
| Mesozoic marine structural | *located in Alaska only, not assessed* | | | |
| Paleozoic marine structural | 3 | 16.5 | 23 | 11 |
| GAS PLAYS | | | | |
| Tertiary/Upper Cretaceous nonmarine | 30 | 5,863 | 8,012 | 856 |
| Mesozoic marine structural | 8 | 10,346 | 11,899 | 3,110 |
| Paleozoic marine structural | 10 | 16,913 | 19,647 | 4,839 |
| Total Kandik Basin* | 54 (oil) and 37,792 (gas) | | | |

* The totals are statistically derived. They are from the empirical distribution table on page 70 and 72. The totals are the basin potential at >50%.

***Figure 6.*** *Estimate of in-place oil potential of the Kandik Tertiary/Upper Cretaceous nonmarine play. Median value of probabilistic assessment is 26 million $m^3$ of in-place oil distributed in 30 fields.*

***Figure 7.*** *Estimate of in-place gas potential of the Kandik Tertiary/Upper Cretaceous nonmarine play. Median value of probabilistic assessment is 5863 million $m^3$ of in-place gas distributed in 30 fields.*

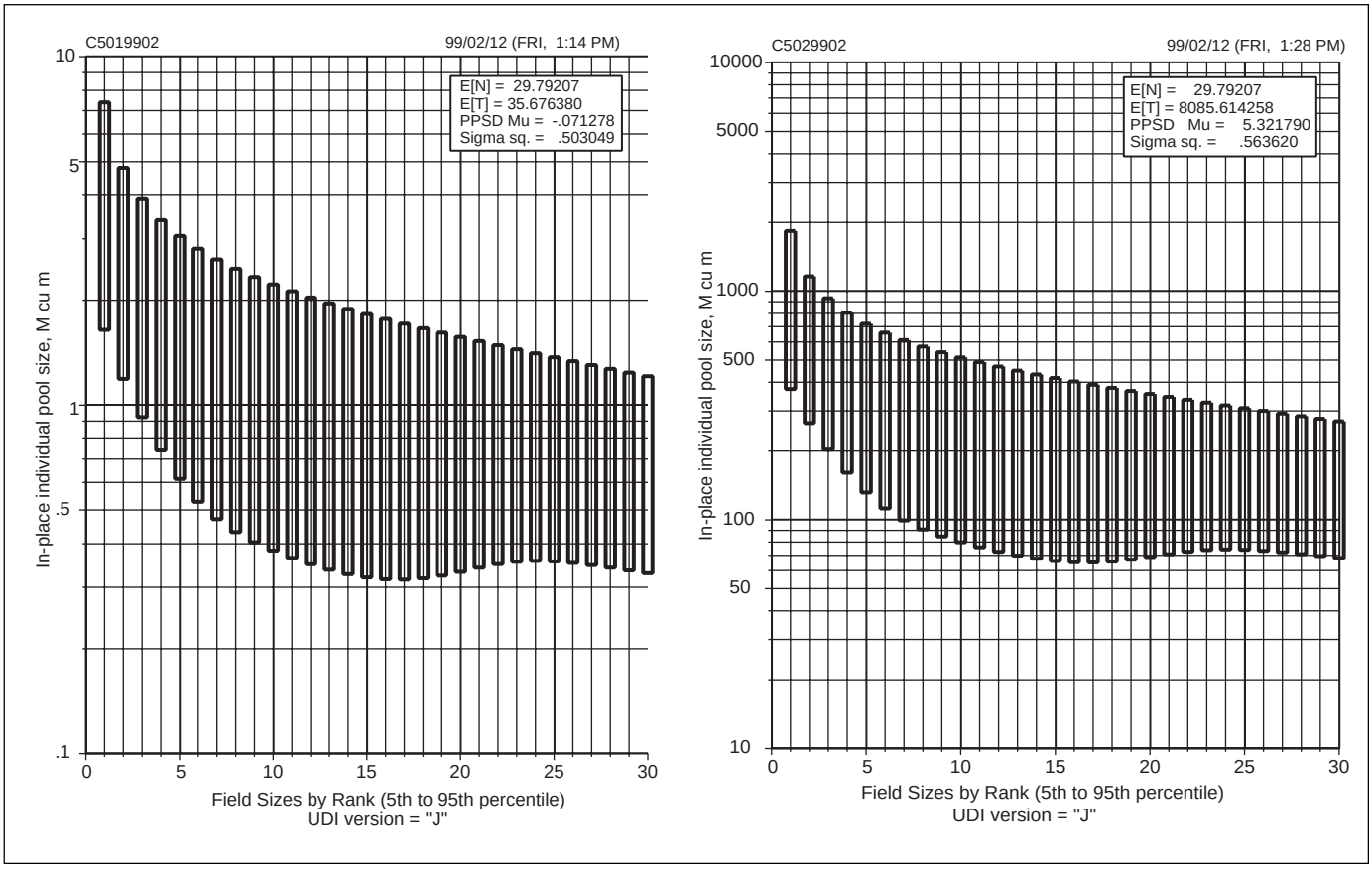


## *Play potential*

The Tertiary/Upper Cretaceous nonmarine play has an estimated in-place median oil and gas potential of 26 million $m^3$ and 5.9 billion $m^3$, respectively (Figures 6 and 7; Table 1). The mean value of the number of predicted fields is 30 for both plays. The largest undiscovered field is expected to contain 3.6 million $m^3$ of oil and 856 million $m^3$ of gas (median values) (Figures 8 and 9, Table 1). No fields with volumes greater than 160 million $m^3$ of in-place oil or 3 billion $m^3$ of gas are predicted to occur in these nonmarine plays (Figures 8 and 9). (See Appendix 3 for computation outputs.)

***Figure 8.*** *Field-size-by-rank plot of the Kandik Tertiary/Upper Cretaceous nonmarine oil play. Median value of the largest predicted field size is 3.6 million $m^3$ of in-place oil.*

***Figure 9.*** *Field-size-by-rank plot of the Kandik Tertiary/Upper Cretaceous nonmarine gas play. Median value of the largest predicted field size is 856 million $m^3$ of in-place gas.*



## Kandik Mesozoic

# MARINE STRUCTURAL OIL AND GAS PLAY

### *Play definition*

This hydrocarbon play encompasses all structural traps involving Jurassic and Late Cretaceous reservoirs formed during post-Aptian compressional folding and thrusting. The play area illustrated on Figure 10 covers the region expected to contain gas in Mesozoic reservoirs. About 40% of the play area is located in the Yukon. It was determined that Mesozoic rocks with thermal maturity characteristics suitable for oil generation are restricted to Alaska. Consequently, no oil assessment was attempted for this play.

### *Geology*

Martin Creek/Keenan Quartzite and Kathul coarse clastic units constitute the principal reservoirs in the Mesozoic hydrocarbon play. These units overlie the excellent petroliferous Glenn source rock. Secondary Paleozoic source rocks also underlie these reservoirs. Mount Goodenough and McGuire shales and siltstones provide both overlying and lateral seals. Trap types in Mesozoic strata include anticlines, overthrust

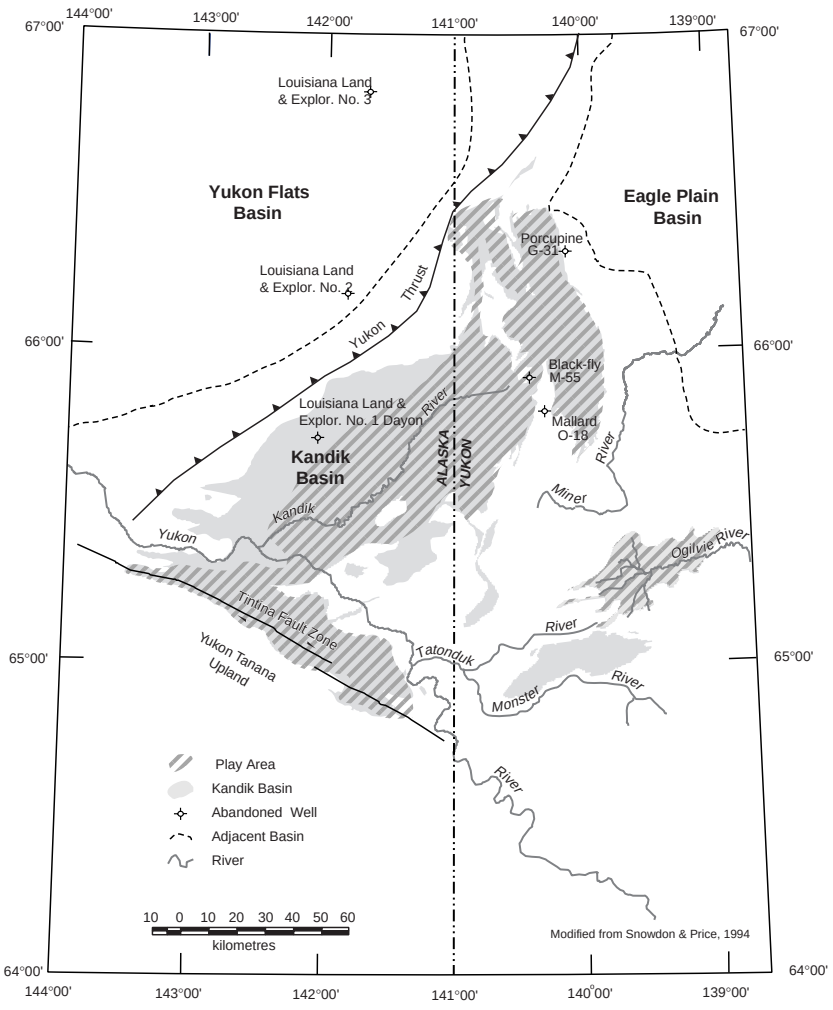



***Figure 10.*** *Kandik Mesozoic marine structural gas play area.*

traps, drag folds on thrust faults and combined structural/unconformity traps. Porosities in these rocks are unknown, so geological analogues were used.

### *Exploration risks*

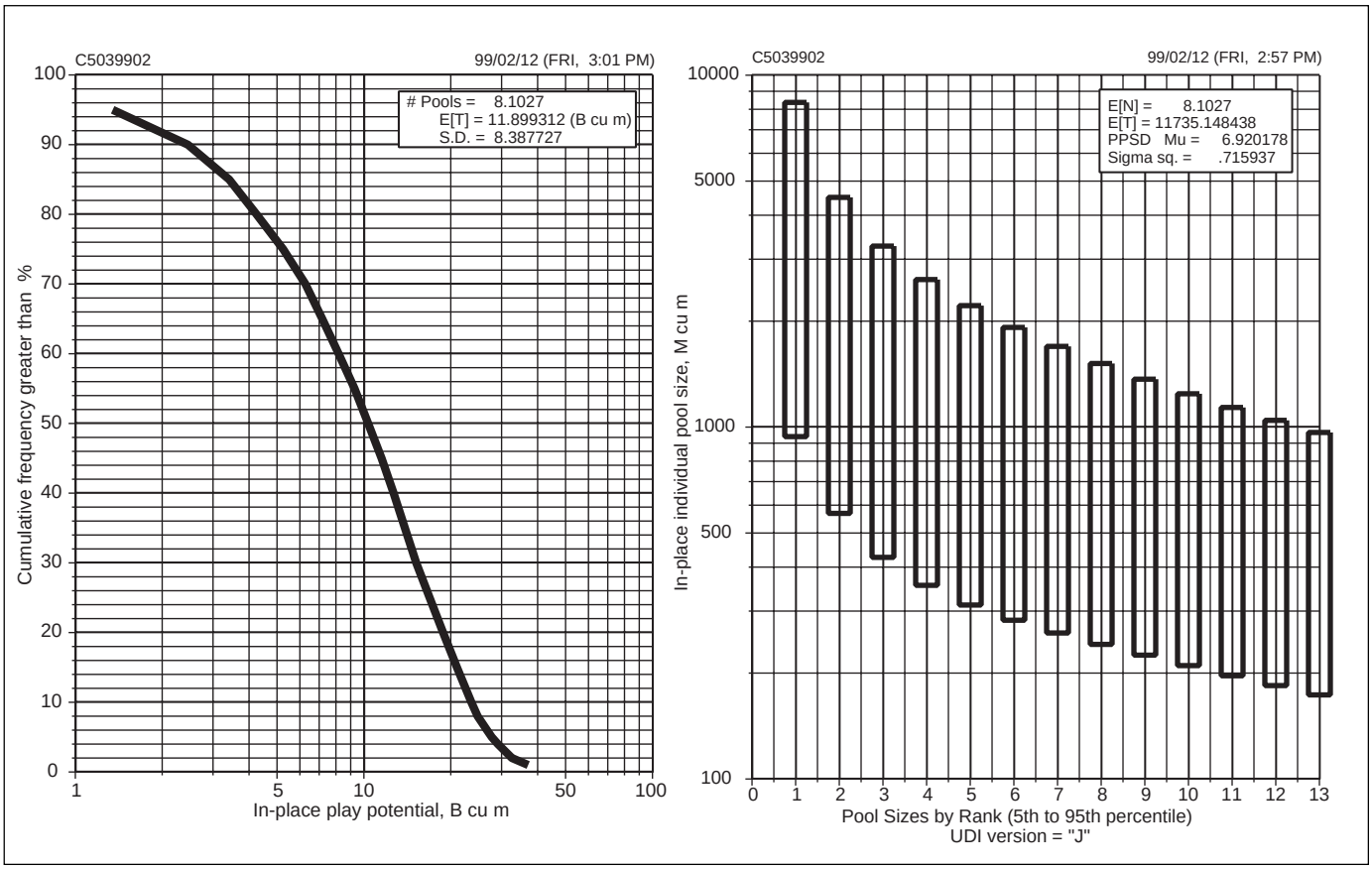
An important exploration risk for Mesozoic prospects is presence of closure where deep-seated erosion along crests of anticlines destroyed the integrity of many traps. The prospect-level risk for presence of closure in this play is 0.5. Another significant risk thought to be important in this assessment is the presence of sufficient porosity for hydrocarbon accumulation which is reflected in the 0.5 marginal probability assigned to the presence of reservoir facies risk factor (Appendix 2). The removal of seal strata as a result of erosion is also considered to be significant in this play (Appendix 2; adequate seal: 0.4).

### *Play potential*

Estimates of the potential for the Mesozoic marine structural gas play show a median in-place volume of 10.35 billion $m^3$ distributed in 8 fields (mean value) (Figures 11 and 12; Table 1). The largest undiscovered gas field is predicted to contain 3.11 billion $m^3$ (median value) (Figure 12). One field greater in size than 3 billion $m^3$ of in-place gas is predicted in this play (Figure 12).

***Figure 11.*** *Estimate of in-place gas potential of the Kandik Mesozic marine structural play. Median value of probabilistic assessment is 10,346 million $m^3$ of in-place gas distributed in 8 fields.*

***Figure 12.*** *Field-size-by-rank plot of the Kandik Mesozoic marine structural gas play. Median value of the largest predicted field size is 3110 million $m^3$ of in-place gas.*



## Kandik Paleozoic

# MARINE STRUCTURAL OIL AND GAS PLAY

### *Play definition*

This hydrocarbon play involves all structures and prospects of Upper Proterozoic to Permian reservoir-quality strata in, within and beneath Kandik Basin. The Paleozoic gas play area encompasses most of the Kandik Basin and neighbouring depocentres (Figure 13). The play area is limited to the west by a zone of supermature strata where no hydrocarbon potential is present (Figure 13, in the vicinity of Doyon No. 1 well; Johnsson *et al.*, 1993). The area of oil potential is much smaller due to thermal maturity considerations in surface outcrops (Figure 14; Johnsson *et al.*, 1993; Hite, 1997).

### *Geology*

Principal prospective targets in the Paleozoic structural play are carbonates of the Cambro-Ordovician Jones Ridge Formation, Devonian Ogilvie Formation, Carboniferous Hart River and Ettrain formations and the Permian Takhandit Formation. Clastic

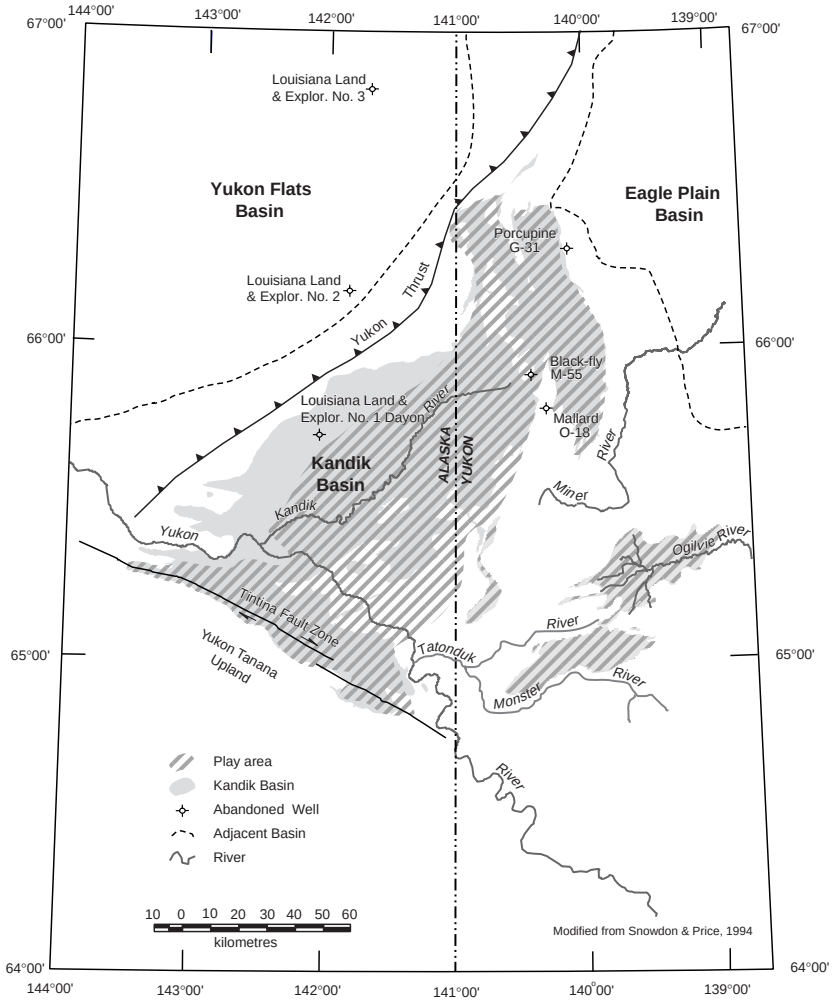



***Figure 13.*** *Kandik Paleozoic marine structural gas play area.*

reservoirs of the Permian Jungle Creek Formation and limestones and sandstones in the Upper Proterozoic Tindir Group are also present. These units underlie the excellent petroliferous Glenn Formation but numerous source rock horizons are interspersed in the Paleozoic succession. The Devonian Canol Formation contains TOC's up to 7% and the upper Road River Formation has TOC contents up to 5%. Upper Paleozoic Ford Lake shales contain organic carbon contents of up to 5% (Snowdon and Price, 1994; Appendix I). Numerous compressional structures affect Paleozoic rocks, such as anticlines, drag folds on thrust faults, overthrust traps, duplex structures, and combined structural/unconformity traps. Good seals are represented by the Adams argillite in the lower Jones Ridge Formation, the Road River Formation, Ford Lake shale, Glenn shale and Biederman argillite (Figure 3). Porosities in carbonates vary from 0 to 20%. Fracture porosity is very common with lesser intercrystalline porous strata present. Thermal maturity data from wells in Canada show generally very low TOC values in the Paleozoic section which, in addition to indicating the low original organic content, denotes that the rocks are relatively high thermal maturity (Snowdon and Price, 1994). The area of oil potential is at least 50 kilometres away from these wells, and the maturity data conclusions may not be relevant in the area. The fact that more than 20 bitumen occurrences have been observed in outcrop, indicates the unrealized oil potential (Hite, 1997).

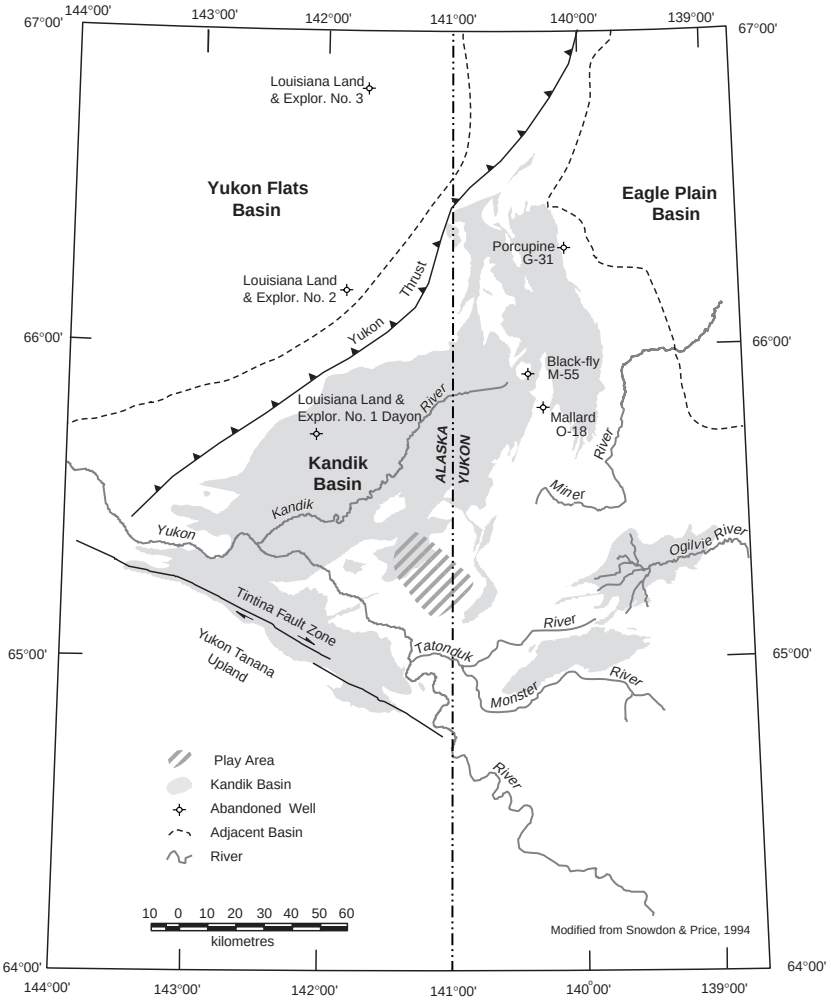



***Figure 14.*** *Kandik Paleozoic marine structural oil play area.*

### *Exploration risks*

Significant geologic risk factors for the Paleozoic structural play are presence of closure and adequacy of reservoir (Appendix 2). Deep erosion along crests of anticlines destroys the integrity of many structural traps. Primary porosity is generally thought to be very low, but secondary fracture porosity has been observed. Primary generation, migration and accumulation of hydrocarbons occurs before many of the compressional structures were formed. However, overthrusting may produce a secondary hydrocarbon charge that would be trapped in previously formed structures.

### *Play potential*

This play has an estimated in-place median gas potential of 17 billion $m^3$ (Figure 15; Table 1). The mean value of the number of predicted fields is 10. The largest undiscovered gas field is expected to contain 5 billion $m^3$ of gas (median value) (Figure 16). Potential for the Paleozoic oil play 16.5 million $m^3$ (median in-place value) (Figure 17; Table 1). The estimate assumes a total field population of 3 (mean value), with the largest undiscovered field having an initial in-place volume of 11 million $m^3$ of oil (Figure 18). Two individual undiscovered gas fields of greater than 3 billion $m^3$ are predicted to occur in the play (Figure 16). No oil fields greater than 160 million $m^3$ of in-place volume are expected in the oil play.

***Figure 15.*** *Estimate of in-place gas potential of the Kandik Paleozoic marine structural play. Median value of probabilistic assessment is 16,913 million $m^3$ of in-place gas distributed in 10 fields.*

***Figure 16.*** *Field-size-by-rank plot of the Kandik Paleozoic marine structural gas play. Median value of the largest predicted field size is 4839 million $m^3$ of in-place gas.*

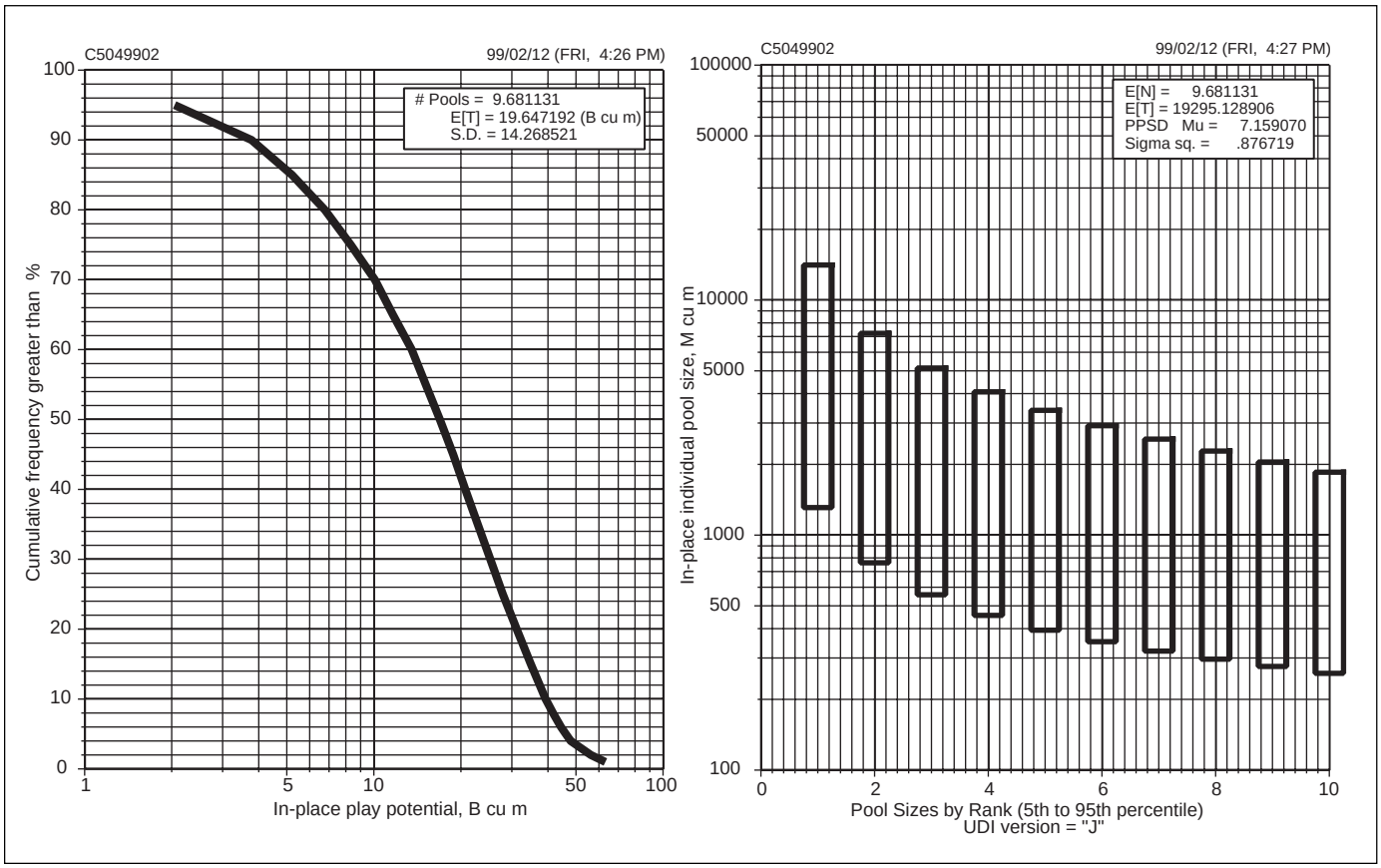
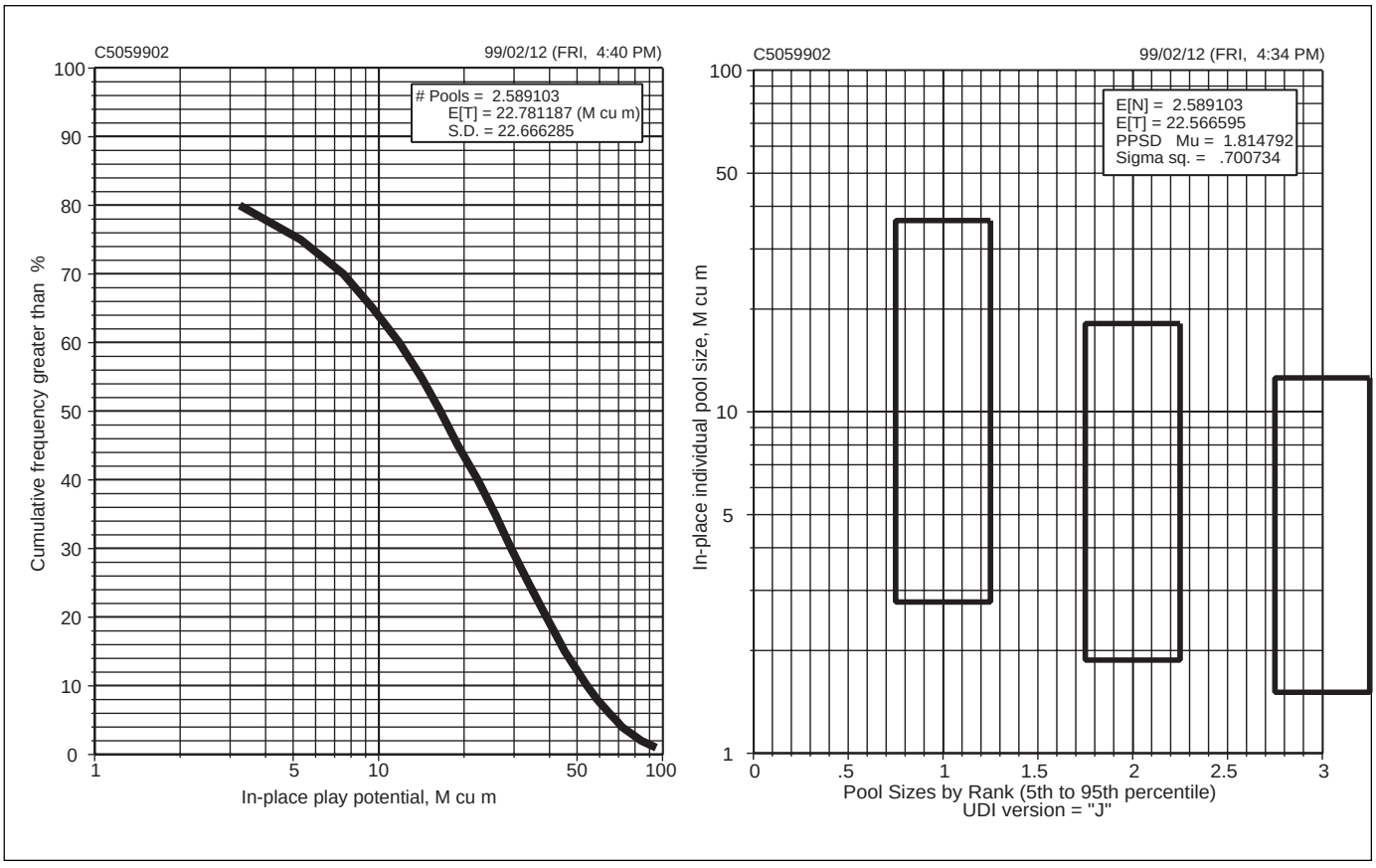


***Figure 17.*** *Estimate of in-place oil potential of the Kandik Paleozoic marine structural play. Median value of probabilistic assessment is 16.5 million m³ of in-place oil distributed in 3 fields.*

***Figure 18.*** *Field-size-by-rank plot of the Kandik Paleozoic marine structural oil play. Median value of the largest predicted field size is 11 million m³ of in-place oil.*



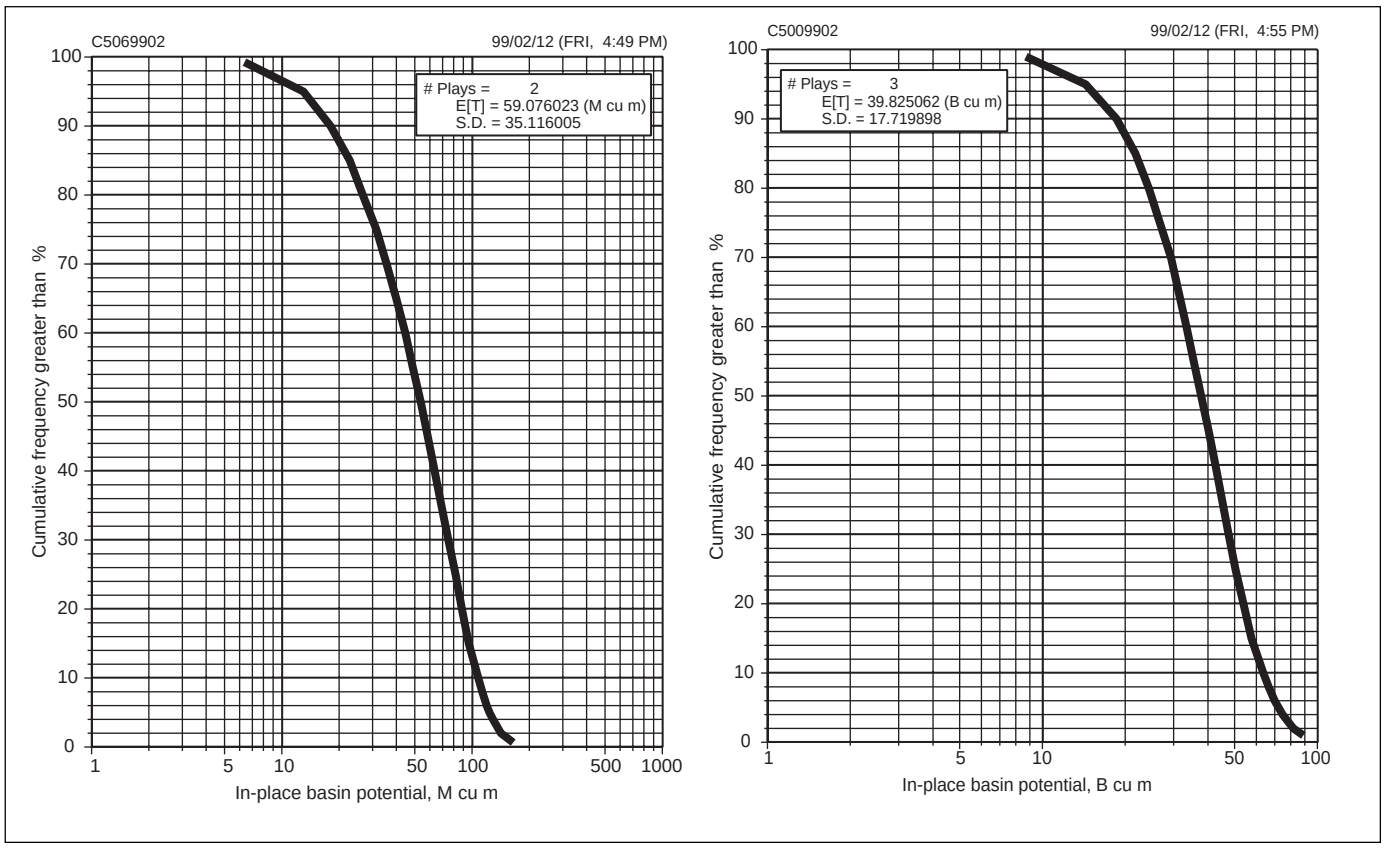
# DISCUSSION OF ASSESSMENT RESULTS

## *Resource potential*

Median estimates of total hydrocarbon potential for the Kandik Basin region (from all plays) are 54 million $m^3$ (340 MMbbl) of in-place oil and 38 billion $m^3$ (1.3 TCF) of in-place gas (Table 1; Figures 19 and 20). (Note that the total median estimates for the Kandik assessment region are not derived arithmetically by adding together the hydrocarbon potentials of individual plays. These numbers are summed using statistical techniques). High confidence (90% probability) and speculative (10% probability) estimates of total oil potential are 18 and 108 million $m^3$ (113 and 678 MMbbl), respectively (Figure 19). High confidence and speculative estimates of gas potential are 19 and 64 billion $m^3$ (657 and 2246 BCF), respectively (Figure 20). Individual field-size estimates display similar probability-dependent variations. The wide range of estimates of total potential and field sizes are typical of frontier region assessments and reflect the geological uncertainties in quantifying lightly explored or conceptual exploration plays.

***Figure 19.*** *Estimate of total oil potential for the Kandik region. Median value of probabilistic assessment is 54 million $m^3$ of in-place oil.*

***Figure 20.*** *Estimate of total gas potential for the Kandik region. Median value of probabilistic assessment is 37,792 million $m^3$ of in-place gas.*



## *Resource distributions*

The highest oil potential or volume occurs in the Tertiary/Upper Cretaceous nonmarine play and highest gas potential in the Paleozoic marine structural play (Table 1). The largest individual oil and gas fields are expected to occur in the Paleozoic play, with median size estimates of 11 million $m^3$ (72 MMbbl) of in-place oil and 4.8 billion $m^3$ (170 BCF) of in-place gas. Individual field sizes for the major plays in the region (ie. plays with 8 or more expected fields) indicate that 40 to 80% of the individual play's total petroleum resource is expected to occur in the five largest oil and gas fields. This resource distribution indicates a moderately concentrated hydrocarbon habitat, typical of composite craton margin or rifted passive margin basins (Klemme, 1984).

The assessment results indicate the Paleozoic structural play is expected to contain about 45% of the region's total gas resource volume and 6 of the 10 largest fields, a concentration reflecting the greater number of reservoir horizons and size of closures within the thick Paleozoic succession. In contrast, oil resource distribution differs in that about 45% of the region's oil resource is concentrated in younger Tertiary/Upper Cretaceous nonmarine rocks while 7 of the 10 largest oil fields are expected to occur in the Paleozoic marine play. This distribution illustrates the numerous small structural and stratigraphic trapping configurations in the nonmarine play in contrast with the smaller number of larger-volume structures present in the Paleozoic play (Note that if the Mesozoic oil play was assessed, the oil distribution would be slightly different, but there is sufficient information to arrive at a general conclusion).

### *Assessment results and exploration history*

The exploration risks estimated in the assessment suggest success rates for exploratory drilling in the Kandik Basin should average about 1 in 6. The absence of discoveries among the 4 wells drilled to date is reasonable. Historically, the first significant hydrocarbon discovery in a frontier region is often preceded by many unsuccessful exploration wells. Seismic coverage is sparse in the region, so many significant structures have not been recognized. Some of the wells were drilled in less than optimum locations; Doyon No. 1 well was drilled in an area of thermally supermature sediments and it did not penetrate below the Jurassic stratal horizon.

### *Distribution of resources in the Yukon*

Hydrocarbon plays in Kandik Basin occupy areas on both sides of the Yukon/Alaska boundary. If it can be assumed that the hydrocarbon resource is evenly distributed throughout the play areas, the proportion of resource in the Yukon can be estimated by comparing play areas between the two countries. The location of the largest field cannot be determined, so two scenarios are proposed; scenario 1 where the largest field is assumed to be in the Yukon, and scenario 2 where the largest field is in Alaska. Table 2 itemizes the diminished oil and gas potential for Kandik Basin in the Yukon Territory under the two scenarios. About 35% of the play areas for the Tertiary/Upper Cretaceous nonmarine oil and gas play is located in the Yukon (Figure 5), so the amount of oil and gas predicted, if the largest undiscovered field is assumed to be in the Yukon is 12 million $m^3$ and 2849 million $m^3$, respectively. If, however, the largest field is assumed to be in Alaska, then the potential is estimated to be 8.8 million and 1993 million $m^3$ of oil and gas, respectively (Table 2). The Mesozoic part of the succession has an oil and gas component, but thermal maturity considerations restrict the oil window to the Alaska portion of the basin. Consequently, no oil assessment was completed for the Mesozoic play. Natural gas potential is estimated to be 7662 and

4552 million $m^3$ of in-place volumes under the two scenarios under the provision that 45% of the play area is in Yukon (Figure 10). About 15% of the Paleozoic play within the oil window is found in Canada (Figure 14). If the largest field is predicted to be in Yukon, then the oil potential is 13.5 million $m^3$ in-place. On the other hand, the assumption that the largest field is not in the Yukon reduces the oil potential to only 2.5 million $m^3$. This reflects the large trapping configurations in the play producing the relatively large oil field accumulations (largest field size is predicted to be 11 million $m^3$). In the much larger Paleozoic gas play area, 52% of the area is in Yukon (Figure 13). Scenario 1 indicates that the Yukon portion of Paleozoic gas is 13,634 million $m^3$ in-place. Scenario 2 suggests that Yukon gas is 8,795 million $m^3$.

***Table 2.*** *Oil and gas potential in Kandik Basin.*

| Play name | Median play potential (in-place) (million $m^3$) | Median of largest field size (in-place) (million $m^3$) | Scenario 1 Play potential in the Yukon (million $m^3$) | Scenario 2 Play potential in the Yukon (million $m^3$) |
|---|---|---|---|---|
| OIL PLAYS | | | | |
| Tertiary/Upper Cretaceous nonmarine | 26 | 3.6 | 12 | 8.8 |
| Mesozoic marine structural | *located in Alaska only; not assessed* | | | |
| Paleozoic marine structural | 16.5 | 11 | 13.5 | 2.5 |
| GAS PLAYS | | | | |
| Tertiary/Upper Cretaceous nonmarine | 5,863 | 856 | 2,849 | 1,993 |
| Mesozoic marine structural | 10,346 | 3,110 | 7,662 | 4,552 |
| Paleozoic marine structural | 16,913 | 4,839 | 13,634 | 8,795 |

Scenario 1: Largest undiscovered field is assumed to occur in the Yukon.
Scenario 2: Largest undiscovered field is assumed to occur outside the Yukon.

# CONCLUSIONS

The oil and gas resource potential of Kandik Basin has been evaluated through regional hydrocarbon play assessments. The quantitative assessments were derived using the Geological Survey of Canada's (PETRIMES) assessment methodology system. The assessments included analyses of 5 conceptual plays, each of which incorporated the calculation or estimation of field size parametric data, numbers of prospects and exploration risks. Oil and gas volumes reported for these conceptual plays are total statistical estimates of the resource present 'in the ground', not the volumes that are economically producible. Individual field-size determinations are important in identifying which plays are attractive for exploration programs.

Median estimates for total oil and gas potentials for all Kandik plays are 54 million $m^3$ of in-place oil and 38 billion $m^3$ of in-place gas (Figs. 19, 20; Table 1). In-place oil and gas potential for all plays except the Mesozoic marine oil play, encompasses both Yukon and Alaska portions of the basin. Mesozoic marine oil potential occurs in Alaska only.

Resource estimates are quoted initially for the entire area. After the numerical analysis, the total resource for the Yukon area is estimated proportionately by area and sedimentary volume, and separate cases are proposed based on location of the largest predicted field. The portion of the resource estimated to exist in the Yukon is 25.5 million $m^3$ oil and 24,145 million $m^3$ gas in the case where the largest pool occurs on the Yukon side of the border. The portion of the resource estimated to exist in the Yukon is 11.3 million $m^3$ oil and 15,340 million $m^3$ gas in the case where the largest pool is predicted to occur on the Alaska side of the border.

The potential for significant hydrocarbon accumulations in Kandik Basin is achieved by the combined presence of numerous and diverse trapping configurations, good to excellent petroleum source rocks in favourable stratal positions and reservoir-quality strata in some parts of the stratigraphic column. However, significant risks associated with breaching of traps associated with deep-seated erosion along crests of structures, lack of porosity in Paleozoic and Mesozoic strata, and thermal maturity considerations reduces overall hydrocarbon potential. Significant gas potential is predicted for the Mesozoic and Paleozoic marine structural plays, even though risk factors are substantial in the plays. Estimates for oil potential are less optimistic. The complex geology and anticipated high exploration risks associated with the plays suggest that considerable amounts of new seismic data and exploration wells may be required to properly evaluate the region's oil and gas potential.

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# APPENDIX 1

## ROCK-EVAL/TOC DATA FOR THREE WELLS IN THE KANDIK BASIN, WESTERN YUKON TERRITORY

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Rock-Eval/TOC pyrolysis analyses have been carried out for the following three wells in the Kandik Basin, Yukon Territory:

- Inexco Husky Amoco Black-fly M-55 (65°54'55"N 140°25'55"W),
- Inexco Mallard YT O-18 (65°47'58.00"N 140°17'41"W), and
- Inexco Husky Porcupine G-31 (66°20'22"N 140°06'13"W).

These wells were drilled between 1970 and 1972 and “excess bag cuttings” stored at the Institute of Sedimentary and Petroleum Geology since that time were the samples used for this study. Similar work carried out in Eagle Plains Basin (Snowdon, 1988) on old cuttings yielded very good results and so the rather negative results obtained for these wells are presumed to actually be representative of the sections drilled.

The raw data are presented in Table 1 (also on diskette) and Figures 1 to 3. All depths are reported in feet because these are the units in which the wells were drilled and in which the well data are reported. The results indicate that the entire section represented in all three of these wells is at a high level of thermal maturity. With the exception of selected intervals within the Ford Lake shale in the Mallard YT O-18 well (thrust repeated) and the shallowest portion of the Porcupine G-31 well (Devonian), very few samples have total organic carbon (TOC) contents in excess of 1%. The low TOC values reflect the high maturity as well as the original organic content of these rocks.

These results are consistent with high vintrinite reflectance values (generally >2% VRo) reported by Underwood et al. (1992, Figure 8) for the Kandik River belt on the north side of the Glenn Creek Fault on the Alaska side of the border.

It must be concluded that there is no residual oil generation potential and limited to no gas generation potential for the Paleozoic sections represented in these wells. Indications from the Alaska data are that there may be some residual petroleum potential for Mesozoic and Tertiary sections over part of the Canadian portion of the Kandik Basin.

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## Appendix 1: Rock-Eval/TOC Data for Three Wells in the Kandik Basin, Western Yukon Territory

**INEXCO HUSKY AMOCO BLACKFLY M-55 0 6030 300 .50**

| DEPTH | TOC | PI | S1+S2 | TMAX | S1 | S2 | S3 | HI | OI |
|---|---|---|---|---|---|---|---|---|---|
| 60F | .54 | .61 | .74 | 366 | .45 | .29 | .84 | 53 | 155 |
| 90 | .77 | .56 | 1.65 | 377 | .92 | .73 | 1.19 | 94 | 154 |
| 120 | .82 | .59 | 2.30 | 379 | 1.35 | .95 | 1.38 | 115 | 168 |
| 140 | .77 | .54 | 1.89 | 378 | 1.03 | .86 | 1.23 | 111 | 159 |
| 180 | .79 | .58 | 1.86 | 371 | 1.08 | .78 | 1.32 | 98 | 167 |
| 240 | .32 | .69 | .48 | 332 | .33 | .15 | .20 | 46 | 62 |
| 270 | .79 | .51 | 1.27 | 345 | .65 | .62 | 1.31 | 78 | 165 |
| 300 | .87 | .49 | 2.28 | 372 | 1.12 | 1.16 | 1.42 | 133 | 163 |
| 330 | .55 | .61 | 1.02 | 371 | .62 | .40 | .52 | 72 | 94 |
| 360 | .60 | .56 | 1.31 | 337 | .74 | .57 | 1.05 | 95 | 175 |
| 390 | .54 | .71 | .76 | 369 | .54 | .22 | .19 | 40 | 35 |
| 420 | .44 | .75 | .51 | 0 | .38 | .13 | .18 | 29 | 40 |
| 470 | .54 | .69 | .78 | 382 | .54 | .24 | .23 | 44 | 42 |
| 510 | .49 | .66 | .64 | 369 | .42 | .22 | .69 | 44 | 140 |
| 540 | .61 | .68 | .82 | 374 | .56 | .26 | .49 | 42 | 80 |
| 570 | .53 | .64 | 1.14 | 362 | .73 | .41 | .40 | 77 | 75 |
| 600 | .52 | .70 | .80 | 368 | .56 | .24 | .39 | 46 | 75 |
| 630 | .60 | .63 | 1.45 | 384 | .92 | .53 | .59 | 88 | 98 |
| 700 | .90 | .62 | 3.48 | 372 | 2.16 | 1.32 | 1.12 | 146 | 124 |
| 770 | .56 | .67 | .83 | 374 | .56 | .27 | .52 | 48 | 92 |
| 810 | .59 | .63 | 1.16 | 374 | .73 | .43 | .33 | 72 | 55 |
| 840 | .69 | .56 | 1.71 | 394 | .95 | .76 | .57 | 110 | 82 |
| 870 | .49 | .69 | .75 | 363 | .52 | .23 | .21 | 46 | 42 |
| 900 | .56 | .67 | .81 | 372 | .54 | .27 | .59 | 48 | 105 |
| 930 | .54 | .75 | .55 | 362 | .41 | .14 | .25 | 25 | 46 |
| 940 | .53 | .72 | .64 | 366 | .46 | .18 | .41 | 33 | 77 |
| 990 | .51 | .71 | .80 | 364 | .57 | .23 | .33 | 45 | 64 |
| 1020 | .69 | .69 | 2.03 | 367 | 1.41 | .62 | .27 | 89 | 39 |
| 1050 | .47 | .70 | .63 | 365 | .44 | .19 | .22 | 40 | 46 |
| 1080 | .43 | .77 | .65 | 361 | .50 | .15 | .19 | 34 | 44 |
| 1110 | .51 | .72 | 1.42 | 373 | 1.02 | .40 | .23 | 78 | 45 |
| 1140 | .56 | .68 | 1.39 | 375 | .95 | .44 | .35 | 78 | 62 |
| 1170 | .50 | .69 | 1.01 | 367 | .70 | .31 | .51 | 62 | 102 |
| 1200 | .59 | .70 | 1.79 | 373 | 1.25 | .54 | .49 | 91 | 83 |
| 1230 | .40 | .75 | .51 | 368 | .38 | .13 | .55 | 32 | 137 |
| 1260 | .56 | .52 | 1.19 | 344 | .62 | .57 | 1.31 | 101 | 233 |
| 1290 | .50 | .63 | .70 | 370 | .44 | .26 | .74 | 52 | 148 |
| 1320 | .51 | .69 | 1.19 | 381 | .82 | .37 | .87 | 72 | 170 |
| 1350 | .40 | .69 | 1.34 | 382 | .92 | .42 | .52 | 105 | 130 |
| 1380 | .37 | .70 | .47 | 352 | .33 | .14 | .48 | 37 | 129 |
| 1410 | .31 | .65 | .54 | 368 | .35 | .19 | .50 | 61 | 161 |
| 1440 | .44 | .66 | .87 | 367 | .57 | .30 | .30 | 68 | 68 |
| 1460 | .51 | .69 | .99 | 365 | .68 | .31 | .16 | 60 | 31 |
| 1500 | .51 | .63 | 1.52 | 373 | .95 | .57 | .30 | 111 | 58 |
| 1540 | .17 | .73 | .67 | 366 | .49 | .18 | .12 | 105 | 70 |
| 1570 | .15 | .66 | .61 | 401 | .40 | .21 | .15 | 140 | 100 |
| 1590 | .10 | .79 | .43 | 314 | .34 | .09 | .12 | 90 | 120 |
| 1620 | .16 | .78 | .67 | 377 | .52 | .15 | .21 | 93 | 131 |
| 1680 | .20 | .73 | .40 | 363 | .29 | .11 | .09 | 55 | 45 |
| 1710 | .32 | .62 | .93 | 372 | .58 | .35 | .18 | 109 | 56 |
| 1740 | .34 | .52 | .77 | 401 | .40 | .37 | .23 | 108 | 67 |
| 1770 | .17 | .82 | .62 | 323 | .51 | .11 | .27 | 64 | 158 |
| 1800 | .18 | .80 | .82 | 371 | .66 | .16 | .25 | 88 | 138 |
| 1830 | .23 | .70 | .82 | 373 | .57 | .25 | .15 | 108 | 65 |
| 1830 | .12 | .71 | .52 | 377 | .37 | .15 | .10 | 125 | 83 |
| 1860 | .38 | .68 | 1.87 | 379 | 1.27 | .60 | .23 | 157 | 60 |
| 1890 | .16 | .79 | .85 | 379 | .67 | .18 | .38 | 112 | 237 |
| 1920 | .18 | .70 | .84 | 367 | .59 | .25 | .32 | 138 | 177 |
| 1950 | .12 | .78 | .73 | 393 | .57 | .16 | .22 | 133 | 183 |
| 1980 | .05 | .91 | .22 | 327 | .20 | .02 | .11 | 40 | 220 |
| 2010 | .31 | .67 | .61 | 371 | .41 | .20 | .16 | 64 | 51 |
| 2040 | .13 | .81 | .26 | 373 | .21 | .05 | .26 | 38 | 200 |
| 2070 | .28 | .69 | .64 | 368 | .44 | .20 | .19 | 71 | 67 |
| 2100 | .09 | .74 | .35 | 0 | .26 | .09 | .13 | 100 | 144 |
| 2130 | .03 | .79 | .14 | 403 | .11 | .03 | .22 | 100 | 733 |
| 2160 | .28 | .67 | .33 | 374 | .22 | .11 | .20 | 39 | 71 |
| 2190 | .21 | .71 | .28 | 364 | .20 | .08 | .26 | 38 | 123 |
| 2220 | .14 | .91 | .11 | 336 | .10 | .01 | .20 | 7 | 142 |
| 2250 | .29 | .61 | .57 | 378 | .35 | .22 | .57 | 75 | 196 |
| 2280 | .26 | .70 | .30 | 343 | .21 | .09 | .32 | 34 | 123 |
| 2310 | .28 | .75 | .32 | 370 | .24 | .08 | .16 | 28 | 57 |
| 2340 | .28 | .67 | .40 | 373 | .27 | .13 | .14 | 46 | 50 |
| 2370 | .21 | .74 | .27 | 323 | .20 | .07 | .13 | 33 | 61 |
| 2430 | .25 | .74 | .27 | 325 | .20 | .07 | .21 | 27 | 84 |
| 2460 | .11 | .87 | .16 | 0 | .14 | .02 | .29 | 18 | 263 |
| 2490 | .22 | .63 | .27 | 0 | .17 | .10 | .45 | 45 | 204 |
| 2520 | .37 | .77 | .26 | 393 | .20 | .06 | .38 | 16 | 102 |
| 2550 | .27 | .70 | .43 | 369 | .30 | .13 | .33 | 48 | 122 |
| 2580 | .13 | 1.00 | .10 | 0 | .10 | .00 | .25 | 0 | 192 |
| 2610 | .18 | .89 | .19 | 0 | .17 | .02 | .29 | 11 | 161 |
| 2640 | .24 | .65 | .40 | 325 | .26 | .14 | .28 | 58 | 116 |
| 2650 | .18 | .71 | .72 | 377 | .51 | .21 | .14 | 116 | 77 |
| 2670 | .03 | 1.00 | .10 | 0 | .10 | .00 | .28 | 0 | 933 |
| 2700 | .15 | .88 | .24 | 0 | .21 | .03 | .35 | 20 | 233 |
| 2730 | .07 | .86 | .21 | 0 | .18 | .03 | .09 | 42 | 128 |
| 2760 | .04 | 1.00 | .07 | 0 | .07 | .00 | .11 | 0 | 275 |
| 2790 | .08 | 1.00 | .18 | 0 | .18 | .00 | .26 | 0 | 325 |
| 2820 | .65 | .83 | 4.19 | 425 | 3.46 | .73 | .37 | 112 | 56 |
| 2850 | .11 | .93 | .30 | 0 | .28 | .02 | .21 | 18 | 190 |
| 2880 | .20 | .75 | .44 | 345 | .33 | .11 | .28 | 55 | 140 |
| 2910 | .20 | .73 | .44 | 326 | .32 | .12 | .22 | 60 | 110 |
| 2940 | .23 | .81 | .21 | 0 | .17 | .04 | .21 | 17 | 91 |
| 2970 | .14 | .71 | .48 | 0 | .34 | .14 | .11 | 100 | 78 |
| 3000 | .21 | .73 | .30 | 325 | .22 | .08 | .26 | 38 | 123 |
| 3030 | .17 | .65 | .37 | 330 | .24 | .13 | .15 | 76 | 88 |
| 3060 | .05 | .92 | .12 | 0 | .11 | .01 | .12 | 20 | 240 |
| 3090 | .10 | .79 | .29 | 408 | .23 | .06 | .13 | 60 | 130 |
| 3120 | .18 | .72 | .47 | 324 | .34 | .13 | .10 | 72 | 55 |
| 3150 | .23 | .78 | .41 | 0 | .32 | .09 | .15 | 39 | 65 |
| 3180 | .15 | .87 | .32 | 0 | .28 | .04 | .10 | 26 | 66 |
| 3210 | .22 | .73 | .37 | 368 | .27 | .10 | .18 | 45 | 81 |
| 3240 | .27 | .78 | .73 | 365 | .57 | .16 | .27 | 59 | 100 |
| 3280 | .26 | .80 | .40 | 0 | .32 | .08 | .15 | 30 | 57 |
| 3300 | .30 | .68 | .50 | 327 | .34 | .16 | .13 | 53 | 43 |
| 3330 | .25 | .78 | .32 | 0 | .25 | .07 | .14 | 27 | 55 |
| 3360 | .20 | .83 | .75 | 304 | .62 | .13 | .18 | 65 | 90 |
| 3390 | .21 | .79 | .53 | 380 | .42 | .11 | .13 | 52 | 61 |
| 3420 | .20 | .72 | .50 | 380 | .36 | .14 | .20 | 70 | 100 |
| 3450 | .34 | .74 | .80 | 370 | .59 | .21 | .21 | 61 | 61 |
| 3480 | .25 | .78 | .49 | 336 | .38 | .11 | .16 | 44 | 64 |
| 3510 | .28 | .73 | .88 | 370 | .64 | .24 | .12 | 85 | 42 |
| 3550 | .31 | .72 | .81 | 374 | .58 | .23 | .19 | 74 | 61 |
| 3570 | .23 | .69 | .62 | 376 | .43 | .19 | .10 | 82 | 43 |
| 3600 | .20 | .76 | .54 | 309 | .41 | .13 | .07 | 65 | 35 |
| 3630 | .20 | .71 | .59 | 350 | .42 | .17 | .08 | 85 | 40 |
| 3660 | .33 | .69 | .96 | 380 | .66 | .30 | .16 | 90 | 48 |
| 3690 | .21 | .75 | .51 | 374 | .38 | .13 | .14 | 61 | 66 |
| 3720 | .28 | .67 | .84 | 386 | .56 | .28 | .16 | 100 | 57 |
| 3750 | .10 | .74 | .34 | 330 | .25 | .09 | .07 | 90 | 70 |
| 3780 | .20 | .66 | .47 | 386 | .31 | .16 | .12 | 80 | 60 |
| 3810 | .23 | .68 | .66 | 392 | .45 | .21 | .34 | 91 | 147 |
| 3840 | .26 | .70 | .64 | 377 | .45 | .19 | .25 | 73 | 96 |
| 3870 | .06 | .79 | .39 | 396 | .31 | .08 | .05 | 133 | 83 |
| 3900 | .45 | .84 | 3.50 | 431 | 2.93 | .57 | .32 | 126 | 71 |
| 3930 | .02 | 1.00 | .16 | 0 | .16 | .00 | .03 | 0 | 150 |
| 3960 | .06 | .92 | .51 | 0 | .47 | .04 | .08 | 66 | 133 |
| 3990 | .04 | .88 | .34 | 0 | .30 | .04 | .07 | 100 | 174 |
| 4030 | .04 | .95 | .21 | 0 | .20 | .01 | .05 | 25 | 125 |
| 4050 | .03 | .96 | .26 | 0 | .25 | .01 | .13 | 33 | 433 |
| 4080 | .04 | 1.00 | .28 | 0 | .28 | .00 | .07 | 0 | 174 |
| 4110 | .07 | .96 | .28 | 0 | .27 | .01 | .23 | 14 | 328 |
| 4140 | .03 | .96 | .27 | 354 | .26 | .01 | .16 | 33 | 533 |
| 4170 | .05 | 1.00 | .13 | 0 | .13 | .00 | .13 | 0 | 260 |
| 4200 | .03 | 1.00 | .13 | 0 | .13 | .00 | .10 | 0 | 333 |
| 4230 | .09 | .88 | .26 | 0 | .23 | .03 | .12 | 33 | 133 |
| 4260 | .02 | 1.00 | .15 | 0 | .15 | .00 | .13 | 0 | 650 |
| 4290 | 70.09 | .94 | .17 | 0 | .16 | .01 | .23 | 0 | 0 |
| 4320 | .05 | 1.00 | .11 | 0 | .11 | .00 | .13 | 0 | 260 |
| 4350 | .08 | .57 | .28 | 421 | .16 | .12 | .33 | 150 | 412 |
| 4380 | .03 | 1.00 | .09 | 0 | .09 | .00 | .06 | 0 | 200 |
| 4410 | .04 | .95 | .19 | 0 | .18 | .01 | .08 | 25 | 200 |
| 4440 | .08 | .84 | .38 | 0 | .32 | .06 | .15 | 75 | 187 |
| 4470 | .06 | .95 | .20 | 0 | .19 | .01 | .08 | 16 | 133 |
| 4510 | .07 | .95 | .20 | 0 | .19 | .01 | .10 | 14 | 142 |
| 4530 | .11 | .95 | .21 | 0 | .20 | .01 | .10 | 9 | 90 |

**INEXCO HUSKY AMOCO BLACKFLY M-55 0 6030 300 .50**

| DEPTH | TOC | PI | S1+S2 | TMAX | S1 | S2 | S3 | HI | OI |
|---|---|---|---|---|---|---|---|---|---|
| 4560 | .03 | 1.00 | .14 | 0 | .14 | .00 | .16 | 0 | 533 |
| 4590 | .08 | .89 | .37 | 0 | .33 | .04 | .10 | 50 | 125 |
| 4620 | .02 | 1.00 | .09 | 0 | .09 | .00 | .06 | 0 | 300 |
| 4650 | .12 | .80 | .20 | 0 | .16 | .04 | .08 | 33 | 66 |
| 4680 | .10 | .87 | .23 | 379 | .20 | .03 | .09 | 30 | 90 |
| 4710 | .10 | .90 | .20 | 420 | .18 | .02 | .05 | 20 | 50 |
| 4740 | .10 | .84 | .32 | 0 | .27 | .05 | .08 | 50 | 80 |
| 4770 | .09 | .82 | .17 | 0 | .14 | .03 | .15 | 33 | 166 |
| 4800 | .16 | .88 | .17 | 0 | .15 | .02 | .11 | 12 | 68 |
| 4830 | .20 | .94 | .17 | 0 | .16 | .01 | .16 | 5 | 80 |
| 4860 | .16 | .78 | .27 | 0 | .21 | .06 | .11 | 37 | 68 |
| 4890 | .17 | .88 | .24 | 401 | .21 | .03 | .08 | 17 | 47 |
| 4910 | .25 | .51 | .85 | 387 | .43 | .42 | .17 | 168 | 68 |
| 4950 | .10 | .81 | .36 | 313 | .29 | .07 | .14 | 70 | 140 |
| 4980 | .08 | 1.00 | .15 | 0 | .15 | .00 | .06 | 0 | 75 |
| 5010 | .12 | .81 | .21 | 0 | .17 | .04 | .11 | 33 | 91 |
| 5040 | .15 | .72 | .36 | 0 | .26 | .10 | .06 | 66 | 40 |
| 5070 | .21 | .77 | .31 | 0 | .24 | .07 | .09 | 33 | 42 |
| 5100 | .18 | .66 | .35 | 318 | .23 | .12 | .10 | 66 | 55 |
| 5130 | .14 | .56 | .18 | 408 | .10 | .08 | .11 | 57 | 78 |
| 5160 | .17 | .78 | .72 | 395 | .56 | .16 | .20 | 94 | 117 |
| 5190 | .09 | .92 | .12 | 0 | .11 | .01 | .07 | 11 | 77 |
| 5200 | .15 | .65 | .26 | 342 | .17 | .09 | .21 | 60 | 140 |
| 5310 | .18 | .75 | .20 | 0 | .15 | .05 | .24 | 27 | 133 |
| 5340 | .17 | .67 | .18 | 323 | .12 | .06 | .15 | 35 | 88 |
| 5370 | .18 | .73 | .22 | 380 | .16 | .06 | .26 | 33 | 144 |
| 5400 | .31 | .88 | 1.97 | 374 | 1.74 | .23 | .08 | 74 | 25 |
| 5430 | .22 | .67 | .43 | 386 | .29 | .14 | .11 | 63 | 50 |
| 5460 | .15 | .75 | .12 | 0 | .09 | .03 | .14 | 20 | 93 |
| 5490 | .20 | .90 | .10 | 0 | .09 | .01 | .25 | 5 | 125 |
| 5520 | .17 | 1.00 | .07 | 0 | .07 | .00 | .22 | 0 | 129 |
| 5550 | .20 | .75 | .08 | 0 | .06 | .02 | .24 | 10 | 120 |
| 5580 | .18 | .78 | .18 | 0 | .14 | .04 | .11 | 22 | 61 |
| 5610 | .13 | 1.00 | .07 | 0 | .07 | .00 | .12 | 0 | 92 |
| 5640 | .15 | 1.00 | .08 | 0 | .08 | .00 | .14 | 0 | 93 |
| 5670 | .15 | 1.00 | .11 | 0 | .11 | .00 | .10 | 0 | 66 |
| 5700 | .30 | .74 | .42 | 0 | .31 | .11 | .06 | 36 | 20 |
| 5730 | .19 | .92 | .12 | 0 | .11 | .01 | .22 | 5 | 115 |
| 5760 | .13 | .82 | .11 | 0 | .09 | .02 | .13 | 15 | 100 |
| 5790 | .25 | .92 | .12 | 0 | .11 | .01 | .29 | 4 | 116 |
| 5820 | .25 | .72 | .18 | 305 | .13 | .05 | .19 | 20 | 76 |
| 5850 | .27 | .78 | .36 | 0 | .28 | .08 | .14 | 29 | 51 |
| 5880 | .23 | .82 | .22 | 0 | .18 | .04 | .11 | 17 | 47 |
| 5910 | .26 | .83 | .24 | 0 | .20 | .04 | .08 | 15 | 30 |
| 5940 | .28 | .90 | .21 | 0 | .19 | .02 | .14 | 7 | 50 |
| 5970 | .33 | .85 | .20 | 382 | .17 | .03 | .12 | 9 | 36 |
| 6000 | .71 | .81 | 3.54 | 373 | 2.88 | .66 | .14 | 92 | 19 |
| 6030 | .53 | .79 | .62 | 390 | .49 | .13 | .05 | 24 | 9 |

| | |
|---|---|
| Jungle Creek Fm | -1528F |
| Ettrain Fm | -3887 |
| Blackie Fm | -4644 |
| Ford Lake Sh | -6790 |

## Appendix 1: Rock-Eval/TOC Data for Three Wells in the Kandik Basin, Western Yukon Territory

**INEXCO MALLARD YT O-18 010440 300 .50**

| DEPTH | TOC | PI | S1+S2 | TMAX | S1 | S2 | S3 | HI | OI |
|---|---|---|---|---|---|---|---|---|---|
| 50F | 1.15 | .33 | 3.74 | 382 | 1.22 | 2.52 | 1.19 | 219 | 103 |
| 80 | .59 | .89 | .27 | 406 | .24 | .03 | .14 | 5 | 23 |
| 110 | 1.40 | 1.00 | .13 | 0 | .13 | .00 | .24 | 0 | 17 |
| 140 | .65 | .78 | .18 | 0 | .14 | .04 | .10 | 6 | 15 |
| 170 | .45 | 1.00 | .10 | 0 | .10 | .00 | .55 | 0 | 122 |
| 200 | .35 | 1.00 | .10 | 0 | .10 | .00 | .08 | 0 | 22 |
| 230 | .38 | .81 | .16 | 0 | .13 | .03 | .07 | 7 | 18 |
| 260 | .45 | .74 | .27 | 312 | .20 | .07 | .12 | 15 | 26 |
| 290 | .34 | 1.00 | .14 | 0 | .14 | .00 | .08 | 0 | 23 |
| 320 | .33 | .75 | .24 | 363 | .18 | .06 | .12 | 18 | 36 |
| 350 | .45 | .52 | .31 | 361 | .16 | .15 | .54 | 33 | 120 |
| 380 | .39 | .68 | .25 | 422 | .17 | .08 | .21 | 20 | 53 |
| 410 | .27 | .63 | .16 | 312 | .10 | .06 | .12 | 22 | 44 |
| 440 | .56 | .91 | .22 | 0 | .20 | .02 | .14 | 3 | 25 |
| 470 | .33 | 1.00 | .07 | 0 | .07 | .00 | .06 | 0 | 18 |
| 500 | .29 | 1.00 | .08 | 0 | .08 | .00 | .04 | 0 | 13 |
| 530 | .23 | .50 | .12 | 372 | .06 | .06 | .06 | 26 | 26 |
| 560 | .32 | .56 | .09 | 368 | .05 | .04 | .10 | 12 | 31 |
| 590 | .63 | .10 | .71 | 377 | .07 | .64 | .83 | 101 | 131 |
| 620 | .34 | .41 | .22 | 385 | .09 | .13 | .12 | 38 | 35 |
| 650 | .20 | .50 | .10 | 312 | .05 | .05 | .05 | 25 | 25 |
| 680 | .28 | .41 | .29 | 367 | .12 | .17 | .14 | 60 | 50 |
| 710 | .20 | .44 | .18 | 375 | .08 | .10 | .05 | 50 | 25 |
| 740 | .19 | .57 | .14 | 373 | .08 | .06 | .03 | 31 | 15 |
| 770 | .13 | .47 | .17 | 373 | .08 | .09 | .02 | 69 | 15 |
| 800 | .14 | .39 | .18 | 390 | .07 | .11 | .06 | 78 | 42 |
| 830 | .40 | .12 | .81 | 377 | .10 | .71 | .83 | 177 | 207 |
| 860 | .10 | .39 | .18 | 372 | .07 | .11 | .05 | 110 | 50 |
| 890 | .13 | .31 | .16 | 374 | .05 | .11 | .08 | 84 | 61 |
| 920 | .10 | .41 | .22 | 371 | .09 | .13 | .12 | 130 | 120 |
| 950 | .06 | .38 | .08 | 332 | .03 | .05 | .04 | 83 | 66 |
| 980 | .07 | .43 | .07 | 324 | .03 | .04 | .16 | 57 | 228 |
| 1010 | .06 | .38 | .08 | 350 | .03 | .05 | .02 | 83 | 33 |
| 1040 | .08 | .33 | .09 | 360 | .03 | .06 | .03 | 75 | 37 |
| 1070 | .12 | .52 | .29 | 339 | .15 | .14 | .13 | 116 | 108 |
| 1100 | .06 | .40 | .05 | 380 | .02 | .03 | .02 | 50 | 33 |
| 1130 | .12 | .38 | .13 | 374 | .05 | .08 | .03 | 66 | 25 |
| 1160 | .07 | .67 | .06 | 317 | .04 | .02 | .03 | 28 | 42 |
| 1190 | .03 | .38 | .08 | 321 | .03 | .05 | .01 | 166 | 33 |
| 1250 | .06 | 1.00 | .05 | 0 | .05 | .00 | .02 | 0 | 33 |
| 1280 | .06 | .67 | .09 | 0 | .06 | .03 | .06 | 50 | 100 |
| 1310 | .11 | .52 | .23 | 0 | .12 | .11 | .19 | 100 | 172 |
| 1340 | .10 | .85 | .13 | 312 | .11 | .02 | .06 | 20 | 60 |
| 1370 | .14 | .82 | .17 | 312 | .14 | .03 | .04 | 21 | 28 |
| 1400 | .14 | .81 | .21 | 424 | .17 | .04 | .05 | 28 | 35 |
| 1430 | .35 | .96 | .23 | 0 | .22 | .01 | .06 | 2 | 17 |
| 1460 | .19 | .71 | .28 | 304 | .20 | .08 | .06 | 42 | 31 |
| 1490 | .05 | .75 | .16 | 300 | .12 | .04 | .07 | 80 | 140 |
| 1520 | .07 | 1.00 | .07 | 0 | .07 | .00 | .02 | 0 | 28 |
| 1550 | .16 | 1.00 | .12 | 0 | .12 | .00 | .05 | 0 | 31 |
| 1580 | .19 | .86 | .14 | 303 | .12 | .02 | .05 | 10 | 26 |
| 1610 | .14 | .73 | .22 | 370 | .16 | .06 | .05 | 42 | 35 |
| 1640 | .47 | .81 | .26 | 312 | .21 | .05 | .08 | 10 | 17 |
| 1670 | .22 | .62 | .21 | 348 | .13 | .08 | .08 | 36 | 36 |
| 1700 | .32 | .77 | .47 | 0 | .36 | .11 | .09 | 34 | 28 |
| 1730 | .33 | .71 | .41 | 321 | .29 | .12 | .10 | 36 | 30 |
| 1760 | .39 | .78 | .18 | 393 | .14 | .04 | .08 | 10 | 20 |
| 1790 | .45 | .63 | .27 | 307 | .17 | .10 | .11 | 22 | 24 |
| 1820 | .36 | .82 | .17 | 311 | .14 | .03 | .07 | 8 | 19 |
| 1850 | .50 | .63 | .67 | 385 | .42 | .25 | .13 | 50 | 26 |
| 1880 | .33 | .86 | .14 | 324 | .12 | .02 | .06 | 6 | 18 |
| 1910 | .41 | .67 | .43 | 416 | .29 | .14 | .14 | 34 | 34 |
| 1940 | .20 | .63 | .38 | 385 | .24 | .14 | .07 | 70 | 35 |
| 1970 | .38 | .73 | .48 | 354 | .35 | .13 | .12 | 34 | 31 |
| 2000 | .40 | .92 | .12 | 0 | .11 | .01 | .05 | 2 | 12 |
| 2030 | .25 | .58 | .43 | 409 | .25 | .18 | .15 | 72 | 60 |
| 2060 | .33 | .72 | .36 | 379 | .26 | .10 | .10 | 30 | 30 |
| 2090 | .23 | .54 | .37 | 408 | .20 | .17 | .12 | 73 | 52 |
| 2120 | .19 | .81 | .21 | 327 | .17 | .04 | .10 | 21 | 52 |
| 2150 | .25 | .68 | .25 | 326 | .17 | .08 | .06 | 32 | 24 |
| 2180 | .26 | .63 | .40 | 394 | .25 | .15 | .09 | 57 | 34 |
| 2210 | .44 | .80 | .25 | 309 | .20 | .05 | .06 | 11 | 13 |
| 2240 | .91 | 1.00 | .01 | 0 | .01 | .00 | .06 | 0 | 6 |
| 2270 | .30 | .00 | .01 | 0 | .00 | .01 | .03 | 3 | 10 |
| 2300 | .29 | .67 | .40 | 338 | .27 | .13 | .10 | 44 | 34 |
| 2330 | .35 | .73 | .40 | 0 | .29 | .11 | .11 | 31 | 31 |
| 2360 | .30 | .69 | .26 | 305 | .18 | .08 | .11 | 26 | 36 |
| 2390 | .40 | .71 | .35 | 304 | .25 | .10 | .10 | 25 | 25 |
| 2420 | .33 | .81 | .31 | 0 | .25 | .06 | .09 | 18 | 27 |
| 2450 | .33 | .55 | .56 | 395 | .31 | .25 | .14 | 75 | 42 |
| 2480 | .31 | .73 | .26 | 302 | .19 | .07 | .09 | 22 | 29 |
| 2510 | .13 | .74 | .19 | 389 | .14 | .05 | .09 | 38 | 69 |
| 2540 | .33 | .65 | .34 | 330 | .22 | .12 | .11 | 36 | 33 |
| 2570 | .25 | .72 | .25 | 349 | .18 | .07 | .12 | 27 | 48 |
| 2630 | .09 | .78 | .09 | 423 | .07 | .02 | .12 | 22 | 133 |
| 2660 | .28 | .76 | .33 | 301 | .25 | .08 | .14 | 28 | 50 |
| 2690 | .73 | .83 | .30 | 0 | .25 | .05 | .12 | 6 | 16 |
| 2730 | .65 | .65 | .20 | 305 | .13 | .07 | .15 | 10 | 23 |
| 2750 | .27 | .64 | .25 | 353 | .16 | .09 | .11 | 33 | 40 |
| 2780 | .49 | .74 | .27 | 0 | .20 | .07 | .12 | 14 | 24 |
| 2810 | .23 | .89 | .09 | 0 | .08 | .01 | .07 | 4 | 30 |
| 2840 | .19 | .79 | .19 | 0 | .15 | .04 | .08 | 21 | 42 |
| 2870 | .26 | .69 | .42 | 312 | .29 | .13 | .12 | 50 | 46 |
| 2900 | .15 | .71 | .21 | 0 | .15 | .06 | .07 | 40 | 46 |
| 2930 | .11 | .90 | .10 | 0 | .09 | .01 | .04 | 9 | 36 |
| 2960 | .18 | .85 | .20 | 312 | .17 | .03 | .07 | 16 | 38 |
| 2990 | .11 | .92 | .12 | 0 | .11 | .01 | .04 | 9 | 36 |
| 3020 | .11 | .85 | .13 | 0 | .11 | .02 | .09 | 18 | 81 |
| 3050 | .09 | .83 | .12 | 0 | .10 | .02 | .07 | 22 | 77 |
| 3080 | .42 | .69 | .51 | 426 | .35 | .16 | .13 | 38 | 30 |
| 3110 | .31 | .64 | .59 | 399 | .38 | .21 | .18 | 67 | 58 |
| 3140 | 1.07 | .70 | .27 | 349 | .19 | .08 | .17 | 7 | 15 |
| 3170 | .14 | .68 | .19 | 343 | .13 | .06 | .10 | 42 | 71 |
| 3200 | .63 | .71 | .17 | 304 | .12 | .05 | .11 | 7 | 17 |
| 3230 | .14 | .67 | .24 | 339 | .16 | .08 | .09 | 57 | 64 |
| 3260 | .53 | .71 | .28 | 0 | .20 | .08 | .16 | 15 | 30 |
| 3290 | 1.30 | .85 | .13 | 0 | .11 | .02 | .13 | 1 | 10 |
| 3320 | .25 | .73 | .22 | 301 | .16 | .06 | .11 | 24 | 44 |
| 3350 | .22 | .71 | .31 | 381 | .22 | .09 | .13 | 40 | 59 |
| 3380 | .15 | .75 | .08 | 0 | .06 | .02 | .08 | 13 | 53 |
| 3440 | 1.41 | .68 | .38 | 319 | .26 | .12 | .14 | 8 | 9 |
| 3470 | 3.48 | 1.00 | .02 | 0 | .02 | .00 | .23 | 0 | 6 |
| 3500 | 4.31 | 1.00 | .02 | 0 | .02 | .00 | .38 | 0 | 8 |
| 3530 | 4.22 | .00 | .01 | 0 | .00 | .01 | .37 | 0 | 8 |
| 3560 | 3.44 | .75 | .08 | 377 | .06 | .02 | .30 | 0 | 8 |
| 3590 | 3.82 | .71 | .07 | 306 | .05 | .02 | .40 | 0 | 10 |
| 3620 | 4.02 | .00 | .01 | 0 | .00 | .01 | .28 | 0 | 6 |
| 3650 | .94 | .82 | .22 | 0 | .18 | .04 | .14 | 4 | 14 |
| 3650 | 3.08 | .00 | .01 | 0 | .00 | .01 | .27 | 0 | 8 |
| 3710 | .54 | .61 | .23 | 312 | .14 | .09 | .10 | 16 | 18 |
| 3740 | .85 | 1.00 | .08 | 0 | .08 | .00 | .08 | 0 | 9 |
| 3770 | .80 | .72 | .32 | 329 | .23 | .09 | .15 | 11 | 18 |
| 3800 | .95 | .92 | .12 | 0 | .11 | .01 | .12 | 1 | 12 |
| 3830 | .79 | .77 | .13 | 0 | .10 | .03 | .14 | 3 | 17 |
| 3860 | .51 | .93 | .14 | 0 | .13 | .01 | .09 | 1 | 17 |
| 3890 | .37 | .85 | .20 | 0 | .17 | .03 | .10 | 8 | 27 |
| 3920 | .36 | .75 | .28 | 0 | .21 | .07 | .09 | 19 | 25 |
| 3950 | 1.03 | .92 | .13 | 0 | .12 | .01 | .13 | 0 | 12 |
| 3980 | .36 | .85 | .13 | 371 | .11 | .02 | .10 | 5 | 27 |
| 4010 | .71 | 1.00 | .10 | 0 | .10 | .00 | .09 | 0 | 12 |
| 4040 | .51 | .68 | .19 | 302 | .13 | .06 | .09 | 11 | 17 |
| 4070 | .61 | .86 | .14 | 0 | .12 | .02 | .07 | 3 | 11 |
| 4100 | .41 | .82 | .17 | 0 | .14 | .03 | .09 | 7 | 21 |
| 4130 | .31 | .93 | .14 | 0 | .13 | .01 | .07 | 3 | 22 |
| 4160 | .47 | .93 | .14 | 301 | .13 | .01 | .07 | 2 | 14 |
| 4190 | .59 | .91 | .11 | 304 | .10 | .01 | .07 | 1 | 11 |
| 4220 | .26 | 1.00 | .13 | 0 | .13 | .00 | .06 | 0 | 23 |
| 4250 | .30 | 1.00 | .10 | 0 | .10 | .00 | .05 | 0 | 16 |
| 4280 | .57 | .91 | .11 | 0 | .10 | .01 | .08 | 1 | 14 |
| 4310 | .61 | .82 | .17 | 0 | .14 | .03 | .08 | 4 | 13 |
| 4340 | .55 | .81 | .21 | 312 | .17 | .04 | .09 | 7 | 16 |
| 4370 | .61 | .63 | .62 | 386 | .39 | .23 | .14 | 37 | 22 |
| 4400 | .56 | .84 | .19 | 362 | .16 | .03 | .09 | 5 | 16 |
| 4430 | .64 | .60 | .43 | 381 | .26 | .17 | .11 | 26 | 17 |
| 4460 | .60 | .88 | .17 | 343 | .15 | .02 | .11 | 3 | 18 |
| 4490 | .50 | .94 | .17 | 0 | .16 | .01 | .09 | 2 | 18 |

**INEXCO MALLARD YT O-18 010440 300 .50**

| DEPTH | TOC | PI | S1+S2 | TMAX | S1 | S2 | S3 | HI | OI |
|---|---|---|---|---|---|---|---|---|---|
| 4520 | 1.30 | 1.00 | .10 | 0 | .10 | .00 | .12 | 0 | 9 |
| 4550 | .57 | .82 | .11 | 0 | .09 | .02 | .08 | 3 | 14 |
| 4580 | .47 | 1.00 | .07 | 0 | .07 | .00 | .05 | 0 | 10 |
| 4610 | .84 | .65 | .20 | 331 | .13 | .07 | .13 | 8 | 15 |
| 4640 | .69 | 1.00 | .11 | 0 | .11 | .00 | .07 | 0 | 10 |
| 4670 | 1.02 | 1.00 | .09 | 0 | .09 | .00 | .11 | 0 | 10 |
| 4700 | 1.07 | .78 | .36 | 0 | .28 | .08 | .15 | 7 | 14 |
| 4730 | .84 | .68 | .38 | 331 | .26 | .12 | .18 | 14 | 21 |
| 4760 | .65 | 1.00 | .08 | 0 | .08 | .00 | .10 | 0 | 15 |
| 4790 | .98 | .93 | .15 | 394 | .14 | .01 | .14 | 1 | 14 |
| 4820 | .58 | .83 | .12 | 0 | .10 | .02 | .15 | 3 | 25 |
| 4850 | .39 | .92 | .13 | 0 | .12 | .01 | .08 | 2 | 20 |
| 4880 | .75 | .86 | .14 | 0 | .12 | .02 | .12 | 2 | 16 |
| 4910 | .53 | 1.00 | .06 | 0 | .06 | .00 | .09 | 0 | 16 |
| 4940 | .65 | 1.00 | .09 | 0 | .09 | .00 | .09 | 0 | 13 |
| 4970 | .37 | .63 | .43 | 383 | .27 | .16 | .09 | 43 | 24 |
| 5000 | .40 | .71 | .17 | 351 | .12 | .05 | .08 | 12 | 20 |
| 5030 | .29 | .85 | .13 | 0 | .11 | .02 | .07 | 6 | 24 |
| 5060 | .25 | .74 | .19 | 308 | .14 | .05 | .09 | 20 | 36 |
| 5090 | .43 | .83 | .24 | 0 | .20 | .04 | .21 | 9 | 48 |
| 5120 | .23 | .78 | .23 | 0 | .18 | .05 | .08 | 21 | 34 |
| 5150 | .28 | .79 | .24 | 0 | .19 | .05 | .11 | 17 | 39 |
| 5180 | .31 | .86 | .36 | 391 | .31 | .05 | .21 | 16 | 67 |
| 5210 | .35 | .80 | .30 | 0 | .24 | .06 | .11 | 17 | 31 |
| 5240 | .36 | .77 | .35 | 0 | .27 | .08 | .10 | 22 | 27 |
| 5270 | .37 | .71 | .48 | 0 | .34 | .14 | .12 | 37 | 32 |
| 5300 | .29 | .90 | .20 | 0 | .18 | .02 | .08 | 6 | 27 |
| 5330 | .21 | .82 | .22 | 301 | .18 | .04 | .08 | 19 | 38 |
| 5360 | .39 | .79 | .29 | 0 | .23 | .06 | .12 | 15 | 30 |
| 5390 | .29 | .69 | .51 | 343 | .35 | .16 | .12 | 55 | 41 |
| 5420 | .22 | .88 | .17 | 0 | .15 | .02 | .07 | 9 | 31 |
| 5450 | .33 | .58 | .26 | 340 | .15 | .11 | .08 | 33 | 24 |
| 5480 | .35 | .69 | .26 | 333 | .18 | .08 | .07 | 22 | 19 |
| 5510 | .35 | .70 | .23 | 361 | .16 | .07 | .11 | 19 | 31 |
| 5540 | .21 | .75 | .28 | 301 | .21 | .07 | .09 | 33 | 42 |
| 5570 | .38 | .92 | .25 | 302 | .23 | .02 | .07 | 5 | 18 |
| 5600 | .43 | .49 | .82 | 437 | .40 | .42 | .11 | 97 | 25 |
| 5630 | .55 | .50 | .76 | 396 | .38 | .38 | .21 | 69 | 38 |
| 5660 | .38 | .63 | .27 | 368 | .17 | .10 | .10 | 26 | 26 |
| 5690 | .40 | .56 | .62 | 354 | .35 | .27 | .12 | 67 | 30 |
| 5720 | .54 | .41 | 1.16 | 398 | .48 | .68 | .56 | 125 | 103 |
| 5750 | .62 | .36 | 1.17 | 414 | .42 | .75 | .21 | 120 | 33 |
| 5780 | .41 | .79 | .38 | 0 | .30 | .08 | .09 | 19 | 21 |
| 5810 | .39 | .76 | .49 | 310 | .37 | .12 | .09 | 30 | 23 |
| 5840 | .58 | .66 | .32 | 302 | .21 | .11 | .10 | 18 | 17 |
| 5870 | .55 | .54 | .37 | 459 | .20 | .17 | .11 | 30 | 20 |
| 5900 | .37 | .75 | .32 | 0 | .24 | .08 | .07 | 21 | 18 |
| 5930 | .34 | .63 | .35 | 399 | .22 | .13 | .08 | 38 | 23 |
| 5960 | .48 | .86 | .29 | 0 | .25 | .04 | .08 | 8 | 16 |
| 5990 | .45 | .67 | .49 | 334 | .33 | .16 | .11 | 35 | 24 |
| 6020 | 1.12 | .56 | 1.05 | 392 | .59 | .46 | .17 | 41 | 15 |
| 6050 | 1.42 | 1.00 | .12 | 0 | .12 | .00 | .13 | 0 | 9 |
| 6090 | 2.32 | 1.00 | .03 | 0 | .03 | .00 | .20 | 0 | 8 |
| 6110 | 2.31 | .80 | .15 | 0 | .12 | .03 | .17 | 1 | 7 |
| 6140 | .72 | .52 | .93 | 395 | .48 | .45 | .14 | 62 | 19 |
| 6170 | 1.92 | .74 | .31 | 355 | .23 | .08 | .18 | 4 | 9 |
| 6200 | .89 | .66 | .35 | 335 | .23 | .12 | .10 | 13 | 11 |
| 6230 | 1.28 | .67 | .36 | 354 | .24 | .12 | .18 | 9 | 14 |
| 6260 | 1.57 | .64 | .28 | 353 | .18 | .10 | .15 | 6 | 9 |
| 6290 | 1.14 | .72 | .18 | 0 | .13 | .05 | .10 | 4 | 8 |
| 6320 | .79 | .60 | .20 | 397 | .12 | .08 | .13 | 10 | 16 |
| 6350 | .42 | .81 | .27 | 364 | .22 | .05 | .10 | 11 | 23 |
| 6380 | .38 | .77 | .30 | 310 | .23 | .07 | .07 | 18 | 18 |
| 6410 | .37 | .64 | .36 | 0 | .23 | .13 | .11 | 35 | 29 |
| 6440 | .35 | .62 | .26 | 342 | .16 | .10 | .12 | 28 | 34 |
| 6470 | .34 | .62 | .29 | 338 | .18 | .11 | .10 | 32 | 29 |
| 6500 | .45 | .55 | .40 | 405 | .22 | .18 | .16 | 40 | 35 |
| 6530 | .59 | .49 | 1.42 | 395 | .70 | .72 | .14 | 122 | 23 |
| 6560 | 1.03 | .76 | .33 | 371 | .25 | .08 | .13 | 7 | 12 |
| 6590 | .59 | .47 | .94 | 421 | .44 | .50 | .20 | 84 | 33 |
| 6620 | .58 | .57 | .65 | 388 | .37 | .28 | .12 | 48 | 20 |
| 6650 | .27 | .49 | .61 | 394 | .30 | .31 | .08 | 114 | 29 |
| 6680 | .22 | .83 | .40 | 363 | .33 | .07 | .05 | 31 | 22 |
| 6710 | .71 | .38 | 2.59 | 395 | .99 | 1.60 | .46 | 225 | 64 |
| 6740 | .55 | .52 | .46 | 377 | .24 | .22 | .24 | 40 | 43 |
| 6770 | .55 | .42 | .26 | 375 | .11 | .15 | .09 | 27 | 16 |
| 6800 | .76 | .53 | .34 | 371 | .18 | .16 | .08 | 21 | 10 |
| 6830 | .25 | .57 | .14 | 337 | .08 | .06 | .07 | 24 | 27 |
| 6860 | .36 | .25 | .60 | 386 | .15 | .45 | .10 | 125 | 27 |
| 6890 | 1.59 | .49 | .37 | 376 | .18 | .19 | .15 | 11 | 9 |
| 6920 | 1.03 | .48 | .27 | 375 | .13 | .14 | .12 | 13 | 11 |
| 6950 | 1.08 | .66 | 7.00 | 375 | 4.61 | 2.39 | .37 | 221 | 34 |
| 6980 | .28 | .32 | .34 | 379 | .11 | .23 | .11 | 82 | 39 |
| 7010 | .54 | .40 | .58 | 381 | .23 | .35 | .09 | 64 | 16 |
| 7040 | .70 | .34 | 1.11 | 383 | .38 | .73 | .33 | 104 | 47 |
| 7100 | .53 | .58 | .38 | 358 | .22 | .16 | .15 | 30 | 28 |
| 7130 | .96 | .60 | .15 | 404 | .09 | .06 | .20 | 6 | 20 |
| 7160 | .30 | .74 | .34 | 304 | .25 | .09 | .14 | 30 | 46 |
| 7190 | .40 | .60 | .43 | 323 | .26 | .17 | .15 | 42 | 37 |
| 7220 | .42 | .64 | .59 | 349 | .38 | .21 | .20 | 50 | 47 |
| 7250 | .25 | .55 | .49 | 424 | .27 | .22 | .20 | 88 | 80 |
| 7280 | .27 | .64 | .36 | 312 | .23 | .13 | .12 | 48 | 44 |
| 7310 | .40 | .62 | .45 | 347 | .28 | .17 | .23 | 42 | 57 |
| 7340 | .38 | .73 | .30 | 309 | .22 | .08 | .16 | 21 | 42 |
| 7370 | .38 | .60 | .55 | 390 | .33 | .22 | .19 | 57 | 50 |
| 7410 | .38 | .53 | .55 | 389 | .29 | .26 | .21 | 68 | 55 |
| 7470 | .26 | .57 | .47 | 387 | .27 | .20 | .19 | 76 | 73 |
| 7500 | .17 | .63 | .32 | 351 | .20 | .12 | .15 | 70 | 88 |
| 7530 | .15 | .43 | .37 | 447 | .16 | .21 | .15 | 140 | 100 |
| 7550 | .16 | .58 | .26 | 383 | .15 | .11 | .15 | 68 | 93 |
| 7590 | .50 | .68 | .19 | 302 | .13 | .06 | .14 | 12 | 27 |
| 7620 | .22 | .65 | .31 | 382 | .20 | .11 | .13 | 50 | 59 |
| 7660 | .34 | .63 | .32 | 302 | .20 | .12 | .11 | 35 | 32 |
| 7690 | .30 | .67 | .66 | 391 | .44 | .22 | .21 | 73 | 70 |
| 7710 | .31 | .26 | .94 | 451 | .24 | .70 | .17 | 225 | 54 |
| 7740 | .28 | .59 | .37 | 388 | .22 | .15 | .30 | 53 | 107 |
| 7770 | .44 | .71 | .31 | 0 | .22 | .09 | .17 | 20 | 38 |
| 7800 | .20 | .61 | .28 | 362 | .17 | .11 | .16 | 55 | 80 |
| 7830 | .40 | .67 | .39 | 359 | .26 | .13 | .20 | 32 | 50 |
| 7870 | .68 | .70 | .20 | 312 | .14 | .06 | .14 | 8 | 20 |
| 7890 | .31 | .71 | .17 | 311 | .12 | .05 | .18 | 16 | 58 |
| 7920 | .28 | .59 | .27 | 332 | .16 | .11 | .19 | 39 | 67 |
| 7980 | .35 | .10 | 1.47 | 451 | .15 | 1.32 | .16 | 377 | 45 |
| 8010 | .17 | .69 | .32 | 446 | .22 | .10 | .22 | 58 | 129 |
| 8040 | .32 | .70 | .54 | 359 | .38 | .16 | .38 | 50 | 118 |
| 8070 | .28 | .72 | .29 | 368 | .21 | .08 | .11 | 28 | 39 |
| 8100 | .92 | .80 | .15 | 306 | .12 | .03 | .10 | 3 | 10 |
| 8130 | .50 | .89 | .18 | 306 | .16 | .02 | .08 | 4 | 16 |
| 8160 | 2.22 | .67 | .12 | 312 | .08 | .04 | .16 | 1 | 7 |
| 8190 | 2.95 | .65 | .17 | 356 | .11 | .06 | .25 | 2 | 8 |
| 8220 | 4.81 | .04 | 9.30 | 436 | .38 | 8.92 | .38 | 185 | 7 |
| 8250 | 3.83 | .60 | .10 | 442 | .06 | .04 | .30 | 1 | 7 |
| 8280 | 3.76 | .54 | .13 | 422 | .07 | .06 | .41 | 1 | 10 |
| 8310 | 4.16 | 1.00 | .03 | 0 | .03 | .00 | .25 | 0 | 6 |
| 8340 | 2.98 | .50 | .12 | 306 | .06 | .06 | .23 | 2 | 7 |
| 8370 | 1.72 | 1.00 | .05 | 0 | .05 | .00 | .13 | 0 | 7 |
| 8400 | 1.37 | .86 | .07 | 0 | .06 | .01 | .13 | 0 | 9 |
| 8430 | 2.26 | .75 | .04 | 0 | .03 | .01 | .12 | 0 | 5 |
| 8460 | 2.01 | 1.00 | .03 | 0 | .03 | .00 | .17 | 0 | 8 |
| 8490 | 1.92 | 1.00 | .01 | 0 | .01 | .00 | .14 | 0 | 7 |
| 8520 | 2.66 | .57 | .07 | 341 | .04 | .03 | .13 | 1 | 4 |
| 8550 | 2.24 | .60 | .05 | 334 | .03 | .02 | .16 | 0 | 7 |
| 8580 | 3.07 | 1.00 | .04 | 0 | .04 | .00 | .21 | 0 | 6 |
| 8610 | 3.18 | 1.00 | .03 | 0 | .03 | .00 | .17 | 0 | 5 |
| 8640 | 3.39 | .75 | .04 | 0 | .03 | .01 | .25 | 0 | 7 |
| 8670 | 2.85 | .00 | .01 | 0 | .00 | .01 | .15 | 0 | 5 |
| 8700 | 2.98 | .00 | .01 | 0 | .00 | .01 | .15 | 0 | 5 |
| 8730 | 1.89 | .00 | .01 | 0 | .00 | .01 | .11 | 0 | 5 |
| 8760 | 2.06 | .54 | .13 | 354 | .07 | .06 | .16 | 2 | 7 |
| 8790 | 2.74 | 1.00 | .02 | 0 | .02 | .00 | .18 | 0 | 6 |
| 8820 | 2.79 | .75 | .04 | 307 | .03 | .01 | .17 | 0 | 6 |
| 8850 | 3.01 | .50 | .02 | 0 | .01 | .01 | .18 | 0 | 5 |
| 8880 | 2.57 | .05 | .21 | 426 | .01 | .20 | .15 | 7 | 5 |
| 8910 | 1.31 | .67 | .06 | 432 | .04 | .02 | .08 | 1 | 6 |
| 8940 | 1.05 | 1.00 | .04 | 0 | .04 | .00 | .10 | 0 | 9 |
| 8970 | 1.31 | .75 | .04 | 0 | .03 | .01 | .11 | 0 | 8 |

**INEXCO MALLARD YT O-18 010440 300 .50**

| DEPTH | TOC | PI | S1+S2 | TMAX | S1 | S2 | S3 | HI | OI |
|---|---|---|---|---|---|---|---|---|---|
| 9000 | .78 | .78 | .09 | 0 | .07 | .02 | .09 | 2 | 11 |
| 9030 | .57 | .80 | .05 | 422 | .04 | .01 | .16 | 1 | 28 |
| 9060 | 1.02 | .76 | .17 | 0 | .13 | .04 | .18 | 3 | 17 |
| 9090 | .35 | .57 | .07 | 302 | .04 | .03 | .17 | 8 | 48 |
| 9120 | .36 | .54 | .13 | 306 | .07 | .06 | .16 | 16 | 44 |
| 9150 | .48 | .62 | .21 | 323 | .13 | .08 | .21 | 16 | 43 |
| 9180 | .21 | .57 | .14 | 302 | .08 | .06 | .20 | 28 | 95 |
| 9180 | 2.45 | .01 | 1.20 | 414 | .01 | 1.19 | 1.08 | 48 | 44 |
| 9210 | .42 | .58 | .12 | 0 | .07 | .05 | .15 | 11 | 35 |
| 9240 | .77 | .71 | .24 | 0 | .17 | .07 | .16 | 9 | 20 |
| 9270 | .79 | .73 | .15 | 302 | .11 | .04 | .22 | 5 | 27 |
| 9300 | .70 | .69 | .16 | 382 | .11 | .05 | .16 | 7 | 22 |
| 9330 | .44 | .78 | .09 | 310 | .07 | .02 | .14 | 4 | 31 |
| 9360 | .62 | .67 | .03 | 312 | .02 | .01 | .09 | 1 | 14 |
| 9390 | .85 | 1.00 | .04 | 0 | .04 | .00 | .12 | 0 | 14 |
| 9420 | .59 | .75 | .04 | 309 | .03 | .01 | .09 | 1 | 15 |
| 9450 | .25 | .79 | .42 | 320 | .33 | .09 | .15 | 36 | 60 |
| 9480 | 9.25 | .50 | 32.70 | 346 | 16.51 | 16.19 | 13.95 | 175 | 150 |
| 9510 | .31 | .46 | .28 | 345 | .13 | .15 | .91 | 48 | 293 |
| 9540 | .29 | .62 | .29 | 353 | .18 | .11 | .18 | 37 | 62 |
| 9570 | .82 | .73 | .62 | 0 | .45 | .17 | 1.13 | 20 | 137 |
| 9600 | .70 | .69 | .29 | 336 | .20 | .09 | .24 | 12 | 34 |
| 9660 | .80 | .48 | .87 | 423 | .42 | .45 | .27 | 56 | 33 |
| 9690 | 14.54 | .35 | 51.02 | 344 | 17.77 | 33.25 | 29.73 | 228 | 204 |
| 9720 | .65 | .58 | .48 | 420 | .28 | .20 | .33 | 30 | 50 |
| 9750 | 2.74 | .67 | .40 | 331 | .27 | .13 | .38 | 4 | 13 |
| 9780 | .71 | .59 | 1.03 | 421 | .61 | .42 | 1.18 | 59 | 166 |
| 9810 | .45 | .55 | .60 | 388 | .33 | .27 | .34 | 60 | 75 |
| 9840 | .32 | .64 | .53 | 361 | .34 | .19 | .26 | 59 | 81 |
| 9870 | .29 | .22 | .81 | 436 | .18 | .63 | .18 | 217 | 62 |
| 9900 | .28 | .58 | .19 | 412 | .11 | .08 | .15 | 28 | 53 |
| 9930 | 5.54 | .34 | 28.88 | 438 | 9.73 | 19.15 | 7.89 | 345 | 142 |
| 9960 | .37 | .74 | .31 | 387 | .23 | .08 | .29 | 21 | 78 |
| 9990 | .20 | .73 | .11 | 337 | .08 | .03 | .21 | 15 | 105 |
| 10020 | .21 | .67 | .15 | 311 | .10 | .05 | .18 | 23 | 85 |
| 10050 | .74 | .42 | .84 | 433 | .35 | .49 | .87 | 66 | 117 |
| 10080 | .23 | .50 | .18 | 361 | .09 | .09 | .17 | 39 | 73 |
| 10110 | .28 | .55 | .22 | 341 | .12 | .10 | .16 | 35 | 57 |
| 10140 | .13 | .67 | .12 | 0 | .08 | .04 | .18 | 30 | 138 |
| 10170 | .66 | .79 | .19 | 0 | .15 | .04 | .14 | 6 | 21 |
| 10200 | .54 | .33 | .45 | 439 | .15 | .30 | .17 | 55 | 31 |
| 10230 | .65 | .68 | .22 | 384 | .15 | .07 | .18 | 10 | 27 |
| 10260 | .29 | .67 | .12 | 312 | .08 | .04 | .19 | 13 | 65 |
| 10290 | .61 | .36 | 1.15 | 437 | .41 | .74 | .23 | 121 | 37 |
| 10320 | .47 | .63 | .48 | 390 | .30 | .18 | .37 | 38 | 78 |
| 10350 | .45 | .55 | .42 | 423 | .23 | .19 | .26 | 42 | 57 |
| 10380 | .46 | .66 | .29 | 335 | .19 | .10 | .18 | 21 | 39 |
| 10410 | .32 | .46 | .35 | 429 | .16 | .19 | .16 | 59 | 50 |
| 10440 | .43 | .60 | .20 | 363 | .12 | .08 | .14 | 18 | 32 |

| | |
|---|---|
| Jungle Creek Fm | -15F |
| Ettrain Fm | -866 |
| Blackie Fm | -1351 |
| Ford Lake Sh | -3401 |
| Ford Lake Sh | -8085 |

**INEXCO HUSKY PORCUPINE G-31 0 8700 300 .50**

| DEPTH | TOC | PI | S1+S2 | TMAX | S1 | S2 | S3 | HI | OI |
|---|---|---|---|---|---|---|---|---|---|
| 30F | 1.02 | .61 | 1.09 | 376 | .67 | .42 | 1.27 | 41 | 124 |
| 60 | 1.50 | .71 | .48 | 368 | .34 | .14 | .32 | 9 | 21 |
| 90 | 1.53 | .93 | .27 | 309 | .25 | .02 | .36 | 1 | 23 |
| 120 | .75 | .71 | .41 | 0 | .29 | .12 | 1.20 | 16 | 160 |
| 150 | .68 | .88 | .24 | 0 | .21 | .03 | .34 | 4 | 50 |
| 180 | .73 | .43 | .88 | 416 | .38 | .50 | .09 | 68 | 12 |
| 210 | .59 | .58 | .76 | 375 | .44 | .32 | .45 | 54 | 76 |
| 240 | .65 | .76 | .54 | 361 | .41 | .13 | .16 | 20 | 24 |
| 270 | .63 | .69 | .68 | 366 | .47 | .21 | .21 | 33 | 33 |
| 300 | .41 | .77 | .57 | 0 | .44 | .13 | .10 | 31 | 24 |
| 330 | .68 | .67 | .61 | 323 | .41 | .20 | .11 | 29 | 16 |
| 360 | .91 | .75 | .51 | 0 | .38 | .13 | .10 | 14 | 10 |
| 390 | .83 | .77 | .52 | 0 | .40 | .12 | .11 | 14 | 13 |
| 420 | .73 | .73 | .49 | 0 | .36 | .13 | .56 | 17 | 76 |
| 450 | .91 | .66 | .77 | 367 | .51 | .26 | .41 | 28 | 45 |
| 480 | 1.31 | .68 | .72 | 362 | .49 | .23 | .17 | 17 | 12 |
| 510 | .67 | .68 | .60 | 347 | .41 | .19 | .11 | 28 | 16 |
| 540 | .68 | .63 | .95 | 355 | .60 | .35 | .16 | 51 | 23 |
| 570 | .82 | .69 | .90 | 0 | .62 | .28 | .14 | 34 | 17 |
| 600 | 1.04 | .71 | .89 | 315 | .63 | .26 | .14 | 25 | 13 |
| 630 | 1.34 | .65 | .79 | 366 | .51 | .28 | .13 | 20 | 9 |
| 660 | .86 | .67 | .48 | 368 | .32 | .16 | .14 | 18 | 16 |
| 690 | .88 | .65 | .78 | 357 | .51 | .27 | .16 | 30 | 18 |
| 720 | 1.06 | .70 | .77 | 355 | .54 | .23 | .13 | 21 | 12 |
| 750 | .93 | .71 | .80 | 355 | .57 | .23 | .11 | 24 | 11 |
| 780 | .88 | .71 | 1.01 | 315 | .72 | .29 | .13 | 32 | 14 |
| 810 | 1.02 | .64 | .78 | 315 | .50 | .28 | .26 | 27 | 25 |
| 840 | .81 | .66 | .90 | 0 | .59 | .31 | .11 | 38 | 13 |
| 870 | 1.52 | .64 | 1.02 | 367 | .65 | .37 | .16 | 24 | 10 |
| 900 | .94 | .69 | 1.21 | 363 | .84 | .37 | .13 | 39 | 13 |
| 930 | .54 | .73 | .67 | 383 | .49 | .18 | .12 | 33 | 22 |
| 960 | .68 | .64 | 3.62 | 391 | 2.33 | 1.29 | .52 | 189 | 76 |
| 990 | .28 | .63 | .86 | 0 | .54 | .32 | .14 | 114 | 50 |
| 1030 | .66 | .65 | 1.20 | 367 | .78 | .42 | .20 | 63 | 30 |
| 1050 | .69 | .66 | 1.02 | 364 | .67 | .35 | .13 | 50 | 18 |
| 1080 | .83 | .67 | 1.32 | 364 | .88 | .44 | .16 | 53 | 19 |
| 1120 | .62 | .64 | 1.60 | 365 | 1.03 | .57 | .18 | 91 | 29 |
| 1140 | 1.64 | .66 | .85 | 369 | .56 | .29 | .18 | 17 | 10 |
| 1170 | 1.54 | .73 | .73 | 329 | .53 | .20 | .11 | 12 | 7 |
| 1200 | .62 | .76 | 3.68 | 354 | 2.80 | .88 | .20 | 141 | 32 |
| 1230 | .42 | .60 | 2.25 | 370 | 1.35 | .90 | .24 | 214 | 57 |
| 1260 | .59 | .72 | 4.87 | 358 | 3.49 | 1.38 | .31 | 233 | 52 |
| 1290 | .43 | .70 | 3.47 | 367 | 2.42 | 1.05 | .27 | 244 | 62 |
| 1320 | .35 | .62 | 2.17 | 359 | 1.35 | .82 | .31 | 234 | 88 |
| 1380 | .24 | .65 | 1.28 | 381 | .83 | .45 | .18 | 187 | 75 |
| 1410 | .53 | .69 | 1.18 | 372 | .81 | .37 | .18 | 69 | 33 |
| 1440 | 1.77 | .60 | .75 | 379 | .45 | .30 | .31 | 16 | 17 |
| 1470 | .71 | .49 | 1.22 | 371 | .60 | .62 | .24 | 87 | 33 |
| 1500 | .38 | .66 | 1.03 | 317 | .68 | .35 | .16 | 92 | 42 |
| 1500 | .72 | .59 | .70 | 364 | .41 | .29 | .24 | 40 | 33 |
| 1530 | .36 | .56 | 2.58 | 375 | 1.45 | 1.13 | .34 | 313 | 94 |
| 1590 | .49 | .58 | 2.21 | 382 | 1.28 | .93 | .29 | 189 | 59 |
| 1590 | 1.11 | .60 | 1.56 | 376 | .94 | .62 | .33 | 55 | 29 |
| 1620 | .85 | .69 | 1.67 | 373 | 1.15 | .52 | .31 | 61 | 36 |
| 1680 | .49 | .61 | 1.83 | 381 | 1.12 | .71 | .34 | 144 | 69 |
| 1710 | .50 | .61 | 1.97 | 385 | 1.20 | .77 | .37 | 154 | 74 |
| 1740 | .80 | .64 | 4.45 | 401 | 2.83 | 1.62 | .47 | 202 | 58 |
| 1770 | .63 | .61 | 2.90 | 394 | 1.78 | 1.12 | .60 | 177 | 95 |
| 1800 | .56 | .61 | 2.49 | 397 | 1.52 | .97 | .45 | 173 | 80 |
| 1830 | .55 | .60 | 2.64 | 398 | 1.59 | 1.05 | .38 | 190 | 69 |
| 1860 | .54 | .64 | 1.78 | 383 | 1.14 | .64 | .27 | 118 | 50 |
| 1890 | .53 | .63 | 1.87 | 366 | 1.17 | .70 | .31 | 132 | 58 |
| 1920 | .43 | .67 | 1.92 | 385 | 1.28 | .64 | .43 | 148 | 100 |
| 1950 | .50 | .66 | 1.89 | 382 | 1.24 | .65 | .30 | 130 | 60 |
| 2000 | .81 | .76 | 4.17 | 368 | 3.18 | .99 | .36 | 122 | 44 |
| 2040 | .63 | .63 | 2.58 | 381 | 1.63 | .95 | .41 | 150 | 65 |
| 2070 | .55 | .59 | 2.33 | 389 | 1.38 | .95 | .38 | 172 | 69 |
| 2100 | .43 | .58 | 1.13 | 391 | .65 | .48 | .27 | 111 | 62 |
| 2130 | .54 | .55 | 1.58 | 385 | .87 | .71 | .27 | 131 | 50 |
| 2160 | .57 | .58 | 2.31 | 381 | 1.35 | .96 | .32 | 168 | 56 |
| 2190 | .38 | .61 | 1.48 | 380 | .91 | .57 | .22 | 150 | 57 |
| 2220 | .45 | .59 | 1.43 | 382 | .84 | .59 | .26 | 131 | 57 |
| 2250 | .71 | .55 | .49 | 349 | .27 | .22 | .25 | 30 | 35 |
| 2280 | .46 | .65 | .40 | 328 | .26 | .14 | .15 | 30 | 32 |
| 2310 | .64 | .63 | 1.10 | 373 | .69 | .41 | .17 | 64 | 26 |
| 2340 | .66 | .64 | 1.79 | 378 | 1.14 | .65 | .30 | 98 | 45 |
| 2370 | .70 | .61 | 2.61 | 392 | 1.58 | 1.03 | .42 | 147 | 59 |
| 2400 | .55 | .59 | 1.74 | 398 | 1.02 | .72 | .41 | 130 | 74 |
| 2430 | .41 | .68 | .74 | 379 | .50 | .24 | .23 | 58 | 56 |
| 2460 | .75 | .72 | 2.18 | 382 | 1.57 | .61 | .29 | 81 | 38 |
| 2490 | .78 | .60 | 1.39 | 376 | .83 | .56 | .26 | 71 | 33 |
| 2520 | .27 | .49 | .45 | 388 | .22 | .23 | .17 | 85 | 62 |
| 2550 | .40 | .57 | 1.41 | 382 | .80 | .61 | .26 | 152 | 65 |
| 2580 | .55 | .61 | 1.91 | 376 | 1.16 | .75 | .40 | 136 | 72 |
| 2610 | .54 | .67 | 1.31 | 323 | .88 | .43 | .19 | 79 | 35 |
| 2640 | .40 | .72 | 1.03 | 0 | .74 | .29 | .12 | 72 | 30 |
| 2670 | .42 | .60 | 1.54 | 315 | .93 | .61 | .20 | 145 | 47 |
| 2700 | .46 | .55 | 1.48 | 387 | .81 | .67 | .23 | 145 | 50 |
| 2820 | .33 | .59 | 1.21 | 364 | .71 | .50 | .34 | 151 | 103 |
| 2850 | .48 | .60 | 1.22 | 375 | .73 | .49 | .25 | 102 | 52 |
| 2880 | .68 | .59 | 1.49 | 387 | .88 | .61 | .30 | 89 | 44 |
| 2910 | .59 | .60 | 1.86 | 374 | 1.11 | .75 | .58 | 127 | 98 |
| 2940 | .50 | .61 | 1.32 | 379 | .81 | .51 | .21 | 102 | 42 |
| 2970 | .43 | .47 | .80 | 384 | .38 | .42 | .15 | 97 | 34 |
| 3000 | .28 | .58 | .91 | 0 | .53 | .38 | .20 | 135 | 71 |
| 3030 | .33 | .52 | 1.22 | 381 | .64 | .58 | .21 | 175 | 63 |
| 3060 | .18 | .60 | .67 | 346 | .40 | .27 | .17 | 150 | 94 |
| 3090 | .59 | .64 | .44 | 0 | .28 | .16 | .10 | 27 | 16 |
| 3120 | .34 | .66 | .41 | 0 | .27 | .14 | .14 | 41 | 41 |
| 3150 | .27 | .57 | .54 | 377 | .31 | .23 | .14 | 85 | 51 |
| 3180 | .23 | .54 | .90 | 0 | .49 | .41 | .14 | 178 | 60 |
| 3210 | .16 | .61 | .67 | 356 | .41 | .26 | .12 | 162 | 75 |
| 3240 | 3.26 | .68 | .25 | 0 | .17 | .08 | .32 | 2 | 9 |
| 3270 | 2.29 | .58 | .26 | 320 | .15 | .11 | .28 | 4 | 12 |
| 3300 | .58 | .55 | .51 | 305 | .28 | .23 | .16 | 39 | 27 |
| 3330 | .34 | .53 | .72 | 365 | .38 | .34 | .18 | 100 | 52 |
| 3360 | .60 | .50 | .52 | 375 | .26 | .26 | .24 | 43 | 40 |
| 3390 | .23 | .57 | .74 | 360 | .42 | .32 | .26 | 139 | 113 |
| 3420 | .37 | .58 | 1.06 | 339 | .61 | .45 | .21 | 121 | 56 |
| 3450 | .25 | .43 | .37 | 342 | .16 | .21 | .14 | 84 | 55 |
| 3480 | .29 | .54 | .95 | 387 | .51 | .44 | .18 | 151 | 62 |
| 3510 | .55 | .64 | .87 | 312 | .56 | .31 | .17 | 56 | 30 |
| 3540 | .29 | .45 | .65 | 351 | .29 | .36 | .21 | 124 | 72 |
| 3570 | .15 | .52 | .56 | 322 | .29 | .27 | .11 | 180 | 73 |
| 3600 | .37 | .65 | 1.34 | 300 | .87 | .47 | .21 | 127 | 56 |
| 3630 | .24 | .75 | 1.68 | 311 | 1.26 | .42 | .18 | 175 | 75 |
| 3660 | .21 | .61 | .33 | 335 | .20 | .13 | .08 | 61 | 38 |
| 3690 | .12 | .60 | .30 | 306 | .18 | .12 | .05 | 100 | 41 |
| 3720 | .14 | .60 | .42 | 303 | .25 | .17 | .08 | 121 | 57 |
| 3750 | .12 | 1.00 | .04 | 0 | .04 | .00 | .07 | 0 | 58 |
| 3780 | .58 | 1.00 | .05 | 0 | .05 | .00 | .06 | 0 | 10 |
| 3810 | .35 | .75 | .24 | 303 | .18 | .06 | .11 | 17 | 31 |
| 3840 | .41 | .56 | .45 | 335 | .25 | .20 | .10 | 48 | 24 |
| 3870 | .58 | .50 | .42 | 346 | .21 | .21 | .12 | 36 | 20 |
| 3900 | .37 | .92 | .13 | 0 | .12 | .01 | .08 | 2 | 21 |
| 3930 | .30 | .46 | .50 | 0 | .23 | .27 | .07 | 90 | 23 |
| 3960 | .01 | 1.00 | .01 | 0 | .01 | .00 | .04 | 0 | 400 |
| 3990 | .09 | .00 | .01 | 0 | .00 | .01 | .03 | 11 | 33 |
| 4020 | .13 | 1.00 | .07 | 0 | .07 | .00 | .05 | 0 | 38 |
| 4050 | .20 | .71 | .07 | 0 | .05 | .02 | .06 | 10 | 30 |
| 4080 | .12 | .89 | .09 | 0 | .08 | .01 | .05 | 8 | 41 |
| 4110 | .22 | .79 | .39 | 0 | .31 | .08 | .08 | 36 | 36 |
| 4140 | .10 | 1.00 | .16 | 0 | .16 | .00 | .08 | 0 | 80 |
| 4170 | .12 | 1.00 | .16 | 0 | .16 | .00 | .06 | 0 | 50 |
| 4200 | .74 | .95 | 7.63 | 0 | 7.22 | .41 | .21 | 55 | 28 |
| 4230 | .16 | .84 | .19 | 0 | .16 | .03 | .10 | 18 | 62 |
| 4260 | .07 | .83 | .06 | 0 | .05 | .01 | .07 | 14 | 100 |
| 4290 | .08 | .27 | .15 | 446 | .04 | .11 | .06 | 137 | 75 |
| 4320 | .16 | .81 | .26 | 420 | .21 | .05 | .10 | 31 | 62 |
| 4350 | .09 | .79 | .14 | 0 | .11 | .03 | .12 | 33 | 133 |
| 4380 | .09 | .80 | .15 | 0 | .12 | .03 | .08 | 33 | 88 |
| 4410 | .08 | .79 | .19 | 0 | .15 | .04 | .08 | 50 | 100 |
| 4440 | .08 | .67 | .12 | 0 | .08 | .04 | .08 | 50 | 100 |
| 4470 | .10 | .67 | .21 | 0 | .14 | .07 | .07 | 70 | 70 |
| 4500 | .08 | 1.00 | .07 | 0 | .07 | .00 | .05 | 0 | 62 |
| 4530 | .14 | .69 | .16 | 0 | .11 | .05 | .04 | 35 | 28 |

## APPENDIX 1: ROCK-EVAL/TOC DATA FOR THREE WELLS IN THE KANDIK BASIN, WESTERN YUKON TERRITORY

**INEXCO MALLARD YT O-18 010440 300 .50**

| DEPTH | TOC | PI | S1+S2 | TMAX | S1 | S2 | S3 | HI | OI |
|---|---|---|---|---|---|---|---|---|---|
| 4560 | .13 | .68 | .19 | 0 | .13 | .06 | .08 | 46 | 61 |
| 4590 | .07 | 1.00 | .05 | 0 | .05 | .00 | .05 | 0 | 71 |
| 4620 | .09 | 1.00 | .06 | 0 | .06 | .00 | .03 | 0 | 33 |
| 4650 | .10 | .82 | .17 | 0 | .14 | .03 | .05 | 30 | 50 |
| 4680 | .11 | .72 | .18 | 385 | .13 | .05 | .08 | 45 | 72 |
| 4710 | .10 | .80 | .10 | 0 | .08 | .02 | .04 | 20 | 40 |
| 4740 | .09 | 1.00 | .05 | 0 | .05 | .00 | .04 | 0 | 44 |
| 4770 | .07 | 1.00 | .03 | 0 | .03 | .00 | .04 | 0 | 57 |
| 4800 | .11 | 1.00 | .06 | 0 | .06 | .00 | .06 | 0 | 54 |
| 4830 | .15 | .81 | .26 | 0 | .21 | .05 | .10 | 33 | 66 |
| 4860 | .10 | 1.00 | .10 | 0 | .10 | .00 | .08 | 0 | 80 |
| 4870 | .04 | 1.00 | .04 | 0 | .04 | .00 | .05 | 0 | 125 |
| 4920 | .11 | .91 | .23 | 0 | .21 | .02 | .16 | 18 | 145 |
| 4950 | .12 | 1.00 | .19 | 0 | .19 | .00 | .09 | 0 | 75 |
| 4980 | .07 | 1.00 | .18 | 0 | .18 | .00 | .06 | 0 | 85 |
| 5010 | .07 | 1.00 | .14 | 0 | .14 | .00 | .06 | 0 | 85 |
| 5040 | .12 | 1.00 | .05 | 0 | .05 | .00 | .04 | 0 | 33 |
| 5070 | .04 | 1.00 | .04 | 0 | .04 | .00 | .07 | 0 | 174 |
| 5100 | .05 | 1.00 | .22 | 0 | .22 | .00 | .07 | 0 | 140 |
| 5130 | .08 | 1.00 | .21 | 0 | .21 | .00 | .08 | 0 | 100 |
| 5160 | .11 | .88 | .25 | 357 | .22 | .03 | .38 | 27 | 345 |
| 5190 | .19 | 1.00 | .11 | 0 | .11 | .00 | .09 | 0 | 47 |
| 5220 | .13 | 1.00 | .16 | 0 | .16 | .00 | .05 | 0 | 38 |
| 5250 | .21 | .87 | .45 | 0 | .39 | .06 | .19 | 28 | 90 |
| 5280 | .05 | 1.00 | .02 | 0 | .02 | .00 | .04 | 0 | 80 |
| 5310 | .06 | 1.00 | .06 | 0 | .06 | .00 | .03 | 0 | 50 |
| 5340 | .07 | 1.00 | .10 | 0 | .10 | .00 | .06 | 0 | 85 |
| 5370 | .10 | 1.00 | .04 | 0 | .04 | .00 | .02 | 0 | 20 |
| 5400 | .13 | 1.00 | .08 | 0 | .08 | .00 | .03 | 0 | 23 |
| 5430 | .14 | 1.00 | .25 | 0 | .25 | .00 | .23 | 0 | 164 |
| 5460 | .18 | .65 | .52 | 380 | .34 | .18 | .55 | 100 | 305 |
| 5490 | .12 | 1.00 | .14 | 0 | .14 | .00 | .11 | 0 | 91 |
| 5520 | .04 | 1.00 | .07 | 0 | .07 | .00 | .05 | 0 | 125 |
| 5550 | .15 | 1.00 | .11 | 0 | .11 | .00 | .08 | 0 | 53 |
| 5580 | .05 | 1.00 | .05 | 0 | .05 | .00 | .04 | 0 | 80 |
| 5610 | .14 | .00 | .01 | 0 | .00 | .01 | .12 | 7 | 85 |
| 5640 | .09 | .87 | .08 | 0 | .07 | .01 | .05 | 11 | 55 |
| 5670 | .01 | 1.00 | .01 | 0 | .01 | .00 | .06 | 0 | 600 |
| 5700 | .01 | 1.00 | .02 | 0 | .02 | .00 | .02 | 0 | 200 |
| 5730 | .01 | 1.00 | .08 | 0 | .08 | .00 | .02 | 0 | 200 |
| 5760 | .09 | 1.00 | .07 | 0 | .07 | .00 | .04 | 0 | 44 |
| 5790 | .01 | 1.00 | .05 | 0 | .05 | .00 | .05 | 0 | 500 |
| 5820 | .01 | 1.00 | .02 | 0 | .02 | .00 | .08 | 0 | 800 |
| 5850 | .07 | .69 | .55 | 0 | .38 | .17 | .17 | 242 | 242 |
| 5880 | .01 | .00 | .01 | 0 | .00 | .01 | .08 | 100 | 800 |
| 5910 | .06 | 1.00 | .05 | 0 | .05 | .00 | .08 | 0 | 133 |
| 5940 | .06 | 1.00 | .05 | 0 | .05 | .00 | .05 | 0 | 83 |
| 5970 | .12 | .83 | .06 | 0 | .05 | .01 | .11 | 8 | 91 |
| 6000 | .03 | 1.00 | .05 | 0 | .05 | .00 | .06 | 0 | 200 |
| 6030 | .01 | 1.00 | .04 | 0 | .04 | .00 | .03 | 0 | 300 |
| 6060 | .05 | .92 | .25 | 0 | .23 | .02 | .37 | 40 | 740 |
| 6090 | .07 | .44 | .16 | 367 | .07 | .09 | .67 | 128 | 957 |
| 6120 | .16 | .67 | .15 | 332 | .10 | .05 | .15 | 31 | 93 |
| 6150 | .22 | .73 | .70 | 372 | .51 | .19 | .64 | 86 | 290 |
| 6180 | .82 | .66 | 3.01 | 332 | 2.00 | 1.01 | 2.43 | 123 | 296 |
| 6210 | .02 | .89 | .09 | 335 | .08 | .01 | .34 | 501 | 700 |
| 6240 | .13 | .81 | .54 | 304 | .44 | .10 | .75 | 76 | 576 |
| 6270 | .52 | .72 | 1.36 | 399 | .98 | .38 | .98 | 73 | 188 |
| 6300 | .04 | .50 | .10 | 375 | .05 | .05 | .27 | 125 | 675 |
| 6330 | .04 | .87 | .08 | 0 | .07 | .01 | .33 | 25 | 825 |
| 6360 | .03 | 1.00 | .08 | 0 | .08 | .00 | .14 | 0 | 466 |
| 6390 | .01 | 1.00 | .08 | 0 | .08 | .00 | .13 | 0 | 1300 |
| 6420 | .02 | .85 | .13 | 0 | .11 | .02 | .26 | 100 | 1300 |
| 6450 | .08 | .95 | .20 | 0 | .19 | .01 | .16 | 12 | 200 |
| 6480 | .13 | .73 | .98 | 341 | .72 | .26 | .60 | 200 | 461 |
| 6510 | .03 | .59 | .17 | 406 | .10 | .07 | .48 | 233 | 1600 |
| 6540 | .01 | .87 | .08 | 0 | .07 | .01 | .11 | 100 | 1100 |
| 6570 | .03 | 1.00 | .08 | 0 | .08 | .00 | .10 | 0 | 333 |
| 6600 | .01 | 1.00 | .01 | 0 | .01 | .00 | .06 | 0 | 600 |
| 6630 | .02 | 1.00 | .15 | 0 | .15 | .00 | .10 | 0 | 500 |
| 6660 | .45 | .38 | 2.13 | 340 | .82 | 1.31 | 1.59 | 291 | 353 |
| 6690 | .11 | .31 | .39 | 346 | .12 | .27 | 1.01 | 245 | 918 |
| 6720 | .08 | .83 | .46 | 392 | .38 | .08 | .60 | 100 | 750 |
| 6750 | .04 | .67 | .03 | 0 | .02 | .01 | .58 | 251 | 450 |
| 6780 | .06 | .81 | .43 | 337 | .35 | .08 | .44 | 133 | 733 |
| 6810 | .13 | .66 | .80 | 358 | .53 | .27 | .58 | 207 | 446 |
| 6840 | .02 | 1.00 | .07 | 0 | .07 | .00 | .44 | 0 | 2200 |
| 6870 | .01 | 1.00 | .05 | 0 | .05 | .00 | .11 | 0 | 1100 |
| 6900 | .01 | 1.00 | .03 | 0 | .03 | .00 | .05 | 0 | 500 |
| 6930 | .01 | 1.00 | .02 | 0 | .02 | .00 | .09 | 0 | 900 |
| 6960 | .01 | 1.00 | .02 | 0 | .02 | .00 | .03 | 0 | 300 |
| 6990 | .01 | 1.00 | .01 | 0 | .01 | .00 | .02 | 0 | 200 |
| 7020 | .02 | 1.00 | .11 | 0 | .11 | .00 | .36 | 0 | 1800 |
| 7050 | .01 | 1.00 | .01 | 0 | .01 | .00 | .08 | 0 | 800 |
| 7080 | .01 | 1.00 | .03 | 0 | .03 | .00 | .04 | 0 | 400 |
| 7110 | .01 | .89 | .09 | 0 | .08 | .01 | .10 | 100 | 1000 |
| 7140 | .01 | .94 | .16 | 0 | .15 | .01 | .09 | 100 | 900 |
| 7170 | .05 | .95 | .57 | 0 | .54 | .03 | .15 | 60 | 300 |
| 7200 | .01 | 1.00 | .10 | 0 | .10 | .00 | .10 | 0 | 1000 |
| 7230 | .01 | 1.00 | .02 | 0 | .02 | .00 | .03 | 0 | 300 |
| 7260 | .02 | 1.00 | .05 | 0 | .05 | .00 | .05 | 0 | 250 |
| 7290 | .09 | .94 | .18 | 368 | .17 | .01 | .51 | 11 | 566 |
| 7320 | .03 | 1.00 | .03 | 0 | .03 | .00 | .07 | 0 | 233 |
| 7350 | .05 | 1.00 | .06 | 0 | .06 | .00 | .15 | 0 | 300 |
| 7380 | .02 | 1.00 | .03 | 0 | .03 | .00 | .05 | 0 | 250 |
| 7410 | .25 | .74 | 1.73 | 413 | 1.28 | .45 | .27 | 180 | 108 |
| 7440 | .01 | 1.00 | .01 | 0 | .01 | .00 | .05 | 0 | 500 |
| 7470 | .04 | 1.00 | .14 | 0 | .14 | .00 | .09 | 0 | 225 |
| 7500 | 3.08 | .40 | 4.55 | 451 | 1.82 | 2.73 | .31 | 88 | 10 |
| 7530 | .01 | 1.00 | .05 | 0 | .05 | .00 | .06 | 0 | 600 |
| 7560 | .03 | 1.00 | .05 | 0 | .05 | .00 | .05 | 0 | 166 |
| 7590 | .01 | 1.00 | .01 | 0 | .01 | .00 | .03 | 0 | 300 |
| 7620 | .01 | 1.00 | .04 | 0 | .04 | .00 | .07 | 0 | 699 |
| 7650 | .01 | 1.00 | .03 | 0 | .03 | .00 | .12 | 0 | 1200 |
| 7710 | .01 | 1.00 | .01 | 0 | .01 | .00 | .05 | 0 | 500 |
| 7740 | .01 | .00 | .01 | 0 | .00 | .01 | .03 | 100 | 300 |
| 7770 | .01 | 1.00 | .01 | 0 | .01 | .00 | .02 | 0 | 200 |
| 7800 | .04 | 1.00 | .02 | 0 | .02 | .00 | .10 | 0 | 250 |
| 7830 | .01 | 1.00 | .02 | 0 | .02 | .00 | .05 | 0 | 500 |
| 7860 | .01 | 1.00 | .02 | 0 | .02 | .00 | .04 | 0 | 400 |
| 7890 | .01 | 1.00 | .03 | 0 | .03 | .00 | .07 | 0 | 699 |
| 7920 | .01 | 1.00 | .02 | 0 | .02 | .00 | .04 | 0 | 400 |
| 7950 | .04 | .95 | .43 | 0 | .41 | .02 | .15 | 50 | 375 |
| 7980 | .01 | 1.00 | .02 | 0 | .02 | .00 | .03 | 0 | 300 |
| 8010 | .02 | 1.00 | .02 | 0 | .02 | .00 | .04 | 0 | 200 |
| 8040 | .03 | 1.00 | .11 | 0 | .11 | .00 | .07 | 0 | 233 |
| 8070 | .04 | 1.00 | .02 | 0 | .02 | .00 | .03 | 0 | 75 |
| 8100 | 2.41 | .05 | 1.13 | 412 | .06 | 1.07 | 1.07 | 44 | 44 |
| 8130 | .06 | .75 | .04 | 365 | .03 | .01 | .04 | 16 | 66 |
| 8160 | .15 | .80 | .05 | 0 | .04 | .01 | .05 | 6 | 33 |
| 8190 | .10 | .77 | .30 | 326 | .23 | .07 | .15 | 70 | 150 |
| 8220 | .06 | .92 | .12 | 0 | .11 | .01 | .41 | 16 | 683 |
| 8250 | .03 | .67 | .09 | 0 | .06 | .03 | .05 | 100 | 166 |
| 8280 | .01 | .75 | .04 | 0 | .03 | .01 | .04 | 100 | 400 |
| 8310 | .01 | .50 | .04 | 0 | .02 | .02 | .02 | 200 | 200 |
| 8340 | .01 | .80 | .05 | 0 | .04 | .01 | .04 | 100 | 400 |
| 8370 | .01 | .40 | .05 | 0 | .02 | .03 | .04 | 300 | 400 |
| 8400 | .01 | .00 | .01 | 0 | .00 | .01 | .01 | 100 | 100 |
| 8430 | .01 | 1.00 | .03 | 0 | .03 | .00 | .01 | 0 | 100 |
| 8460 | .01 | 1.00 | .04 | 0 | .04 | .00 | .03 | 0 | 300 |
| 8490 | .01 | 1.00 | .01 | 0 | .01 | .00 | .01 | 0 | 100 |
| 8520 | .01 | .00 | .01 | 0 | .00 | .01 | .01 | 100 | 100 |
| 8550 | 2.41 | .03 | 1.20 | 415 | .04 | 1.16 | 1.00 | 48 | 41 |
| 8580 | .01 | 1.00 | .04 | 0 | .04 | .00 | .08 | 0 | 800 |
| 8610 | .01 | 1.00 | .01 | 0 | .01 | .00 | .03 | 0 | 300 |
| 8640 | .01 | 1.00 | .05 | 0 | .05 | .00 | .02 | 0 | 200 |
| 8670 | .09 | .68 | .41 | 347 | .28 | .13 | .69 | 144 | 766 |
| 8700 | 2.52 | .03 | 1.25 | 416 | .04 | 1.21 | 1.01 | 48 | 40 |

| | |
|---|---|
| Devonian | -15F |
| Ogilvie/Road R. | -3198 |
| Arnica Fm | -4093 |
| Ronning Grp | -5461 |
| Franklin Mt. Fm | -5727 |
| Proterozoic | -8284 |

# APPENDIX 2

## INPUT DATA FOR KANDIK HYDROCARBON ASSESSMENTS

The following tables present the probability distributions of reservoir parameters, number of prospects, and marginal probabilities of geological risk factors used as input for the various conceptual statistical analyses discussed in this paper. These estimates are based on subjective opinion, partly constrained by reservoir data and information from analogous hydrocarbon-bearing basins.

### 1. KANDIK TERTIARY/UPPER CRETACEOUS NON-MARINE OIL PLAY

***Table II.1a.*** *Probability distributions of reservoir parameters*

| Geological variable | Unit of measurement | Probability in upper percentiles 1.00 | Probability in upper percentiles 0.50 | Probability in upper percentiles 0.01 | Probability in upper percentiles 0.00 |
|---|---|---|---|---|---|
| Area of closure | $km^2$ | 0.5 | 7 | 21 | 40 |
| Reservoir thickness | m | 1 | 6 | 10 | 20 |
| Porosity | decimal fraction | 0.05 | 0.12 | 0.22 | 0.25 |
| Trap fill | decimal fraction | 0.05 | 0.25 | 0.9 | 1.00 |
| Oil saturation | decimal fraction | 0.5 | 0.65 | 0.75 | 0.8 |
| Shrinkage factor | decimal fraction | 1.137 | 1.137 | 1.137 | 1.137 |

***Table II.1b.*** *Marginal probabilities of geological risk factors*

| Geological factors | Marginal probability | Play level | Prospect level |
|---|---|---|---|
| Presence of closure | 0.8 | | x |
| Presence of reservoir facies | 1.00 | | x |
| Adequate seal | 0.7 | | x |
| Adequate timing | 0.75 | | x |
| Adequate source | 0.9 | | x |

***Table II.1c.*** *Probability distribution for number of prospects*

| Geological variable | Probability in upper percentiles 0.99 | Probability in upper percentiles 0.5 | Probability in upper percentiles 0.00 |
|---|---|---|---|
| Number of prospects | 14 | 50 | 200 |

## 2. KANDIK TERTIARY/UPPER CRETACEOUS NON-MARINE GAS PLAY

***Table II.2a.*** *Probability distributions of reservoir parameters*

| Geological variable | Unit of measurement | Probability in upper percentiles 1.00 | Probability in upper percentiles 0.50 | Probability in upper percentiles 0.01 | Probability in upper percentiles 0.00 |
|---|---|---|---|---|---|
| Area of closure | $km^2$ | 0.5 | 7 | 21 | 40 |
| Reservoir thickness | m | 1 | 6 | 10 | 20 |
| Porosity | decimal fraction | 0.05 | 0.12 | 0.22 | 0.25 |
| Trap fill | decimal fraction | 0.05 | 0.25 | 0.9 | 1.00 |
| Gas saturation | decimal fraction | 0.5 | 0.65 | 0.75 | 0.8 |
| Formation volume factor | decimal fraction | 0.002 | 0.004 | 0.009 | 0.01 |

***Table II.2b.*** *Marginal probabilities of geological risk factors*

| Geological factors | Marginal probability | Play level | Prospect level |
|---|---|---|---|
| Presence of closure | 0.8 | | x |
| Presence of reservoir facies | 1.00 | | x |
| Adequate seal | 0.7 | | x |
| Adequate timing | 0.75 | | x |
| Adequate source | 0.9 | | x |

***Table II.2c.*** *Probability distribution for number of prospects*

| Geological variable | Probability in upper percentiles 0.99 | Probability in upper percentiles 0.5 | Probability in upper percentiles 0.00 |
|---|---|---|---|
| Number of prospects | 14 | 50 | 200 |

## 3. KANDIK MESOZOIC MARINE STRUCTURAL PLAY

***Table II.3a.*** *Probability distributions of reservoir parameters*

| Geological variable | Unit of measurement | Probability in upper percentiles 1.00 | Probability in upper percentiles 0.50 | Probability in upper percentiles 0.01 | Probability in upper percentiles 0.00 |
|---|---|---|---|---|---|
| Area of closure | $km^2$ | 0.5 | 9 | 75 | 80 |
| Reservoir thickness | m | 30 | 40 | 55 | 70 |
| Porosity | decimal fraction | 0.05 | 0.06 | 0.2 | 0.25 |
| Trap fill | decimal fraction | 0.05 | 0.25 | 0.9 | 1 |
| Gas saturation | decimal fraction | 0.7 | 0.75 | 0.85 | 0.9 |
| Formation volume factor | decimal fraction | 0.002 | 0.004 | 0.009 | 0.01 |

***Table II.3b.*** *Marginal probabilities of geological risk factors*

| Geological factors | Marginal probability | Play level | Prospect level |
|---|---|---|---|
| Presence of closure | 0.5 | | x |
| Presence of reservoir facies | 0.5 | | x |
| Adequate seal | 0.4 | | x |
| Adequate timing | 0.75 | | x |
| Adequate source | 0.8 | | x |

***Table II.3c.*** *Probability distribution for number of prospects*

| Geological variable | Probability in upper percentiles 0.99 | Probability in upper percentiles 0.5 | Probability in upper percentiles 0.00 |
|---|---|---|---|
| Number of prospects | 30 | 120 | 270 |

## 4. KANDIK PALEOZOIC MARINE STRUCTURAL OIL PLAY

***Table II.4a.*** *Probability distributions of reservoir parameters*

| Geological variable | Unit of measurement | Probability in upper percentiles 1.00 | Probability in upper percentiles 0.50 | Probability in upper percentiles 0.01 | Probability in upper percentiles 0.00 |
|---|---|---|---|---|---|
| Area of closure | $km^2$ | 0.5 | 9 | 75 | 80 |
| Reservoir thickness | m | 60 | 80 | 110 | 150 |
| Porosity | decimal fraction | 0.015 | 0.04 | 0.12 | 0.2 |
| Trap fill | decimal fraction | 0.05 | 0.25 | 0.9 | 1.00 |
| Oil saturation | decimal fraction | 0.7 | 0.75 | 0.85 | 0.9 |
| Shrinkage factor | decimal fraction | 1.137 | 1.137 | 1.137 | 1.137 |

***Table II.4b.*** *Marginal probabilities of geological risk factors*

| Geological factors | Marginal probability | Play level | Prospect level |
|---|---|---|---|
| Presence of closure | 0.5 | | x |
| Presence of reservoir facies | 0.3 | | x |
| Adequate seal | 0.75 | | x |
| Adequate timing | 0.5 | | x |
| Adequate source | 0.7 | | x |

***Table II.4c.*** *Probability distribution for number of prospects*

| Geological variable | Probability in upper percentiles 0.99 | Probability in upper percentiles 0.5 | Probability in upper percentiles 0.00 |
|---|---|---|---|
| Number of prospects | 12 | 60 | 130 |

## 5. KANDIK PALEOZOIC MARINE STRUCTURAL GAS PLAY

***Table II.5a.*** *Probability distributions of reservoir parameters*

| vGeological variable | Unit of measurement | Probability in upper percentiles 1.00 | Probability in upper percentiles 0.50 | Probability in upper percentiles 0.01 | Probability in upper percentiles 0.00 |
|---|---|---|---|---|---|
| Area of closure | $km^2$ | 0.5 | 9 | 75 | 80 |
| Reservoir thickness | m | 60 | 80 | 110 | 150 |
| Porosity | decimal fraction | 0.015 | 0.04 | 0.12 | 0.2 |
| Trap fill | decimal fraction | 0.05 | 0.25 | 0.9 | 1.00 |
| Gas saturation | decimal fraction | 0.7 | 0.75 | 0.85 | 0.9 |
| Formation volume factor | decimal fraction | 0.0024 | 0.0042 | 0.019 | 0.02 |

***Table II.5b.*** *Marginal probabilities of geological risk factors*

| Geological factors | Marginal probability | Play level | Prospect level |
|---|---|---|---|
| Presence of closure | 0.5 | | x |
| Presence of reservoir facies | 0.3 | | x |
| Adequate seal | 0.75 | | x |
| Adequate timing | 0.5 | | x |
| Adequate source | 0.7 | | x |

***Table II.5c.*** *Probability distribution for number of prospects*

| Geological variable | Probability in upper percentiles 0.99 | Probability in upper percentiles 0.5 | Probability in upper percentiles 0.00 |
|---|---|---|---|
| Number of prospects | 45 | 220 | 500 |

# APPENDIX 3

## OUTPUT DATA FOR KANDIK HYDROCARBON ASSESSMENTS

The following text presents the output generated by the PETRIMES hydrocarbon assessment program using the conceptual play analysis procedure. For each play, the MPRO, PSRK and PSUM modules are presented. MPRO generates the number of pools distribution and risks for the play. PSRK gives the individual pool sizes by rank and PSUM indicates the Monte Carlo simulation for the pool size distribution. (Note: In text, field sizes are indicated rather than pools. In frontier conceptual plays, insufficient geological and engineering information is available to define individual pool accumulations in single structures). PSUM modules for total oil and gas potential on a basin-scale are also presented.

## PETRIMES MODULE MPRO

***Number of pools distribution and risks***

UAI ..... **C5019902**

PLAY ..... **Tertiary/Upper Cretaceous Nonmarine Oil**

Assessor ..... Peter Hannigan

Geologist ..... Peter Hannigan

Remarks ..... Kandik Assessment Project

Run date ..... Mon., Feb. 8, 1999, 11:43 a.m.

***User supplied parameters***

Do you want to store on DB? > Y

Oil (o) or gas (g)? > O

### *A) Risks*

| | *Geological factor* | | *Marginal probability* |
|---|---|---|---|
| Play level | Overall play level risk | = | 1.00 |
| Prospect level | Presence of closure | (1) | .80 |
| | Presence of reservoir facies | (2) | 1.00 |
| | Adequate seal | (4) | .70 |
| | Adequate timing | (5) | .75 |
| | Adequate source | (6) | .90 |
| | Overall prospect level risk | = | .38 |
| Exploration risk | | = | .38 |

### *B) Number of prospects distribution*

Minimum = 14

Maximum = 200

Mean = 78.82

S.D. = 56.33

| *Frequency* | *Number of prospects* |
|---|---|
| 99.00 | 14 |
| 95 | 17 |
| 90 | 21 |
| 80 | 28 |
| 75 | 32 |
| 60 | 43 |
| 50 | 50 |
| 40 | 80 |
| 25 | 125 |
| 20 | 140 |
| 10 | 170 |
| 5 | 185 |
| 1 | 197 |
| 0 | 200 |

### *C) Number of pools distribution*

Minimum = 0

Maximum = 102

Mean = 29.79

S.D. = 21.72

| *Frequency* | *Number of pools* |
|---|---|
| 100.00 | 0 |
| 99 | 4 |
| 95 | 6 |
| 90 | 8 |
| 80 | 10 |
| 75 | 12 |
| 60 | 16 |
| 50 | 21 |
| 40 | 30 |
| 25 | 47 |
| 20 | 53 |
| 10 | 64 |
| 5 | 71 |
| 1 | 80 |
| 0 | 102 |

Note: The number of pools distribution is saved in the database with UDI= 6201OB4

## PETRIMES MODULE PSRK

***Individual pool sizes by rank where N is a random variable***

UAI ..... **C5019902**
PLAY ..... **Tertiary/Upper Cretaceous Nonmarine Oil**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Mon., Feb. 8, 1999, 11:44 a.m.

***User supplied parameters***

| | | | |
|---|---|---|---|
| Do you want to store on DB? | > | Y | |
| Do you want to use MPRO output? | > | Y | |
| Min. and max. pool ranks? | > | 1 | 71 |
| Do you use lognornal assumption? | > | Y | |
| Do you want to use ppsd output? | > | Y | |

### *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 | = | -.71278E-01 | MEAN | = | 1.1975 | | |
| Statistics | sig. sq. | = | .50305 | S.D. | = | .96825 | | |
| Upper percentiles | 99.99% | = | .66602E-01 | 60.00% | = | .77805 | 15.00% | = 1.9422 |
| | 99.00% | = | .17884 | 55.00% | = | .85180 | 10.00% | = 2.3110 |
| | 95.00% | = | .28999 | 50.00% | = | .93120 | 8.00% | = 2.5226 |
| | 90.00% | = | .37522 | 45.00% | = | 1.0180 | 6.00% | = 2.8052 |
| | 85.00% | = | .44647 | 40.00% | = | 1.1145 | 5.00% | = 2.9902 |
| | 80.00% | = | .51263 | 35.00% | = | 1.2239 | 4.00% | = 3.2233 |
| | 75.00% | = | .57714 | 30.00% | = | 1.3507 | 2.00% | = 3.9963 |
| | 70.00% | = | .64197 | 25.00% | = | 1.5025 | 1.00% | = 4.8487 |
| | 65.00% | = | .70852 | 20.00% | = | 1.6916 | .01% | = 13.020 |

### *C) Number of pools distribution*

| | | |
|---|---|---|
| Lower support | = | 0 |
| Upper support | = | 102 |
| Expectation | = | 29.79 |
| Standard Deviation | = | 21.72 |

### *D) Pool sizes by rank*

| Pool rank | Distribution | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | MEAN = 3.9393 | S.D. = 1.9005 | P(N>=r) = .99996 | 14 | MEAN = 1.1174 | S.D. = .50313 | P(N>=r) = .69234 |
| | 99% = 1.1487 | 75% = 2.6469 | 10% = 6.2506 | | 99% = .19790 | 75% = .67622 | 10% = 1.7599 |
| | 95% = 1.6436 | 50% = 3.5982 | 5% = 7.3930 | | 95% = .32705 | 50% = 1.1546 | 5% = 1.8888 |
| | 90% = 1.9693 | 25% = 4.7958 | 1% = 10.376 | | 90% = .42666 | 25% = 1.5221 | 1% = 2.1252 |
| 2 | MEAN = 2.7783 | S.D. = 1.1368 | P(N>=r) = .99955 | 15 | MEAN = 1.0938 | S.D. = .48254 | P(N>=r) = .65855 |
| | 99% = .79711 | 75% = 1.9386 | 10% = 4.2547 | | 99% = .19406 | 75% = .67579 | 10% = 1.7032 |
| | 95% = 1.1891 | 50% = 2.6572 | 5% = 4.8011 | | 95% = .32012 | 50% = 1.1389 | 5% = 1.8252 |
| | 90% = 1.4365 | 25% = 3.4575 | 1% = 6.0460 | | 90% = .41863 | 25% = 1.4786 | 1% = 2.0491 |
| 3 | MEAN = 2.2782 | S.D. = .93087 | P(N>=r) = .99770 | 16 | MEAN = 1.0740 | S.D. = .46176 | P(N>=r) = .62627 |
| | 99% = .58064 | 75% = 1.5681 | 10% = 3.5087 | | 99% = .19161 | 75% = .68413 | 10% = 1.6509 |
| | 95% = .92366 | 50% = 2.2009 | 5% = 3.8982 | | 95% = .31622 | 50% = 1.1237 | 5% = 1.7668 |
| | 90% = 1.1391 | 25% = 2.8957 | 1% = 4.7259 | | 90% = .41530 | 25% = 1.4384 | 1% = 1.9794 |
| 4 | MEAN = 1.9714 | S.D. = .83116 | P(N>=r) = .99225 | 17 | MEAN = 1.0566 | S.D. = .44076 | P(N>=r) = .59604 |
| | 99% = .43918 | 75% = 1.3249 | 10% = 3.0801 | | 99% = .19065 | 75% = .69866 | 10% = 1.6022 |
| | 95% = .74113 | 50% = 1.9081 | 5% = 3.3945 | | 95% = .31554 | 50% = 1.1080 | 5% = 1.7126 |
| | 90% = .93695 | 25% = 2.5581 | 1% = 4.0343 | | 90% = .41698 | 25% = 1.4006 | 1% = 1.9152 |
| 5 | MEAN = 1.7591 | S.D. = .76792 | P(N>=r) = .98068 | 18 | MEAN = 1.0406 | S.D. = .41976 | P(N>=r) = .56838 |
| | 99% = .35221 | 75% = 1.1520 | 10% = 2.7890 | | 99% = .19123 | 75% = .71439 | 10% = 1.5565 |
| | 95% = .61377 | 50% = 1.7014 | 5% = 3.0577 | | 95% = .31818 | 50% = 1.0912 | 5% = 1.6620 |
| | 90% = .79294 | 25% = 2.3250 | 1% = 3.5884 | | 90% = .42372 | 25% = 1.3648 | 1% = 1.8555 |
| 6 | MEAN = 1.6043 | S.D. = .72045 | P(N>=r) = .96150 | 19 | MEAN = 1.0247 | S.D. = .39924 | P(N>=r) = .54366 |
| | 99% = .30060 | 75% = 1.0258 | 10% = 2.5733 | | 99% = .19329 | 75% = .72641 | 10% = 1.5132 |
| | 95% = .52768 | 50% = 1.5506 | 5% = 2.8103 | | 95% = .32395 | 50% = 1.0730 | 5% = 1.6142 |
| | 90% = .69113 | 25% = 2.1524 | 1% = 3.2685 | | 90% = .43480 | 25% = 1.3303 | 1% = 1.7996 |
| 7 | MEAN = 1.4882 | S.D. = .68123 | P(N>=r) = .93518 | 20 | MEAN = 1.0082 | S.D. = .37978 | P(N>=r) = .52206 |
| | 99% = .26950 | 75% = .93261 | 10% = 2.4047 | | 99% = .19659 | 75% = .73224 | 10% = 1.4721 |
| | 95% = .47064 | 50% = 1.4396 | 5% = 2.6178 | | 95% = .33216 | 50% = 1.0531 | 5% = 1.5689 |
| | 90% = .61991 | 25% = 2.0188 | 1% = 3.0236 | | 90% = .44816 | 25% = 1.2968 | 1% = 1.7470 |
| 8 | MEAN = 1.3984 | S.D. = .64739 | P(N>=r) = .90374 | 21 | MEAN = .99031 | S.D. = .36192 | P(N>=r) = .50348 |
| | 99% = .24975 | 75% = .86235 | 10% = 2.2675 | | 99% = .20069 | 75% = .73167 | 10% = 1.4328 |
| | 95% = .43202 | 50% = 1.3577 | 5% = 2.4618 | | 95% = .34137 | 50% = 1.0317 | 5% = 1.5258 |
| | 90% = .56916 | 25% = 1.9115 | 1% = 2.8274 | | 90% = .46055 | 25% = 1.2640 | 1% = 1.6972 |
| 9 | MEAN = 1.3270 | S.D. = .61764 | P(N>=r) = .86946 | 22 | MEAN = .97103 | S.D. = .34601 | P(N>=r) = .48762 |
| | 99% = .23606 | 75% = .80780 | 10% = 2.1525 | | 99% = .20489 | 75% = .72568 | 10% = 1.3949 |
| | 95% = .40412 | 50% = 1.2969 | 5% = 2.3312 | | 95% = .34961 | 50% = 1.0090 | 5% = 1.4848 |
| | 90% = .53111 | 25% = 1.8225 | 1% = 2.6649 | | 90% = .46898 | 25% = 1.2320 | 1% = 1.6500 |
| 10 | MEAN = 1.2685 | S.D. = .59115 | P(N>=r) = .83401 | 23 | MEAN = .95050 | S.D. = .33213 | P(N>=r) = .47400 |
| | 99% = .22553 | 75% = .76449 | 10% = 2.0537 | | 99% = .20838 | 75% = .71557 | 10% = 1.3584 |
| | 95% = .38232 | 50% = 1.2517 | 5% = 2.2194 | | 95% = .35513 | 50% = .98550 | 5% = 1.4456 |
| | 90% = .50090 | 25% = 1.7465 | 1% = 2.5269 | | 90% = .47223 | 25% = 1.2004 | 1% = 1.6051 |
| 11 | MEAN = 1.2200 | S.D. = .56717 | P(N>=r) = .79823 | 24 | MEAN = .92912 | S.D. = .32008 | P(N>=r) = .46211 |
| | 99% = .21679 | 75% = .73014 | 10% = 1.9673 | | 99% = .21055 | 75% = .70267 | 10% = 1.3231 |
| | 95% = .36433 | 50% = 1.2179 | 5% = 2.1219 | | 95% = .35714 | 50% = .96165 | 5% = 1.4078 |
| | 90% = .47604 | 25% = 1.6803 | 1% = 2.4075 | | 90% = .47074 | 25% = 1.1696 | 1% = 1.5623 |
| 12 | MEAN = 1.1794 | S.D. = .54494 | P(N>=r) = .76252 | 25 | MEAN = .90738 | S.D. = .30954 | P(N>=r) = .45145 |
| | 99% = .20934 | 75% = .70389 | 10% = 1.8907 | | 99% = .21113 | 75% = .68810 | 10% = 1.2890 |
| | 95% = .34925 | 50% = 1.1921 | 5% = 2.0356 | | 95% = .35595 | 50% = .93789 | 5% = 1.3714 |
| | 90% = .45551 | 25% = 1.6218 | 1% = 2.3025 | | 90% = .46576 | 25% = 1.1397 | 1% = 1.5215 |
| 13 | MEAN = 1.1456 | S.D. = .52378 | P(N>=r) = .72713 | 26 | MEAN = .88567 | S.D. = .30016 | P(N>=r) = .44160 |
| | 99% = .20303 | 75% = .68576 | 10% = 1.8221 | | 99% = .21031 | 75% = .67272 | 10% = 1.2562 |
| | 95% = .33681 | 50% = 1.1718 | 5% = 1.9585 | | 95% = .35238 | 50% = .91452 | 5% = 1.3363 |
| | 90% = .43903 | 25% = 1.5695 | 1% = 2.2092 | | 90% = .45855 | 25% = 1.1108 | 1% = 1.4823 |

| Pool rank | Distribution | | | | | |
|---|---|---|---|---|---|---|
| 27 MEAN = .86433 | S.D. = .29162 | P(N>=r) = .43225 | 40 MEAN = .64167 | S.D. = .21053 | P(N>=r) = .31728 |
| 99% = .20847 | 75% = .65714 | 10% = 1.2246 | 99% = .17346 | 75% = .49119 | 10% = .90575 |
| 95% = .34734 | 50% = .89172 | 5% = 1.3026 | 95% = .27558 | 50% = .65667 | 5% = .96574 |
| 90% = .45013 | 25% = 1.0829 | 1% = 1.4443 | 90% = .34782 | 25% = .79753 | 1% = 1.0733 |
| 28 MEAN = .84354 | S.D. = .28371 | P(N>=r) = .42318 | 41 MEAN = .62789 | S.D. = .20558 | P(N>=r) = .30846 |
| 99% = .20599 | 75% = .64172 | 10% = 1.1944 | 99% = .17111 | 75% = .48095 | 10% = .88613 |
| 95% = .34152 | 50% = .86964 | 5% = 1.2704 | 95% = .27100 | 50% = .64203 | 5% = .94513 |
| 90% = .44117 | 25% = 1.0561 | 1% = 1.4080 | 90% = .34143 | 25% = .77985 | 1% = 1.0510 |
| 29 MEAN = .82341 | S.D. = .27626 | P(N>=r) = .41427 | 42 MEAN = .61445 | S.D. = .20077 | P(N>=r) = .29964 |
| 99% = .20319 | 75% = .62667 | 10% = 1.1654 | 99% = .16879 | 75% = .47095 | 10% = .86700 |
| 95% = .33537 | 50% = .84832 | 5% = 1.2396 | 95% = .26650 | 50% = .62770 | 5% = .92505 |
| 90% = .43210 | 25% = 1.0303 | 1% = 1.3732 | 90% = .33517 | 25% = .76258 | 1% = 1.0293 |
| 30 MEAN = .80396 | S.D. = .26917 | P(N>=r) = .40543 | 43 MEAN = .60132 | S.D. = .19609 | P(N>=r) = .29081 |
| 99% = .20025 | 75% = .61210 | 10% = 1.1375 | 99% = .16650 | 75% = .46117 | 10% = .84834 |
| 95% = .32916 | 50% = .82775 | 5% = 1.2101 | 95% = .26208 | 50% = .61373 | 5% = .90547 |
| 90% = .42314 | 25% = 1.0054 | 1% = 1.3402 | 90% = .32904 | 25% = .74571 | 1% = 1.0082 |
| 31 MEAN = .78520 | S.D. = .26238 | P(N>=r) = .39663 | 44 MEAN = .58848 | S.D. = .19154 | P(N>=r) = .28199 |
| 99% = .19729 | 75% = .59805 | 10% = 1.1107 | 99% = .16424 | 75% = .45160 | 10% = .83012 |
| 95% = .32304 | 50% = .80792 | 5% = 1.1817 | 95% = .25774 | 50% = .60008 | 5% = .88637 |
| 90% = .41441 | 25% = .98147 | 1% = 1.3088 | 90% = .32302 | 25% = .72924 | 1% = .98756 |
| 32 MEAN = .76710 | S.D. = .25585 | P(N>=r) = .38783 | 45 MEAN = .57591 | S.D. = .18710 | P(N>=r) = .27318 |
| 99% = .19435 | 75% = .58450 | 10% = 1.0849 | 99% = .16201 | 75% = .44221 | 10% = .81232 |
| 95% = .31706 | 50% = .78883 | 5% = 1.1544 | 95% = .25346 | 50% = .58675 | 5% = .86772 |
| 90% = .40596 | 25% = .95835 | 1% = 1.2787 | 90% = .31711 | 25% = .71309 | 1% = .96745 |
| 33 MEAN = .74963 | S.D. = .24954 | P(N>=r) = .37903 | 46 MEAN = .56361 | S.D. = .18278 | P(N>=r) = .26436 |
| 99% = .19148 | 75% = .57145 | 10% = 1.0599 | 99% = .15979 | 75% = .43300 | 10% = .79493 |
| 95% = .31127 | 50% = .77037 | 5% = 1.1281 | 95% = .24923 | 50% = .57369 | 5% = .84949 |
| 90% = .39781 | 25% = .93601 | 1% = 1.2499 | 90% = .31129 | 25% = .69726 | 1% = .94783 |
| 34 MEAN = .73274 | S.D. = .24344 | P(N>=r) = .37023 | 47 MEAN = .55154 | S.D. = .17856 | P(N>=r) = .25554 |
| 99% = .18869 | 75% = .55885 | 10% = 1.0358 | 99% = .15759 | 75% = .42395 | 10% = .77790 |
| 95% = .30567 | 50% = .75260 | 5% = 1.1026 | 95% = .24507 | 50% = .56089 | 5% = .83168 |
| 90% = .38995 | 25% = .91439 | 1% = 1.2221 | 90% = .30556 | 25% = .68173 | 1% = .92866 |
| 35 MEAN = .71640 | S.D. = .23754 | P(N>=r) = .36141 | 48 MEAN = .53971 | S.D. = .17446 | P(N>=r) = .24672 |
| 99% = .18598 | 75% = .54669 | 10% = 1.0125 | 99% = .15541 | 75% = .41505 | 10% = .76124 |
| 95% = .30027 | 50% = .73543 | 5% = 1.0780 | 95% = .24095 | 50% = .54834 | 5% = .81425 |
| 90% = .38237 | 25% = .89346 | 1% = 1.1953 | 90% = .29991 | 25% = .66652 | 1% = .90993 |
| 36 MEAN = .70057 | S.D. = .23181 | P(N>=r) = .35259 | 49 MEAN = .52810 | S.D. = .17045 | P(N>=r) = .23790 |
| 99% = .18335 | 75% = .53493 | 10% = .98985 | 99% = .15323 | 75% = .40628 | 10% = .74493 |
| 95% = .29504 | 50% = .71873 | 5% = 1.0542 | 95% = .23687 | 50% = .53601 | 5% = .79718 |
| 90% = .37504 | 25% = .87317 | 1% = 1.1694 | 90% = .29432 | 25% = .65165 | 1% = .89161 |
| 37 MEAN = .68522 | S.D. = .22625 | P(N>=r) = .34377 | 50 MEAN = .51669 | S.D. = .16655 | P(N>=r) = .22908 |
| 99% = .18079 | 75% = .52352 | 10% = .96791 | 99% = .15107 | 75% = .39765 | 10% = .72894 |
| 95% = .28998 | 50% = .70262 | 5% = 1.0311 | 95% = .23282 | 50% = .52390 | 5% = .78047 |
| 90% = .36795 | 25% = .85346 | 1% = 1.1443 | 90% = .28880 | 25% = .63719 | 1% = .87368 |
| 38 MEAN = .67030 | S.D. = .22086 | P(N>=r) = .33494 | 51 MEAN = .50548 | S.D. = .16274 | P(N>=r) = .22027 |
| 99% = .17830 | 75% = .51245 | 10% = .94661 | 99% = .14891 | 75% = .38913 | 10% = .71326 |
| 95% = .28506 | 50% = .68694 | 5% = 1.0087 | 95% = .22881 | 50% = .51200 | 5% = .76410 |
| 90% = .36106 | 25% = .83431 | 1% = 1.1199 | 90% = .28333 | 25% = .62319 | 1% = .85614 |
| 39 MEAN = .65580 | S.D. = .21562 | P(N>=r) = .32611 | 52 MEAN = .49445 | S.D. = .15903 | P(N>=r) = .21145 |
| 99% = .17586 | 75% = .50168 | 10% = .92590 | 99% = .14675 | 75% = .38072 | 10% = .69789 |
| 95% = .28027 | 50% = .67165 | 5% = .98692 | 95% = .22482 | 50% = .50030 | 5% = .74805 |
| 90% = .35436 | 25% = .81568 | 1% = 1.0963 | 90% = .27791 | 25% = .60937 | 1% = .83896 |

| Pool rank | Distribution | | |
|---|---|---|---|
| 53 MEAN = .48361 | S.D. = .15542 | P(N>=r) = | .20263 |
| 99% = .14460 | 75% = .37242 | 10% = | .68279 |
| 95% = .22085 | 50% = .48878 | 5% = | .73231 |
| 90% = .27254 | 25% = .59578 | 1% = | .82212 |
| 54 MEAN = .47293 | S.D. = .15189 | P(N>=r) = | .19382 |
| 99% = .14244 | 75% = .36422 | 10% = | .66797 |
| 95% = .21689 | 50% = .47746 | 5% = | .71688 |
| 90% = .26720 | 25% = .58228 | 1% = | .80562 |
| 55 MEAN = .46242 | S.D. = .14846 | P(N>=r) = | .18501 |
| 99% = .14027 | 75% = .35612 | 10% = | .65339 |
| 95% = .21295 | 50% = .46631 | 5% = | .70173 |
| 90% = .26189 | 25% = .56897 | 1% = | .78945 |
| 56 MEAN = .45208 | S.D. = .14511 | P(N>=r) = | .17620 |
| 99% = .13810 | 75% = .34811 | 10% = | .63893 |
| 95% = .20902 | 50% = .45535 | 5% = | .68687 |
| 90% = .25662 | 25% = .55592 | 1% = | .77359 |
| 57 MEAN = .44190 | S.D. = .14184 | P(N>=r) = | .16741 |
| 99% = .13593 | 75% = .34019 | 10% = | .62473 |
| 95% = .20510 | 50% = .44457 | 5% = | .67229 |
| 90% = .25138 | 25% = .54312 | 1% = | .75803 |
| 58 MEAN = .43188 | S.D. = .13866 | P(N>=r) = | .15862 |
| 99% = .13375 | 75% = .33238 | 10% = | .61066 |
| 95% = .20120 | 50% = .43396 | 5% = | .65797 |
| 90% = .24617 | 25% = .53056 | 1% = | .74278 |
| 59 MEAN = .42203 | S.D. = .13556 | P(N>=r) = | .14985 |
| 99% = .13156 | 75% = .32466 | 10% = | .59709 |
| 95% = .19730 | 50% = .42354 | 5% = | .64390 |
| 90% = .24101 | 25% = .51822 | 1% = | .72782 |
| 60 MEAN = .41234 | S.D. = .13254 | P(N>=r) = | .14111 |
| 99% = .12937 | 75% = .31706 | 10% = | .58407 |
| 95% = .19343 | 50% = .41331 | 5% = | .63007 |
| 90% = .23588 | 25% = .50612 | 1% = | .71315 |
| 61 MEAN = .40283 | S.D. = .12960 | P(N>=r) = | .13239 |
| 99% = .12718 | 75% = .30958 | 10% = | .57134 |
| 95% = .18958 | 50% = .40327 | 5% = | .61631 |
| 90% = .23081 | 25% = .49425 | 1% = | .69876 |
| 62 MEAN = .39350 | S.D. = .12673 | P(N>=r) = | .12373 |
| 99% = .12500 | 75% = .30222 | 10% = | .55870 |
| 95% = .18576 | 50% = .39344 | 5% = | .60259 |
| 90% = .22580 | 25% = .48263 | 1% = | .68466 |

| Pool rank | Distribution | | |
|---|---|---|---|
| 63 MEAN = .38436 | S.D. = .12393 | P(N>=r) = | .11513 |
| 99% = .12283 | 75% = .29501 | 10% = | .54622 |
| 95% = .18198 | 50% = .38382 | 5% = | .58915 |
| 90% = .22085 | 25% = .47125 | 1% = | .67085 |
| 64 MEAN = .37542 | S.D. = .12120 | P(N>=r) = | .10662 |
| 99% = .12067 | 75% = .28796 | 10% = | .53400 |
| 95% = .17826 | 50% = .37443 | 5% = | .57633 |
| 90% = .21600 | 25% = .46013 | 1% = | .65733 |
| 65 MEAN = .36669 | S.D. = .11853 | P(N>=r)=.98225E-01 | |
| 99% = .11854 | 75% = .28107 | 10% = | .52207 |
| 95% = .17459 | 50% = .36527 | 5% = | .56410 |
| 90% = .21123 | 25% = .44928 | 1% = | .64409 |
| 66 MEAN = .35818 | S.D. = .11594 | P(N>=r) = | .89969E-01 |
| 99% = .11644 | 75% = .27436 | 10% = | .51041 |
| 95% = .17100 | 50% = .35637 | 5% = | .55214 |
| 90% = .20658 | 25% = .43870 | 1% = | .63115 |
| 67 MEAN = .34990 | S.D. = .11340 | P(N>=r) = | .81893E-01 |
| 99% = .11438 | 75% = .26785 | 10% = | .49905 |
| 95% = .16750 | 50% = .34772 | 5% = | .54032 |
| 90% = .20205 | 25% = .42840 | 1% = | .61850 |
| 68 MEAN = .34186 | S.D. = .11093 | P(N>=r) = | .74034E-01 |
| 99% = .11237 | 75% = .26155 | 10% = | .48798 |
| 95% = .16409 | 50% = .33934 | 5% = | .52872 |
| 90% = .19765 | 25% = .41840 | 1% = | .60612 |
| 69 MEAN = .33407 | S.D. = .10851 | P(N>=r) = | .66437E-01 |
| 99% = .11040 | 75% = .25546 | 10% = | .47722 |
| 95% = .16078 | 50% = .33125 | 5% = | .51744 |
| 90% = .19339 | 25% = .40870 | 1% = | .59391 |
| 70 MEAN = .32654 | S.D. = .10616 | P(N>=r) = | .59145E-01 |
| 99% = .10850 | 75% = .24960 | 10% = | .46676 |
| 95% = .15758 | 50% = .32344 | 5% = | .50646 |
| 90% = .18929 | 25% = .39932 | 1% = | .58191 |
| 71 MEAN = .31928 | S.D. = .10386 | P(N>=r) = | .52204E-01 |
| 99% = .10665 | 75% = .24396 | 10% = | .45663 |
| 95% = .15450 | 50% = .31592 | 5% = | .49580 |
| 90% = .18534 | 25% = .39025 | 1% = | .56921 |

***E) The mean of the potential = 35.600***

## PETRIMES MODULE PSUM

***Monte Carlo sum simulation pool size distribution***

UAI ..... **C5019902**
PLAY ..... **Tertiary/Upper Cretaceous Nonmarine Oil**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Mon, Feb. 8, 1999, 11:52 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store in data base ? | > | Y |
| Oil (o) or gas (g) ? | > | O |
| British or S.I. unit of measurement? | > | Si |
| Recoverable resources? | > | N |
| Do you want to use MPRO output? | > | Y |
| Do you assume lognormal distribution? | > | Y |
| Do you want to use PPSD output? | > | Y |
| Do you compute conditional potential? | > | N |

### *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 | = | -.71278E-01 | MEAN | = | 1.1975 | | |
| Statistics | sig. sq. | = | .50305 | S.D. | = | .96825 | | |
| Upper percentiles | 99.99% | = | .66602E-01 | 60.00% | = | .77805 | 15.00% | = 1.9422 |
| | 99.00% | = | .17884 | 55.00% | = | .85180 | 10.00% | = 2.3110 |
| | 95.00% | = | .28999 | 50.00% | = | .93120 | 8.00% | = 2.5226 |
| | 90.00% | = | .37522 | 45.00% | = | 1.0180 | 6.00% | = 2.8052 |
| | 85.00% | = | .44647 | 40.00% | = | 1.1145 | 5.00% | = 2.9902 |
| | 80.00% | = | .51263 | 35.00% | = | 1.2239 | 4.00% | = 3.2233 |
| | 75.00% | = | .57714 | 30.00% | = | 1.3507 | 2.00% | = 3.9963 |
| | 70.00% | = | .64197 | 25.00% | = | 1.5025 | 1.00% | = 4.8487 |
| | 65.00% | = | .70852 | 20.00% | = | 1.6916 | .01% | = 13.020 |

### *C) Number of pools distribution*

| | | |
|---|---|---|
| Lower support | = | 0 |
| Upper support | = | 102 |
| Expectation | = | 29.79207 |
| Standard Deviation | = | 21.72389 |

### *D) Summary statistics for 4,000 simulations*

| | | |
|---|---|---|
| Play resource | (M cu m ) | |
| Minimum | = | .2604936 |
| Maximum | = | 133.8290 |
| Expectation | = | 35.35617 |
| Standard Deviation | = | 26.35989 |

***Empirical distribution***

| *Greater than percentage* | *Play potential* |
|---|---|
| 100.00 | .26049 |
| 99.00 | 2.6692 |
| 95.00 | 6.1935 |
| 90.00 | 8.2957 |
| 85.00 | 10.235 |
| 80.00 | 12.090 |
| 75.00 | 13.848 |
| 70.00 | 15.603 |
| 65.00 | 17.592 |
| 60.00 | 19.649 |
| 55.00 | 22.331 |
| 50.00 | 25.778 |
| 45.00 | 30.255 |
| 40.00 | 35.876 |
| 35.00 | 41.825 |
| 30.00 | 48.267 |
| 25.00 | 54.705 |
| 20.00 | 61.714 |
| 15.00 | 68.121 |
| 10.00 | 76.017 |
| 8.00 | 79.421 |
| 6.00 | 83.338 |
| 5.00 | 85.769 |
| 4.00 | 88.858 |
| 2.00 | 95.461 |
| 1.00 | 100.97 |
| .01 | 130.86 |
| .00 | 133.53 |

## PETRIMES MODULE MPRO

***Number of of pools distribution and risks***

UAI ..... **C5029902**

PLAY ..... **Tertiary/Upper Cretaceous Nonmarine Gas**

Assessor ..... Peter Hannigan

Geologist ..... Peter Hannigan

Remarks ..... Kandik Assessment Project

Run date ..... Fri., Feb. 5, 1999, 1:29 p.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store on db? | > | Y |
| Oil (o) or gas (g) ? | > | G |

***A) Risks***

| | *Geological factor* | | *Marginal probability* |
|---|---|---|---|
| Play level | overall play level risk | = | 1.00 |
| | Prospect level presence of closure | ( 1) | .80 |
| | Presence of reservoir facies | ( 2) | 1.00 |
| | Adequate seal | ( 4) | .70 |
| | Adequate timing | ( 5) | .75 |
| | Adequate source | ( 6) | .90 |
| | Overall prospect level risk | = | .38 |
| Exploration risk | | = | .38 |

***B) Number of prospects distribution***

| | | |
|---|---|---|
| Minimum | = | 14 |
| Maximum | = | 200 |
| Mean | = | 78.82 |
| S.D. | = | 56.33 |

| *Frequency* | *Number of prospects* |
|---|---|
| 99.00 | 14 |
| 95 | 17 |
| 90 | 21 |
| 80 | 28 |
| 75 | 32 |
| 60 | 43 |
| 50 | 50 |
| 40 | 80 |
| 25 | 125 |
| 20 | 140 |
| 10 | 170 |
| 5 | 185 |
| 1 | 197 |
| 0 | 200 |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Minimum | = | 0 |
| Maximum | = | 102 |
| Mean | = | 29.79 |
| S.D. | = | 21.72 |

| *Frequency* | *Number of pools* |
|---|---|
| 100.00 | 0 |
| 99 | 4 |
| 95 | 6 |
| 90 | 8 |
| 80 | 10 |
| 75 | 12 |
| 60 | 16 |
| 50 | 21 |
| 40 | 30 |
| 25 | 47 |
| 20 | 53 |
| 10 | 64 |
| 5 | 71 |
| 1 | 80 |
| 0 | 102 |

Note: The number of pools distribution is saved in the database with UDI= 6201GB4

## PETRIMES MODULE PSRK

***Individual pool sizes by rank where N is a random variable***

UAI ..... **C5029902**

PLAY ..... **Tertiary/Upper Cretaceous Nonmarine Gas**

Assessor ..... Peter Hannigan

Geologist ..... Peter Hannigan

Remarks ..... Kandik Assessment Project

Run date ..... Mon., Feb. 8, 1999, 11:22 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store on DB? | > | Y |
| Do you want to use MPRO output? | > | Y |
| Minimum and maximum pool ranks? | > | 1 71 |
| Do you use lognornal assumption? | > | Y |
| Do you want to use PPSD output? | > | Y |

***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 | = | 5.3218 | MEAN | = | 271.40 | |
| Statistics | sig. sq. | = | .56362 | S.D. | = | 236.14 | |
| Upper percentiles | 99.99% | = | 12.550 | 60.00% | = | 169.29 | 15.00% = 445.81 |
| | 99.00% | = | 35.705 | 55.00% | = | 186.32 | 10.00% = 535.88 |
| | 95.00% | = | 59.556 | 50.00% | = | 204.75 | 8.00% = 587.95 |
| | 90.00% | = | 78.231 | 45.00% | = | 225.01 | 6.00% = 657.88 |
| | 85.00% | = | 94.037 | 40.00% | = | 247.64 | 5.00% = 703.91 |
| | 80.00% | = | 108.85 | 35.00% | = | 273.44 | 4.00% = 762.12 |
| | 75.00% | = | 123.40 | 30.00% | = | 303.53 | 2.00% = 956.84 |
| | 70.00% | = | 138.12 | 25.00% | = | 339.73 | 1.00% = 1174.1 |
| | 65.00% | = | 153.32 | 20.00% | = | 385.15 | .01% = 3340.3 |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Lower support | = | 0 |
| Upper support | = | 102 |
| Expectation | = | 29.79 |
| Standard Deviation | = | 21.72 |

### *D) Pool sizes by rank*

| Pool rank | Distribution | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | MEAN = 948.46 | S.D. = 488.29 | P(N>=r) = .99996 | 14 | MEAN = 250.00 | S.D. = 117.82 | P(N>=r) = .69234 |
| | 99% = 255.69 | 75% = 618.65 | 10% = 1536.3 | | 99% = 39.746 | 75% = 145.93 | 10% = 401.65 |
| | 95% = 373.60 | 50% = 856.25 | 5% = 1835.0 | | 95% = 67.642 | 50% = 257.08 | 5% = 432.84 |
| | 90% = 452.40 | 25% = 1160.6 | 1% = 2626.9 | | 90% = 89.625 | 25% = 344.42 | 1% = 490.40 |
| 2 | MEAN = 654.53 | S.D. = 283.40 | P(N>=r) = .99955 | 15 | MEAN = 244.37 | S.D. = 112.79 | P(N>=r) = .65855 |
| | 99% = 173.68 | 75% = 444.93 | 10% = 1022.4 | | 99% = 38.929 | 75% = 145.83 | 10% = 387.96 |
| | 95% = 265.21 | 50% = 621.21 | 5% = 1161.9 | | 95% = 66.125 | 50% = 253.40 | 5% = 417.44 |
| | 90% = 323.97 | 25% = 820.85 | 1% = 1483.1 | | 90% = 87.841 | 25% = 334.03 | 1% = 471.82 |
| 3 | MEAN = 530.58 | S.D. = 228.74 | P(N>=r) = .99770 | 16 | MEAN = 239.60 | S.D. = 107.75 | P(N>=r) = .62627 |
| | 99% = 124.19 | 75% = 355.47 | 10% = 833.74 | | 99% = 38.409 | 75% = 147.73 | 10% = 375.36 |
| | 95% = 202.99 | 50% = 508.89 | 5% = 931.99 | | 95% = 65.272 | 50% = 249.81 | 5% = 403.31 |
| | 90% = 253.44 | 25% = 680.39 | 1% = 1142.7 | | 90% = 87.102 | 25% = 324.42 | 1% = 454.86 |
| 4 | MEAN = 455.46 | S.D. = 202.24 | P(N>=r) = .99225 | 17 | MEAN = 235.43 | S.D. = 102.70 | P(N>=r) = .59604 |
| | 99% = 92.412 | 75% = 297.38 | 10% = 726.33 | | 99% = 38.206 | 75% = 151.06 | 10% = 363.65 |
| | 95% = 160.80 | 50% = 437.53 | 5% = 805.03 | | 95% = 65.125 | 50% = 246.12 | 5% = 390.23 |
| | 90% = 206.09 | 25% = 596.73 | 1% = 966.47 | | 90% = 87.476 | 25% = 315.41 | 1% = 439.25 |
| 5 | MEAN = 403.88 | S.D. = 185.46 | P(N>=r) = .98068 | 18 | MEAN = 231.56 | S.D. = 97.690 | P(N>=r) = .56838 |
| | 99% = 73.162 | 75% = 256.46 | 10% = 653.86 | | 99% = 38.329 | 75% = 154.66 | 10% = 352.67 |
| | 95% = 131.70 | 50% = 387.52 | 5% = 720.73 | | 95% = 65.702 | 50% = 242.18 | 5% = 378.02 |
| | 90% = 172.72 | 25% = 539.33 | 1% = 853.78 | | 90% = 88.974 | 25% = 306.88 | 1% = 424.77 |
| 6 | MEAN = 366.52 | S.D. = 172.98 | P(N>=r) = .96150 | 19 | MEAN = 227.75 | S.D. = 92.814 | P(N>=r) = .54366 |
| | 99% = 61.864 | 75% = 226.83 | 10% = 600.47 | | 99% = 38.765 | 75% = 157.42 | 10% = 342.30 |
| | 95% = 112.23 | 50% = 351.26 | 5% = 659.17 | | 95% = 66.964 | 50% = 237.89 | 5% = 366.53 |
| | 90% = 149.34 | 25% = 497.04 | 1% = 773.44 | | 90% = 91.438 | 25% = 298.67 | 1% = 411.24 |
| 7 | MEAN = 338.58 | S.D. = 162.78 | P(N>=r) = .93518 | 20 | MEAN = 223.78 | S.D. = 88.205 | P(N>=r) = .52206 |
| | 99% = 55.112 | 75% = 205.08 | 10% = 558.90 | | 99% = 39.468 | 75% = 158.75 | 10% = 332.46 |
| | 95% = 99.433 | 50% = 324.71 | 5% = 611.48 | | 95% = 68.760 | 50% = 233.22 | 5% = 355.65 |
| | 90% = 133.10 | 25% = 464.44 | 1% = 712.23 | | 90% = 94.414 | 25% = 290.73 | 1% = 398.52 |
| 8 | MEAN = 317.07 | S.D. = 154.08 | P(N>=r) = .90374 | 21 | MEAN = 219.52 | S.D. = 83.980 | P(N>=r) = .50348 |
| | 99% = 50.847 | 75% = 188.76 | 10% = 525.22 | | 99% = 40.339 | 75% = 158.62 | 10% = 323.07 |
| | 95% = 90.818 | 50% = 305.18 | 5% = 572.96 | | 95% = 70.780 | 50% = 228.20 | 5% = 345.33 |
| | 90% = 121.59 | 25% = 438.36 | 1% = 663.40 | | 90% = 97.179 | 25% = 282.95 | 1% = 386.51 |
| 9 | MEAN = 299.97 | S.D. = 146.49 | P(N>=r) = .86946 | 22 | MEAN = 214.95 | S.D. = 80.212 | P(N>=r) = .48762 |
| | 99% = 47.900 | 75% = 176.15 | 10% = 497.05 | | 99% = 41.233 | 75% = 157.25 | 10% = 314.05 |
| | 95% = 84.622 | 50% = 290.74 | 5% = 540.85 | | 95% = 72.590 | 50% = 222.90 | 5% = 335.51 |
| | 90% = 113.01 | 25% = 416.77 | 1% = 623.12 | | 90% = 99.063 | 25% = 275.35 | 1% = 375.14 |
| 10 | MEAN = 286.03 | S.D. = 139.78 | P(N>=r) = .83401 | 23 | MEAN = 210.11 | S.D. = 76.914 | P(N>=r) = .47400 |
| | 99% = 45.641 | 75% = 166.17 | 10% = 472.94 | | 99% = 41.977 | 75% = 154.93 | 10% = 305.36 |
| | 95% = 79.798 | 50% = 280.03 | 5% = 513.43 | | 95% = 73.803 | 50% = 217.41 | 5% = 326.13 |
| | 90% = 106.21 | 25% = 398.40 | 1% = 589.02 | | 90% = 99.788 | 25% = 267.89 | 1% = 364.34 |
| 11 | MEAN = 274.46 | S.D. = 133.74 | P(N>=r) = .79823 | 24 | MEAN = 205.08 | S.D. = 74.039 | P(N>=r) = .46211 |
| | 99% = 43.772 | 75% = 158.27 | 10% = 451.90 | | 99% = 42.438 | 75% = 151.98 | 10% = 296.96 |
| | 95% = 75.829 | 50% = 272.02 | 5% = 489.58 | | 95% = 74.246 | 50% = 211.84 | 5% = 317.11 |
| | 90% = 100.64 | 25% = 382.44 | 1% = 559.59 | | 90% = 99.456 | 25% = 260.63 | 1% = 354.08 |
| 12 | MEAN = 264.79 | S.D. = 128.18 | P(N>=r) = .76252 | 25 | MEAN = 199.99 | S.D. = 71.514 | P(N>=r) = .45145 |
| | 99% = 42.180 | 75% = 152.26 | 10% = 433.30 | | 99% = 42.563 | 75% = 148.64 | 10% = 288.86 |
| | 95% = 72.510 | 50% = 265.94 | 5% = 468.54 | | 95% = 73.983 | 50% = 206.31 | 5% = 308.44 |
| | 90% = 96.054 | 25% = 368.36 | 1% = 533.80 | | 90% = 98.342 | 25% = 253.58 | 1% = 344.29 |
| 13 | MEAN = 256.72 | S.D. = 122.92 | P(N>=r) = .72713 | 26 | MEAN = 194.92 | S.D. = 69.258 | P(N>=r) = .44160 |
| | 99% = 40.836 | 75% = 148.11 | 10% = 416.67 | | 99% = 42.388 | 75% = 145.13 | 10% = 281.08 |
| | 95% = 69.780 | 50% = 261.13 | 5% = 449.76 | | 95% = 73.199 | 50% = 200.87 | 5% = 300.10 |
| | 90% = 92.380 | 25% = 355.79 | 1% = 510.92 | | 90% = 96.732 | 25% = 246.77 | 1% = 334.91 |

| Pool rank | | Distribution | | | |
|---|---|---|---|---|---|
| 27 MEAN = 189.94 | S.D. = 67.200 | P(N>=r) = .43225 | | | |
| 99% = 41.995 | 75% = 141.57 | 10% = 273.62 | | | |
| 95% = 72.092 | 50% = 195.57 | 5% = 292.10 | | | |
| 90% = 94.852 | 25% = 240.22 | 1% = 325.83 | | | |
| 28 MEAN = 185.11 | S.D. = 65.290 | P(N>=r) = .42318 | | | |
| 99% = 41.467 | 75% = 138.06 | 10% = 266.47 | | | |
| 95% = 70.813 | 50% = 190.45 | 5% = 284.46 | | | |
| 90% = 92.856 | 25% = 233.93 | 1% = 317.16 | | | |
| 29 MEAN = 180.43 | S.D. = 63.490 | P(N>=r) = .41427 | | | |
| 99% = 40.870 | 75% = 134.63 | 10% = 259.62 | | | |
| 95% = 69.465 | 50% = 185.51 | 5% = 277.17 | | | |
| 90% = 90.836 | 25% = 227.88 | 1% = 308.88 | | | |
| 30 MEAN = 175.92 | S.D. = 61.779 | P(N>=r) = .40543 | | | |
| 99% = 40.245 | 75% = 131.32 | 10% = 253.06 | | | |
| 95% = 68.104 | 50% = 180.75 | 5% = 270.18 | | | |
| 90% = 88.844 | 25% = 222.06 | 1% = 301.01 | | | |
| 31 MEAN = 171.57 | S.D. = 60.142 | P(N>=r) = .39663 | | | |
| 99% = 39.614 | 75% = 128.13 | 10% = 246.75 | | | |
| 95% = 66.763 | 50% = 176.17 | 5% = 263.48 | | | |
| 90% = 86.905 | 25% = 216.47 | 1% = 293.56 | | | |
| 32 MEAN = 167.39 | S.D. = 58.569 | P(N>=r) = .38783 | | | |
| 99% = 38.991 | 75% = 125.06 | 10% = 240.67 | | | |
| 95% = 65.456 | 50% = 171.77 | 5% = 257.03 | | | |
| 90% = 85.031 | 25% = 211.07 | 1% = 286.43 | | | |
| 33 MEAN = 163.35 | S.D. = 57.053 | P(N>=r) = .37903 | | | |
| 99% = 38.382 | 75% = 122.11 | 10% = 234.82 | | | |
| 95% = 64.192 | 50% = 167.52 | 5% = 250.83 | | | |
| 90% = 83.224 | 25% = 205.87 | 1% = 279.59 | | | |
| 34 MEAN = 159.45 | S.D. = 55.589 | P(N>=r) = .37023 | | | |
| 99% = 37.790 | 75% = 119.26 | 10% = 229.17 | | | |
| 95% = 62.971 | 50% = 163.43 | 5% = 244.85 | | | |
| 90% = 81.485 | 25% = 200.84 | 1% = 273.02 | | | |
| 35 MEAN = 155.69 | S.D. = 54.173 | P(N>=r) = .36141 | | | |
| 99% = 37.215 | 75% = 116.52 | 10% = 223.71 | | | |
| 95% = 61.793 | 50% = 159.49 | 5% = 239.07 | | | |
| 90% = 79.809 | 25% = 195.98 | 1% = 266.68 | | | |
| 36 MEAN = 152.05 | S.D. = 52.801 | P(N>=r) = .35259 | | | |
| 99% = 36.658 | 75% = 113.87 | 10% = 218.42 | | | |
| 95% = 60.655 | 50% = 155.66 | 5% = 233.48 | | | |
| 90% = 78.192 | 25% = 191.27 | 1% = 260.56 | | | |
| 37 MEAN = 148.52 | S.D. = 51.473 | P(N>=r) = .34377 | | | |
| 99% = 36.117 | 75% = 111.30 | 10% = 213.30 | | | |
| 95% = 59.554 | 50% = 151.96 | 5% = 228.07 | | | |
| 90% = 76.627 | 25% = 186.70 | 1% = 254.65 | | | |
| 38 MEAN = 145.10 | S.D. = 50.185 | P(N>=r) = .33494 | | | |
| 99% = 35.590 | 75% = 108.81 | 10% = 208.34 | | | |
| 95% = 58.485 | 50% = 148.38 | 5% = 222.83 | | | |
| 90% = 75.110 | 25% = 182.27 | 1% = 248.92 | | | |
| 39 MEAN = 141.77 | S.D. = 48.936 | P(N>=r) = .32611 | | | |
| 99% = 35.075 | 75% = 106.39 | 10% = 203.52 | | | |
| 95% = 57.445 | 50% = 144.88 | 5% = 217.74 | | | |
| 90% = 73.634 | 25% = 177.97 | 1% = 243.36 | | | |

| Pool rank | | Distribution | | | |
|---|---|---|---|---|---|
| 40 MEAN = 138.54 | S.D. = 47.725 | P(N>=r) = .31728 | | | |
| 99% = 34.570 | 75% = 104.03 | 10% = 198.83 | | | |
| 95% = 56.429 | 50% = 141.47 | 5% = 212.80 | | | |
| 90% = 72.197 | 25% = 173.78 | 1% = 237.97 | | | |
| 41 MEAN = 135.39 | S.D. = 46.548 | P(N>=r) = .30846 | | | |
| 99% = 34.074 | 75% = 101.74 | 10% = 194.27 | | | |
| 95% = 55.436 | 50% = 138.13 | 5% = 207.99 | | | |
| 90% = 70.793 | 25% = 169.70 | 1% = 232.74 | | | |
| 42 MEAN = 132.32 | S.D. = 45.405 | P(N>=r) = .29964 | | | |
| 99% = 33.585 | 75% = 99.504 | 10% = 189.84 | | | |
| 95% = 54.462 | 50% = 134.87 | 5% = 203.32 | | | |
| 90% = 69.421 | 25% = 165.73 | 1% = 227.65 | | | |
| 43 MEAN = 129.33 | S.D. = 44.295 | P(N>=r) = .29081 | | | |
| 99% = 33.104 | 75% = 97.318 | 10% = 185.52 | | | |
| 95% = 53.507 | 50% = 131.69 | 5% = 198.77 | | | |
| 90% = 68.078 | 25% = 161.85 | 1% = 222.70 | | | |
| 44 MEAN = 126.41 | S.D. = 43.215 | P(N>=r) = .28199 | | | |
| 99% = 32.628 | 75% = 95.180 | 10% = 181.30 | | | |
| 95% = 52.568 | 50% = 128.60 | 5% = 194.33 | | | |
| 90% = 66.761 | 25% = 158.07 | 1% = 217.89 | | | |
| 45 MEAN = 123.55 | S.D. = 42.165 | P(N>=r) = .27318 | | | |
| 99% = 32.158 | 75% = 93.087 | 10% = 177.19 | | | |
| 95% = 51.644 | 50% = 125.57 | 5% = 190.00 | | | |
| 90% = 65.468 | 25% = 154.36 | 1% = 213.20 | | | |
| 46 MEAN = 120.75 | S.D. = 41.143 | P(N>=r) = .26436 | | | |
| 99% = 31.692 | 75% = 91.036 | 10% = 173.18 | | | |
| 95% = 50.735 | 50% = 122.62 | 5% = 185.78 | | | |
| 90% = 64.197 | 25% = 150.74 | 1% = 208.62 | | | |
| 47 MEAN = 118.02 | S.D. = 40.148 | P(N>=r) = .25554 | | | |
| 99% = 31.231 | 75% = 89.023 | 10% = 169.25 | | | |
| 95% = 49.837 | 50% = 119.72 | 5% = 181.66 | | | |
| 90% = 62.946 | 25% = 147.19 | 1% = 204.16 | | | |
| 48 MEAN = 115.34 | S.D. = 39.179 | P(N>=r) = .24672 | | | |
| 99% = 30.773 | 75% = 87.046 | 10% = 165.42 | | | |
| 95% = 48.950 | 50% = 116.89 | 5% = 177.63 | | | |
| 90% = 61.714 | 25% = 143.71 | 1% = 199.80 | | | |
| 49 MEAN = 112.71 | S.D. = 38.236 | P(N>=r) = .23790 | | | |
| 99% = 30.317 | 75% = 85.101 | 10% = 161.67 | | | |
| 95% = 48.074 | 50% = 114.11 | 5% = 173.70 | | | |
| 90% = 60.498 | 25% = 140.32 | 1% = 195.55 | | | |
| 50 MEAN = 110.13 | S.D. = 37.317 | P(N>=r) = .22908 | | | |
| 99% = 29.864 | 75% = 83.188 | 10% = 158.00 | | | |
| 95% = 47.205 | 50% = 111.38 | 5% = 169.84 | | | |
| 90% = 59.298 | 25% = 137.03 | 1% = 191.39 | | | |
| 51 MEAN = 107.60 | S.D. = 36.422 | P(N>=r) = .22027 | | | |
| 99% = 29.413 | 75% = 81.303 | 10% = 154.40 | | | |
| 95% = 46.344 | 50% = 108.71 | 5% = 166.08 | | | |
| 90% = 58.110 | 25% = 133.84 | 1% = 187.32 | | | |
| 52 MEAN = 105.12 | S.D. = 35.550 | P(N>=r) = .21145 | | | |
| 99% = 28.962 | 75% = 79.446 | 10% = 150.88 | | | |
| 95% = 45.489 | 50% = 106.08 | 5% = 162.39 | | | |
| 90% = 56.934 | 25% = 130.70 | 1% = 183.34 | | | |

| Pool rank | | Distribution | | | |
|---|---|---|---|---|---|
| 53 MEAN = 102.68 | S.D. = 34.701 | P(N>=r) = .20263 | | | |
| 99% = 28.512 | 75% = 77.613 | 10% = 147.43 | | | |
| 95% = 44.639 | 50% = 103.50 | 5% = 158.77 | | | |
| 90% = 55.769 | 25% = 127.62 | 1% = 179.45 | | | |
| 54 MEAN = 100.28 | S.D. = 33.874 | P(N>=r) = .19382 | | | |
| 99% = 28.061 | 75% = 75.805 | 10% = 144.04 | | | |
| 95% = 43.793 | 50% = 100.96 | 5% = 155.23 | | | |
| 90% = 54.613 | 25% = 124.56 | 1% = 175.64 | | | |
| 55 MEAN = 97.924 | S.D. = 33.068 | P(N>=r) = .18501 | | | |
| 99% = 27.610 | 75% = 74.021 | 10% = 140.72 | | | |
| 95% = 42.952 | 50% = 98.467 | 5% = 151.76 | | | |
| 90% = 53.466 | 25% = 121.55 | 1% = 171.91 | | | |
| 56 MEAN = 95.607 | S.D. = 32.284 | P(N>=r) = .17620 | | | |
| 99% = 27.159 | 75% = 72.260 | 10% = 137.42 | | | |
| 95% = 42.113 | 50% = 96.018 | 5% = 148.36 | | | |
| 90% = 52.327 | 25% = 118.60 | 1% = 168.26 | | | |
| 57 MEAN = 93.329 | S.D. = 31.520 | P(N>=r) = .16741 | | | |
| 99% = 26.706 | 75% = 70.522 | 10% = 134.19 | | | |
| 95% = 41.278 | 50% = 93.612 | 5% = 145.03 | | | |
| 90% = 51.197 | 25% = 115.71 | 1% = 164.68 | | | |
| 58 MEAN = 91.091 | S.D. = 30.776 | P(N>=r) = .15862 | | | |
| 99% = 26.252 | 75% = 68.808 | 10% = 131.00 | | | |
| 95% = 40.446 | 50% = 91.250 | 5% = 141.76 | | | |
| 90% = 50.076 | 25% = 112.88 | 1% = 161.17 | | | |
| 59 MEAN = 88.892 | S.D. = 30.052 | P(N>=r) = .14985 | | | |
| 99% = 25.798 | 75% = 67.119 | 10% = 127.92 | | | |
| 95% = 39.618 | 50% = 88.933 | 5% = 138.56 | | | |
| 90% = 48.964 | 25% = 110.11 | 1% = 157.74 | | | |
| 60 MEAN = 86.734 | S.D. = 29.347 | P(N>=r) = .14111 | | | |
| 99% = 25.344 | 75% = 65.457 | 10% = 124.97 | | | |
| 95% = 38.795 | 50% = 86.660 | 5% = 135.41 | | | |
| 90% = 47.862 | 25% = 107.39 | 1% = 154.38 | | | |
| 61 MEAN = 84.618 | S.D. = 28.660 | P(N>=r) = .13239 | | | |
| 99% = 24.891 | 75% = 63.823 | 10% = 122.09 | | | |
| 95% = 37.978 | 50% = 84.435 | 5% = 132.28 | | | |
| 90% = 46.773 | 25% = 104.72 | 1% = 151.08 | | | |
| 62 MEAN = 82.545 | S.D. = 27.991 | P(N>=r) = .12373 | | | |
| 99% = 24.439 | 75% = 62.219 | 10% = 119.23 | | | |
| 95% = 37.169 | 50% = 82.257 | 5% = 129.16 | | | |
| 90% = 45.699 | 25% = 102.12 | 1% = 147.86 | | | |

| Pool rank | | Distribution | | | |
|---|---|---|---|---|---|
| 63 MEAN = 80.517 | S.D. = 27.339 | P(N>=r) = .11513 | | | |
| 99% = 23.989 | 75% = 60.649 | 10% = 116.41 | | | |
| 95% = 36.369 | 50% = 80.130 | 5% = 126.12 | | | |
| 90% = 44.641 | 25% = 99.570 | 1% = 144.70 | | | |
| 64 MEAN = 78.536 | S.D. = 26.704 | P(N>=r) = .10662 | | | |
| 99% = 23.544 | 75% = 59.114 | 10% = 113.66 | | | |
| 95% = 35.582 | 50% = 78.056 | 5% = 123.22 | | | |
| 90% = 43.602 | 25% = 97.085 | 1% = 141.62 | | | |
| 65 MEAN = 76.605 | S.D. = 26.085 | P(N>=r) = .98225E-01 | | | |
| 99% = 23.104 | 75% = 57.618 | 10% = 110.97 | | | |
| 95% = 34.808 | 50% = 76.037 | 5% = 120.45 | | | |
| 90% = 42.585 | 25% = 94.663 | 1% = 138.60 | | | |
| 66 MEAN = 74.724 | S.D. = 25.482 | P(N>=r) = .89969E-01 | | | |
| 99% = 22.671 | 75% = 56.164 | 10% = 108.35 | | | |
| 95% = 34.051 | 50% = 74.076 | 5% = 117.75 | | | |
| 90% = 41.593 | 25% = 92.305 | 1% = 135.65 | | | |
| 67 MEAN = 72.897 | S.D. = 24.894 | P(N>=r) = .81893E-01 | | | |
| 99% = 22.247 | 75% = 54.754 | 10% = 105.80 | | | |
| 95% = 33.313 | 50% = 72.175 | 5% = 115.08 | | | |
| 90% = 40.628 | 25% = 90.014 | 1% = 132.78 | | | |
| 68 MEAN = 71.126 | S.D. = 24.321 | P(N>=r) = .74034E-01 | | | |
| 99% = 21.832 | 75% = 53.391 | 10% = 103.32 | | | |
| 95% = 32.595 | 50% = 70.335 | 5% = 112.47 | | | |
| 90% = 39.692 | 25% = 87.791 | 1% = 129.97 | | | |
| 69 MEAN = 69.412 | S.D. = 23.763 | P(N>=r) = .66437E-01 | | | |
| 99% = 21.429 | 75% = 52.077 | 10% = 100.90 | | | |
| 95% = 31.900 | 50% = 68.560 | 5% = 109.93 | | | |
| 90% = 38.788 | 25% = 85.639 | 1% = 127.20 | | | |
| 70 MEAN = 67.757 | S.D. = 23.219 | P(N>=r) = .59145E-01 | | | |
| 99% = 21.037 | 75% = 50.812 | 10% = 98.567 | | | |
| 95% = 31.229 | 50% = 66.851 | 5% = 107.46 | | | |
| 90% = 37.916 | 25% = 83.558 | 1% = 124.48 | | | |
| 71 MEAN = 66.162 | S.D. = 22.690 | P(N>=r) = .52204E-01 | | | |
| 99% = 20.659 | 75% = 49.600 | 10% = 96.303 | | | |
| 95% = 30.582 | 50% = 65.208 | 5% = 105.07 | | | |
| 90% = 37.079 | 25% = 81.551 | 1% = 121.60 | | | |

***E) The mean of the potential = 8069.9***

## PETRIMES MODULE PSUM

***Monte Carlo sum simulation pool size distribution***

UAI ..... **C5029902**

PLAY ..... **Tertiary/Upper Cretaceous Nonmarine Gas**

Assessor ..... Peter Hannigan

Geologist ..... Peter Hannigan

Remarks ..... Kandik Assessment Project

Run date ..... Mon, Feb. 8, 1999, 11:31 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store in database? | > | Y |
| Oil (o) or gas (g)? | > | G |
| British or S.I. init of measurement? | > | Si |
| Recoverable resources? | > | N |
| Do you want to use MPRO output? | > | Y |
| Do you assume lognormal distribution? | > | Y |
| Do you want to use PPSD output? | > | Y |
| Do you compute conditional potential? | > | N |

***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 | = 5.3218 | MEAN | = 271.40 | | | |
| Statistics | sig. sq. | = .56362 | S.D. | = 236.14 | | | |
| Upper percentiles | 99.99% | = 12.550 | 60.00% | = 169.29 | 15.00% | = 445.81 | |
| | 99.00% | = 35.705 | 55.00% | = 186.32 | 10.00% | = 535.88 | |
| | 95.00% | = 59.556 | 50.00% | = 204.75 | 8.00% | = 587.95 | |
| | 90.00% | = 78.231 | 45.00% | = 225.01 | 6.00% | = 657.88 | |
| | 85.00% | = 94.037 | 40.00% | = 247.64 | 5.00% | = 703.91 | |
| | 80.00% | = 108.85 | 35.00% | = 273.44 | 4.00% | = 762.12 | |
| | 75.00% | = 123.40 | 30.00% | = 303.53 | 2.00% | = 956.84 | |
| | 70.00% | = 138.12 | 25.00% | = 339.73 | 1.00% | = 1174.1 | |
| | 65.00% | = 153.32 | 20.00% | = 385.15 | .01% | = 3340.3 | |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Lower support | = | 0 |
| Upper support | = | 102 |
| Expectation | = | 29.79207 |
| Standard Deviation | = | 21.72389 |

***D) Summary statistics for 4,000 simulations***

| | | |
|---|---|---|
| Play resource | ( B cu m ) | |
| Minimum | = | .5316375E-01 |
| Maximum | = | 30.73407 |
| Expectation | = | 8.012095 |
| Standard Deviation | = | 5.991732 |

***Empirical distribution***

| *Greater than percentage* | *Play potential* | *Greater than percentage* | *Play potential* | *Greater than percentage* | *Play potential* |
|---|---|---|---|---|---|
| 100.00 | .53164E-01 | 55.00 | 5.0684 | 10.00 | 17.255 |
| 99.00 | .58677 | 50.00 | 5.8628 | 8.00 | 18.034 |
| 95.00 | 1.3841 | 45.00 | 6.8648 | 6.00 | 18.966 |
| 90.00 | 1.8623 | 40.00 | 8.1568 | 5.00 | 19.469 |
| 85.00 | 2.3044 | 35.00 | 9.5152 | 4.00 | 20.131 |
| 80.00 | 2.7130 | 30.00 | 10.897 | 2.00 | 21.757 |
| 75.00 | 3.1337 | 25.00 | 12.386 | 1.00 | 23.032 |
| 70.00 | 3.5305 | 20.00 | 13.987 | .01 | 29.965 |
| 65.00 | 3.9703 | 15.00 | 15.414 | .00 | 30.657 |
| 60.00 | 4.4512 | | | | |

## PETRIMES MODULE MPRO

***Number of pools distribution and risks***

UAI ..... **C5039902**
PLAY ..... **Mesozoic Marine Structural Gas**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Tue., Feb. 9, 1999, 10:38 a.m.

***User supplied parameters***

Do you want to store on db? > Y
Oil (o) or gas (g) ? > G

### *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) | .40 |
| | Adequate timing | ( 5) | .75 |
| | Adequate source | ( 6) | .80 |
| | Overall prospect level risk | = | .06 |
| Exploration risk | | = | .06 |

### *B) Number of prospects distribution*

Minimum = 30
Maximum = 270
Mean = 135.05
S.D. = 70.31

| *Frequency* | *Number of prospects* |
|---|---|
| 99.00 | 30 |
| 95 | 38 |
| 90 | 47 |
| 80 | 65 |
| 75 | 75 |
| 60 | 102 |
| 50 | 120 |
| 40 | 150 |
| 25 | 195 |
| 20 | 210 |
| 10 | 240 |
| 5 | 255 |
| 1 | 267 |
| 0 | 270 |

### *C) Number of pools distribution*

Minimum = 0
Maximum = 34
Mean = 8.10
S.D. = 5.04

| *Frequency* | *Number of pools* |
|---|---|
| 98.51 | 0 |
| 95 | 1 |
| 90 | 2 |
| 80 | 3 |
| 75 | 4 |
| 60 | 6 |
| 50 | 7 |
| 40 | 9 |
| 25 | 12 |
| 20 | 13 |
| 10 | 15 |
| 5 | 17 |
| 1 | 21 |
| 0 | 34 |

Note: The number of pools distribution is saved in the database with UDI= 6201GB4

## PETRIMES MODULE PSRK

***Individual pool sizes by rank where N is a random variable***

UAI ..... **C5039902**

PLAY ..... **Mesozoic Marine Structural Gas**

Assessor ..... Peter Hannigan

Geologist ..... Peter Hannigan

Remarks ..... Kandik Assessment Project

Run date ..... Tue., Feb. 9, 1999, 10:40 a.m.

***User supplied parameters***

| | | | |
|---|---|---|---|
| Do you want to store on DB? | > | Y | |
| Do you want to use MPRO output? | > | Y | |
| Minimum and maximum pool ranks? | > | 1 | 17 |
| Do you use lognornal assumption? | > | Y | |
| Do you want to use PPSD output? | > | Y | |

***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 | = | 6.9202 | MEAN | = | 1448.3 | |
| Statistics | sig. sq. | = | .71594 | S.D. | = | 1481.3 | |
| Upper percentiles | 99.99% | = | 43.528 | 60.00% | = | 817.14 | 15.00% = 2433.6 |
| | 99.00% | = | 141.43 | 55.00% | = | 910.37 | 10.00% = 2994.5 |
| | 95.00% | = | 251.74 | 50.00% | = | 1012.5 | 8.00% = 3324.4 |
| | 90.00% | = | 342.34 | 45.00% | = | 1126.1 | 6.00% = 3773.4 |
| | 85.00% | = | 421.25 | 40.00% | = | 1254.6 | 5.00% = 4072.2 |
| | 80.00% | = | 496.73 | 35.00% | = | 1402.8 | 4.00% = 4453.7 |
| | 75.00% | = | 572.19 | 30.00% | = | 1578.0 | 2.00% = 5755.5 |
| | 70.00% | = | 649.67 | 25.00% | = | 1791.6 | 1.00% = 7248.7 |
| | 65.00% | = | 730.80 | 20.00% | = | 2063.8 | .01% =23552. |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Lower Support | = | 0 |
| Upper Support | = | 34 |
| Expectation | = | 8.10 |
| Standard Deviation | = | 5.04 |

*D) Pool sizes by rank*

| Pool rank | Distribution | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | MEAN = 3695.9 | S.D. = 2598.1 | P(N>=r) = .98513 |
| | 99% = 455.89 | 75% = 2035.3 | 10% = 6663.4 |
| | 95% = 939.68 | 50% = 3109.6 | 5% = 8369.3 |
| | 90% = 1295.9 | 25% = 4626.3 | 1% = 13145. |
| 2 | MEAN = 2190.1 | S.D. = 1257.2 | P(N>=r) = .94261 |
| | 99% = 280.48 | 75% = 1299.3 | 10% = 3788.2 |
| | 95% = 568.58 | 50% = 1988.5 | 5% = 4494.8 |
| | 90% = 799.76 | 25% = 2830.0 | 1% = 6209.7 |
| 3 | MEAN = 1637.7 | S.D. = 894.28 | P(N>=r) = .87564 |
| | 99% = 218.88 | 75% = 980.74 | 10% = 2806.0 |
| | 95% = 426.31 | 50% = 1517.4 | 5% = 3268.5 |
| | 90% = 596.97 | 25% = 2142.5 | 1% = 4320.4 |
| 4 | MEAN = 1335.2 | S.D. = 710.41 | P(N>=r) = .79570 |
| | 99% = 188.28 | 75% = 804.22 | 10% = 2274.7 |
| | 95% = 355.07 | 50% = 1247.4 | 5% = 2625.7 |
| | 90% = 491.80 | 25% = 1754.9 | 1% = 3395.4 |
| 5 | MEAN = 1138.4 | S.D. = 593.32 | P(N>=r) = .71252 |
| | 99% = 169.61 | 75% = 691.52 | 10% = 1928.3 |
| | 95% = 312.14 | 50% = 1068.2 | 5% = 2214.0 |
| | 90% = 427.55 | 25% = 1497.2 | 1% = 2826.1 |
| 6 | MEAN = 996.52 | S.D. = 509.82 | P(N>=r) = .63161 |
| | 99% = 156.53 | 75% = 611.51 | 10% = 1678.0 |
| | 95% = 282.54 | 50% = 937.39 | 5% = 1920.1 |
| | 90% = 383.10 | 25% = 1308.5 | 1% = 2430.7 |
| 7 | MEAN = 886.84 | S.D. = 446.26 | P(N>=r) = .55543 |
| | 99% = 146.41 | 75% = 549.85 | 10% = 1485.0 |
| | 95% = 259.97 | 50% = 835.31 | 5% = 1695.5 |
| | 90% = 349.21 | 25% = 1161.3 | 1% = 2134.9 |
| 8 | MEAN = 797.82 | S.D. = 395.85 | P(N>=r) = .48477 |
| | 99% = 137.88 | 75% = 499.25 | 10% = 1329.5 |
| | 95% = 241.28 | 50% = 751.72 | 5% = 1516.0 |
| | 90% = 321.32 | 25% = 1041.6 | 1% = 1902.4 |
| 9 | MEAN = 723.12 | S.D. = 354.76 | P(N>=r) = .41951 |
| | 99% = 130.24 | 75% = 455.95 | 10% = 1200.5 |
| | 95% = 224.87 | 50% = 681.06 | 5% = 1368.1 |
| | 90% = 297.06 | 25% = 941.33 | 1% = 1713.3 |
| 10 | MEAN = 659.18 | S.D. = 320.60 | P(N>=r) = .35912 |
| | 99% = 123.17 | 75% = 418.07 | 10% = 1091.3 |
| | 95% = 210.00 | 50% = 620.24 | 5% = 1243.4 |
| | 90% = 275.39 | 25% = 855.79 | 1% = 1555.7 |
| 11 | MEAN = 603.87 | S.D. = 291.76 | P(N>=r) = .30316 |
| | 99% = 116.59 | 75% = 384.74 | 10% = 997.64 |
| | 95% = 196.47 | 50% = 567.49 | 5% = 1137.0 |
| | 90% = 255.92 | 25% = 782.09 | 1% = 1422.1 |
| 12 | MEAN = 555.85 | S.D. = 267.09 | P(N>=r) = .25145 |
| | 99% = 110.54 | 75% = 355.52 | 10% = 916.73 |
| | 95% = 184.25 | 50% = 521.67 | 5% = 1045.2 |
| | 90% = 238.54 | 25% = 718.25 | 1% = 1307.6 |
| 13 | MEAN = 514.11 | S.D. = 245.79 | P(N>=r) = .20419 |
| | 99% = 105.04 | 75% = 330.02 | 10% = 846.48 |
| | 95% = 173.36 | 50% = 481.91 | 5% = 965.48 |
| | 90% = 223.20 | 25% = 662.84 | 1% = 1208.5 |
| 14 | MEAN = 477.83 | S.D. = 227.25 | P(N>=r) = .16182 |
| | 99% = 100.12 | 75% = 307.89 | 10% = 785.28 |
| | 95% = 163.74 | 50% = 447.47 | 5% = 896.03 |
| | 90% = 209.77 | 25% = 614.69 | 1% = 1122.1 |
| 15 | MEAN = 446.27 | S.D. = 211.02 | P(N>=r) = .12479 |
| | 99% = 95.752 | 75% = 288.73 | 10% = 731.82 |
| | 95% = 155.31 | 50% = 417.64 | 5% = 835.27 |
| | 90% = 198.05 | 25% = 572.79 | 1% = 1046.6 |
| 16 | MEAN = 418.78 | S.D. = 196.76 | P(N>=r) = .93448E-01 |
| | 99% = 91.883 | 75% = 272.15 | 10% = 685.00 |
| | 95% = 147.93 | 50% = 391.79 | 5% = 781.95 |
| | 90% = 187.86 | 25% = 536.29 | 1% = 980.09 |
| 17 | MEAN = 394.77 | S.D. = 184.19 | P(N>=r) = .67827E-01 |
| | 99% = 88.459 | 75% = 257.76 | 10% = 643.90 |
| | 95% = 141.47 | 50% = 369.34 | 5% = 735.02 |
| | 90% = 178.97 | 25% = 504.41 | 1% = 921.40 |

***E) The mean of the potential = 11688.***

## PETRIMES MODULE PSUM

***Monte Carlo sum simulation pool size distribution***

UAI ..... **C5039902**
PLAY ..... **Mesozoic Marine Structural Gas**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Tue., Feb. 9, 1999, 10:42 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store in data base? | > | Y |
| Oil (o) or gas (g)? | > | G |
| British or S.I. unit of measurement? | > | Si |
| Recoverable resources? | > | N |
| Do you want to use MPRO output? | > | Y |
| Do you assume lognormal distribution? | > | Y |
| Do you want to use PPSD output? | > | Y |
| Do you compute conditional potential? | > | N |

***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 | = 6.9202 | MEAN | = 1448.3 | | | |
| Statistics | sig. sq. | = .71594 | S.D. | = 1481.3 | | | |
| Upper percentiles | 99.99% | = 43.528 | 60.00% | = 817.14 | 15.00% | = 2433.6 | |
| | 99.00% | = 141.43 | 55.00% | = 910.37 | 10.00% | = 2994.5 | |
| | 95.00% | = 251.74 | 50.00% | = 1012.5 | 8.00% | = 3324.4 | |
| | 90.00% | = 342.34 | 45.00% | = 1126.1 | 6.00% | = 3773.4 | |
| | 85.00% | = 421.25 | 40.00% | = 1254.6 | 5.00% | = 4072.2 | |
| | 80.00% | = 496.73 | 35.00% | = 1402.8 | 4.00% | = 4453.7 | |
| | 75.00% | = 572.19 | 30.00% | = 1578.0 | 2.00% | = 5755.5 | |
| | 70.00% | = 649.67 | 25.00% | = 1791.6 | 1.00% | = 7248.7 | |
| | 65.00% | = 730.80 | 20.00% | = 2063.8 | .01% | =23552. | |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Lower Support | = | 0 |
| Upper Support | = | 34 |
| Expectation | = | 8.10270 |
| Standard Deviation | = | 5.04106 |

***D) Summary statistics for 4,000 simulations***

| | | |
|---|---|---|
| Play Resource | ( B cu m ) | |
| Minimum | = | .0000000E+00 |
| Maximum | = | 52.91261 |
| Expectation | = | 11.89931 |
| Standard Deviation | = | 8.387727 |

***Empirical distribution***

| *Greater than percentage* | *Play potential* |
|---|---|
| 100.00 | .00000E+00 |
| 95.00 | 1.3471 |
| 90.00 | 2.4531 |
| 85.00 | 3.4132 |
| 80.00 | 4.2462 |
| 75.00 | 5.2509 |
| 70.00 | 6.2718 |
| 65.00 | 7.1735 |
| 60.00 | 8.1729 |
| 55.00 | 9.2813 |
| 50.00 | 10.346 |
| 45.00 | 11.517 |
| 40.00 | 12.676 |
| 35.00 | 13.871 |
| 30.00 | 15.184 |
| 25.00 | 16.898 |
| 20.00 | 18.813 |
| 15.00 | 21.016 |
| 10.00 | 23.576 |
| 8.00 | 24.782 |
| 6.00 | 26.703 |
| 5.00 | 27.741 |
| 4.00 | 29.131 |
| 2.00 | 32.587 |
| 1.00 | 37.087 |
| .01 | 50.187 |
| .00 | 52.640 |

## PETRIMES MODULE MPRO

***Number of pools distribution and risks***

UAI ..... **C5059902**

PLAY ..... **Paleozoic Marine Structural Oil**

Assessor ..... Peter Hannigan

Geologist ..... Peter Hannigan

Remarks ..... Kandik Hydrocarbon Assessment

Run date ..... Wed., Feb. 10, 1999, 9:17 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store on db? | > | Y |
| Oil (o) or gas (g)? | > | O |

***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) | .30 |
| | Adequate seal | ( 4) | .75 |
| | Adequate timing | ( 5) | .50 |
| | Adequate source | ( 6) | .70 |
| | Overall prospect level risk | = | .04 |
| Exploration risk | | = | .04 |

***B) Number of prospects distribution***

| | | |
|---|---|---|
| Minimum | = | 12 |
| Maximum | = | 130 |
| Mean | = | 65.76 |
| S.D. | = | 34.48 |

| *Frequency* | *Number of prospects* |
|---|---|
| 99.00 | 12 |
| 95 | 16 |
| 90 | 21 |
| 80 | 31 |
| 75 | 36 |
| 60 | 51 |
| 50 | 60 |
| 40 | 74 |
| 25 | 95 |
| 20 | 102 |
| 10 | 116 |
| 5 | 123 |
| 1 | 129 |
| 0 | 130 |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Minimum | = | 0 |
| Maximum | = | 17 |
| Mean | = | 2.59 |
| S.D. | = | 2.08 |

| *Frequency* | *Number of pools* |
|---|---|
| 84.77 | 0 |
| 80 | 1 |
| 75 | 1 |
| 60 | 2 |
| 50 | 2 |
| 40 | 3 |
| 25 | 4 |
| 20 | 4 |
| 10 | 5 |
| 5 | 7 |
| 1 | 9 |
| 0 | 17 |

Note: The number of pools distribution is saved in the database with UDI= 6201OB4

## PETRIMES MODULE PSRK

***Individual pool sizes by rank where N is a random variable***

UAI ..... **C5059902**

PLAY ..... **Paleozoic Marine Structural Oil**

Assessor ..... Peter Hannigan

Geologist ..... Peter Hannigan

Remarks ..... Kandik Hydrocarbon Assessment

Run date ..... Wed., Feb. 10, 1999, 9:19 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store on DB? | > | Y |
| Do you want to use MPRO output? | > | Y |
| Minimum and maximum pool ranks? | > | 1 7 |
| Do you use lognornal assumption? | > | Y |
| Do you want to use PPSD output? | > | Y |

***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 | = | 1.8148 | MEAN | = | 8.7160 | | |
| Statistics | sig. sq. | = | .70073 | S.D. | = | 8.7821 | | |
| Upper percentiles | 99.99% | = | .27297 | 60.00% | = | 4.9665 | 15.00% | = 14.620 |
| | 99.00% | = | .87582 | 55.00% | = | 5.5268 | 10.00% | = 17.950 |
| | 95.00% | = | 1.5494 | 50.00% | = | 6.1398 | 8.00% | = 19.905 |
| | 90.00% | = | 2.1001 | 45.00% | = | 6.8208 | 6.00% | = 22.563 |
| | 85.00% | = | 2.5785 | 40.00% | = | 7.5903 | 5.00% | = 24.330 |
| | 80.00% | = | 3.0352 | 35.00% | = | 8.4769 | 4.00% | = 26.583 |
| | 75.00% | = | 3.4910 | 30.00% | = | 9.5235 | 2.00% | = 34.260 |
| | 70.00% | = | 3.9583 | 25.00% | = | 10.798 | 1.00% | = 43.042 |
| | 65.00% | = | 4.4470 | 20.00% | = | 12.420 | .01% | = 138.10 |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Lower Support | = | 0 |
| Upper Support | = | 17 |
| Expectation | = | 2.59 |
| Standard Deviation | = | 2.08 |

*D) Pool sizes by rank*

| Pool rank | Distribution | | | | | |
|---|---|---|---|---|---|---|
| 1 | MEAN = 14.473 | S.D. = 12.123 | P(N>=r) = .84769 |
| | 99% = 1.4049 | 75% = 6.7462 | 10% = 28.099 |
| | 95% = 2.7736 | 50% = 11.385 | 5% = 36.345 |
| | 90% = 3.9402 | 25% = 18.392 | 1% = 59.702 |
| 2 | MEAN = 8.0055 | S.D. = 5.3850 | P(N>=r) = .63840 |
| | 99% = 1.0273 | 75% = 4.2000 | 10% = 14.817 |
| | 95% = 1.8746 | 50% = 6.8195 | 5% = 18.141 |
| | 90% = 2.5649 | 25% = 10.432 | 1% = 26.361 |
| 3 | MEAN = 5.7884 | S.D. = 3.5845 | P(N>=r) = .44541 |
| | 99% = .86275 | 75% = 3.1921 | 10% = 10.463 |
| | 95% = 1.5090 | 50% = 5.0489 | 5% = 12.577 |
| | 90% = 2.0165 | 25% = 7.5517 | 1% = 17.521 |
| 4 | MEAN = 4.6088 | S.D. = 2.7119 | P(N>=r) = .29034 |
| | 99% = .76208 | 75% = 2.6288 | 10% = 8.1893 |
| | 95% = 1.2960 | 50% = 4.0700 | 5% = 9.7523 |
| | 90% = 1.7036 | 25% = 5.9926 | 1% = 13.303 |
| 5 | MEAN = 3.8656 | S.D. = 2.1877 | P(N>=r) = .17602 |
| | 99% = .69194 | 75% = 2.2643 | 10% = 6.7709 |
| | 95% = 1.1526 | 50% = 3.4434 | 5% = 8.0142 |
| | 90% = 1.4968 | 25% = 5.0042 | 1% = 10.792 |
| 6 | MEAN = 3.3548 | S.D. = 1.8371 | P(N>=r) = .98683E-01 |
| | 99% = .63993 | 75% = 2.0095 | 10% = 5.8016 |
| | 95% = 1.0492 | 50% = 3.0097 | 5% = 6.8346 |
| | 90% = 1.3497 | 25% = 4.3238 | 1% = 9.1182 |
| 7 | MEAN = 2.9842 | S.D. = 1.5868 | P(N>=r) = .50980E-01 |
| | 99% = .59987 | 75% = 1.8223 | 10% = 5.1009 |
| | 95% = .97122 | 50% = 2.6941 | 5% = 5.9848 |
| | 90% = 1.2399 | 25% = 3.8302 | 1% = 7.9248 |

***E) The mean of the potential = 22.460***

## PETRIMES MODULE PSUM

***Monte Carlo sum simulation pool size distribution***

UAI ..... **C5059902**
PLAY ..... **Paleozoic Marine Structural Oil**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Hydrocarbon Assessment
Run date ..... Wed., Feb. 10, 1999, 9:23 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store in data base? | > | Y |
| Oil (o) or gas (g)? | > | O |
| British or S.I. unit of measurement? | > | Si |
| Recoverable resources? | > | N |
| Do you want to use MPRO output? | > | Y |
| Do you assume lognormal distribution? | > | Y |
| Do you want to use PPSD output? | > | Y |
| Do you compute conditional potential? | > | N |

***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 | = | 1.8148 | MEAN | = | 8.7160 | | |
| Statistics | sig. sq. | = | .70073 | S.D. | = | 8.7821 | | |
| Upper percentiles | 99.99% | = | .27297 | 60.00% | = | 4.9665 | 15.00% | = 14.620 |
| | 99.00% | = | .87582 | 55.00% | = | 5.5268 | 10.00% | = 17.950 |
| | 95.00% | = | 1.5494 | 50.00% | = | 6.1398 | 8.00% | = 19.905 |
| | 90.00% | = | 2.1001 | 45.00% | = | 6.8208 | 6.00% | = 22.563 |
| | 85.00% | = | 2.5785 | 40.00% | = | 7.5903 | 5.00% | = 24.330 |
| | 80.00% | = | 3.0352 | 35.00% | = | 8.4769 | 4.00% | = 26.583 |
| | 75.00% | = | 3.4910 | 30.00% | = | 9.5235 | 2.00% | = 34.260 |
| | 70.00% | = | 3.9583 | 25.00% | = | 10.798 | 1.00% | = 43.042 |
| | 65.00% | = | 4.4470 | 20.00% | = | 12.420 | .01% | = 138.10 |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Lower Support | = | 0 |
| Upper Support | = | 17 |
| Expectation | = | 2.58910 |
| Standard Deviation | = | 2.08093 |

***D) Summary statistics for 4,000 simulations***

| Play Resource | (M cu m ) |
|---|---|
| Minimum | = .0000000E+00 |
| Maximum | = 186.0671 |
| Expectation | = 22.78119 |
| Standard Deviation | = 22.66628 |

***Empirical distribution***

| *Greater than percentage* | *Play potential* | *Greater than percentage* | *Play potential* | *Greater than percentage* | *Play potential* |
|---|---|---|---|---|---|
| 100.00 | .00000E+00 | 45.00 | 19.036 | 8.00 | 58.894 |
| 80.00 | 3.2428 | 40.00 | 22.360 | 6.00 | 65.001 |
| 75.00 | 5.3183 | 35.00 | 25.746 | 5.00 | 68.595 |
| 70.00 | 7.5177 | 30.00 | 29.313 | 4.00 | 71.985 |
| 65.00 | 9.5438 | 25.00 | 33.722 | 2.00 | 84.207 |
| 60.00 | 11.822 | 20.00 | 39.023 | 1.00 | 94.959 |
| 55.00 | 14.124 | 15.00 | 45.287 | .01 | 170.86 |
| 50.00 | 16.507 | 10.00 | 54.242 | .00 | 184.55 |

## PETRIMES MODULE MPRO

***Number of pools distribution and risks***

UAI ..... **C5049902**
PLAY ..... **Paleozoic Marine Structural Gas**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Fri., Feb. 5, 1999, 2:23 p.m.

***User supplied parameters***

Do you want to store on DB? > Y
Oil (o) or gas (g)? > G

***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) | .30 |
| | Adequate seal | ( 4) | .75 |
| | Adequate timing | ( 5) | .50 |
| | Adequate source | ( 6) | .70 |
| Overall prospect level risk | | = | .04 |
| Exploration risk | | = | .04 |

***B) Number of prospects distribution***

Minimum = 45
Maximum = 500
Mean = 245.87
S.D. = 133.17

| *Frequency* | *Number of prospects* |
|---|---|
| 99.00 | 45 |
| 95 | 60 |
| 90 | 78 |
| 80 | 113 |
| 75 | 131 |
| 60 | 185 |
| 50 | 220 |
| 40 | 276 |
| 25 | 360 |
| 20 | 388 |
| 10 | 444 |
| 5 | 472 |
| 1 | 495 |
| 0 | 500 |

***C) Number of pools distribution***

Minimum = 0
Maximum = 39
Mean = 9.68
S.D. = 6.07

| *Frequency* | *Number of pools* |
|---|---|
| 98.72 | 0 |
| 95 | 2 |
| 90 | 2 |
| 80 | 4 |
| 75 | 5 |
| 60 | 7 |
| 50 | 9 |
| 40 | 11 |
| 25 | 14 |
| 20 | 15 |
| 10 | 18 |
| 5 | 21 |
| 1 | 25 |
| 0 | 39 |

Note: The number of pools distribution is saved in the database with UDI= 6201GB4

## PETRIMES MODULE PSRK

***Individual pool sizes by rank where n is a random variable***

UAI ..... **C5049902**
PLAY ..... **Paleozoic Marine Structural Gas**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Mon., Feb. 8, 1999, 12:26 p.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store on DB? | > | Y |
| Do you want to use MPRO output? | > | Y |
| Minimum and maximum pool ranks? | > | 1 21 |
| Do you use lognornal assumption? | > | Y |
| Do you want to use PPSD output? | > | Y |

### *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 | = | 7.1591 | MEAN | =1993.1 | | |
| Statistics | sig. sq. | = | .87672 | S.D. | =2360.8 | | |
| Upper percentiles | 99.99% | = | 39.521 | 60.00% | =1014.2 | 15.00% | = 3393.2 |
| | 99.00% | = | 145.60 | 55.00% | =1143.0 | 10.00% | = 4268.5 |
| | 95.00% | = | 275.60 | 50.00% | =1285.7 | 8.00% | = 4791.9 |
| | 90.00% | = | 387.27 | 45.00% | =1446.3 | 6.00% | = 5512.9 |
| | 85.00% | = | 487.17 | 40.00% | =1629.9 | 5.00% | = 5998.1 |
| | 80.00% | = | 584.66 | 35.00% | =1844.3 | 4.00% | = 6622.9 |
| | 75.00% | = | 683.70 | 30.00% | =2100.8 | 2.00% | = 8796.1 |
| | 70.00% | = | 786.86 | 25.00% | =2417.8 | 1.00% | =11354. |
| | 65.00% | = | 896.31 | 20.00% | =2827.4 | .01% | =41827. |

### *C) Number of pools distribution*

| | | |
|---|---|---|
| Lower Support | = | 0 |
| Upper Support | = | 39 |
| Expectation | = | 9.68 |
| Standard Deviation | = | 6.07 |

*D) Pool sizes by rank*

| Pool rank | Distribution | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | MEAN = 5932.0 | S.D. = 4618.2 | P(N>=r) = .98716 |
| | 99% = 584.13 | 75% = 3061.1 | 10% = 11013. |
| | 95% = 1309.8 | 50% = 4838.8 | 5% = 14101. |
| | 90% = 1868.4 | 25% = 7423.9 | 1% = 23048. |
| 2 | MEAN = 3379.7 | S.D. = 2093.3 | P(N>=r) = .95184 |
| | 99% = 342.55 | 75% = 1905.1 | 10% = 6012.4 |
| | 95% = 762.48 | 50% = 3017.3 | 5% = 7223.8 |
| | 90% = 1116.3 | 25% = 4400.8 | 1% = 10233. |
| 3 | MEAN = 2481.1 | S.D. = 1452.2 | P(N>=r) = .89747 |
| | 99% = 260.61 | 75% = 1414.4 | 10% = 4368.9 |
| | 95% = 557.36 | 50% = 2270.3 | 5% = 5140.3 |
| | 90% = 815.06 | 25% = 3279.4 | 1% = 6928.6 |
| 4 | MEAN = 1996.1 | S.D. = 1137.5 | P(N>=r) = .83296 |
| | 99% = 220.44 | 75% = 1143.2 | 10% = 3496.3 |
| | 95% = 455.29 | 50% = 1845.5 | 5% = 4071.2 |
| | 90% = 659.20 | 25% = 2656.1 | 1% = 5352.5 |
| 5 | MEAN = 1683.5 | S.D. = 941.39 | P(N>=r) = .76518 |
| | 99% = 195.97 | 75% = 970.10 | 10% = 2935.0 |
| | 95% = 393.85 | 50% = 1565.1 | 5% = 3396.7 |
| | 90% = 563.97 | 25% = 2245.7 | 1% = 4400.1 |
| 6 | MEAN = 1460.6 | S.D. = 803.73 | P(N>=r) = .69783 |
| | 99% = 178.97 | 75% = 848.60 | 10% = 2534.3 |
| | 95% = 351.95 | 50% = 1362.4 | 5% = 2921.4 |
| | 90% = 498.80 | 25% = 1948.5 | 1% = 3748.3 |
| 7 | MEAN = 1291.0 | S.D. = 699.97 | P(N>=r) = .63274 |
| | 99% = 166.18 | 75% = 757.18 | 10% = 2228.9 |
| | 95% = 320.96 | 50% = 1206.6 | 5% = 2562.6 |
| | 90% = 450.60 | 25% = 1719.5 | 1% = 3266.9 |
| 8 | MEAN = 1155.4 | S.D. = 618.12 | P(N>=r) = .57084 |
| | 99% = 155.96 | 75% = 684.39 | 10% = 1985.6 |
| | 95% = 296.55 | 50% = 1081.1 | 5% = 2278.9 |
| | 90% = 412.65 | 25% = 1535.2 | 1% = 2892.6 |
| 9 | MEAN = 1043.2 | S.D. = 551.53 | P(N>=r) = .51254 |
| | 99% = 147.28 | 75% = 623.56 | 10% = 1785.2 |
| | 95% = 276.11 | 50% = 976.31 | 5% = 2046.9 |
| | 90% = 380.97 | 25% = 1382.2 | 1% = 2590.8 |
| 10 | MEAN = 947.61 | S.D. = 496.21 | P(N>=r) = .45783 |
| | 99% = 139.50 | 75% = 570.80 | 10% = 1616.3 |
| | 95% = 258.05 | 50% = 886.39 | 5% = 1852.4 |
| | 90% = 353.19 | 25% = 1252.1 | 1% = 2340.8 |
| 11 | MEAN = 864.73 | S.D. = 449.53 | P(N>=r) = .40638 |
| | 99% = 132.22 | 75% = 523.97 | 10% = 1471.4 |
| | 95% = 241.50 | 50% = 807.93 | 5% = 1686.4 |
| | 90% = 328.02 | 25% = 1139.6 | 1% = 2129.6 |

| Pool rank | Distribution | | | | | | |
|---|---|---|---|---|---|---|---|
| 12 | MEAN = 792.04 | S.D. = 409.63 | P(N>=r) = .35780 |
| | 99% = 125.31 | 75% = 482.03 | 10% = 1345.7 |
| | 95% = 226.11 | 50% = 738.86 | 5% = 1542.8 |
| | 90% = 304.94 | 25% = 1041.5 | 1% = 1948.3 |
| 13 | MEAN = 727.98 | S.D. = 375.17 | P(N>=r) = .31176 |
| | 99% = 118.75 | 75% = 444.45 | 10% = 1235.7 |
| | 95% = 211.82 | 50% = 677.86 | 5% = 1417.6 |
| | 90% = 283.80 | 25% = 955.27 | 1% = 1791.1 |
| 14 | MEAN = 671.41 | S.D. = 345.14 | P(N>=r) = .26813 |
| | 99% = 112.61 | 75% = 410.95 | 10% = 1139.0 |
| | 95% = 198.70 | 50% = 624.01 | 5% = 1307.6 |
| | 90% = 264.62 | 25% = 879.36 | 1% = 1653.7 |
| 15 | MEAN = 621.48 | S.D. = 318.77 | P(N>=r) = .22705 |
| | 99% = 106.95 | 75% = 381.26 | 10% = 1053.6 |
| | 95% = 186.81 | 50% = 576.56 | 5% = 1210.7 |
| | 90% = 247.41 | 25% = 812.44 | 1% = 1532.8 |
| 16 | MEAN = 577.42 | S.D. = 295.48 | P(N>=r) = .18884 |
| | 99% = 101.80 | 75% = 355.09 | 10% = 978.23 |
| | 95% = 176.15 | 50% = 534.83 | 5% = 1124.9 |
| | 90% = 232.08 | 25% = 753.41 | 1% = 1425.9 |
| 17 | MEAN = 538.55 | S.D. = 274.83 | P(N>=r) = .15393 |
| | 99% = 97.147 | 75% = 332.11 | 10% = 911.45 |
| | 95% = 166.65 | 50% = 498.17 | 5% = 1048.9 |
| | 90% = 218.53 | 25% = 701.34 | 1% = 1331.0 |
| 18 | MEAN = 504.26 | S.D. = 256.46 | P(N>=r) = .12273 |
| | 99% = 92.972 | 75% = 311.95 | 10% = 852.23 |
| | 95% = 158.22 | 50% = 466.00 | 5% = 981.29 |
| | 90% = 206.58 | 25% = 655.38 | 1% = 1246.5 |
| 19 | MEAN = 473.97 | S.D. = 240.08 | P(N>=r) = .95563E-01 |
| | 99% = 89.235 | 75% = 294.27 | 10% = 799.64 |
| | 95% = 150.76 | 50% = 437.74 | 5% = 921.14 |
| | 90% = 196.04 | 25% = 614.79 | 1% = 1171.1 |
| 20 | MEAN = 447.18 | S.D. = 225.43 | P(N>=r) = .72573E-01 |
| | 99% = 85.892 | 75% = 278.75 | 10% = 752.86 |
| | 95% = 144.15 | 50% = 412.89 | 5% = 867.48 |
| | 90% = 186.75 | 25% = 578.88 | 1% = 1103.6 |
| 21 | MEAN = 423.43 | S.D. = 212.31 | P(N>=r) = .53694E-01 |
| | 99% = 82.898 | 75% = 265.08 | 10% = 711.18 |
| | 95% = 138.28 | 50% = 390.98 | 5% = 819.53 |
| | 90% = 178.54 | 25% = 547.05 | 1% = 1043.1 |

***E) The mean of the potential = 19252.***

## PETRIMES MODULE PSUM

***Monte carlo sum simulation pool size distribution***

UAI ..... **C5049902**
PLAY ..... **Paleozoic Marine Structural Gas**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Mon., Feb. 8, 1999, 12:30 p.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store in data base? | > | Y |
| Oil (o) or gas (g)? | > | G |
| British or S.I. unit of measurement? | > | Si |
| Recoverable resources? | > | N |
| Do you want to use MPRO output? | > | Y |
| Do you assume lognormal distribution? | > | Y |
| Do you want to use PPSD output? | > | Y |
| Do you compute conditional potential? | > | N |

***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= 7.1591 | | MEAN | =1993.1 | | | |
| Statistics | sig. sq.= .87672 | | S.D. | =2360.8 | | | |
| Upper percentiles | 99.99% | = 39.521 | 60.00% | =1014.2 | 15.00% | = 3393.2 | |
| | 99.00% | = 145.60 | 55.00% | =1143.0 | 10.00% | = 4268.5 | |
| | 95.00% | = 275.60 | 50.00% | =1285.7 | 8.00% | = 4791.9 | |
| | 90.00% | = 387.27 | 45.00% | =1446.3 | 6.00% | = 5512.9 | |
| | 85.00% | = 487.17 | 40.00% | =1629.9 | 5.00% | = 5998.1 | |
| | 80.00% | = 584.66 | 35.00% | =1844.3 | 4.00% | = 6622.9 | |
| | 75.00% | = 683.70 | 30.00% | =2100.8 | 2.00% | = 8796.1 | |
| | 70.00% | = 786.86 | 25.00% | =2417.8 | 1.00% | =11354. | |
| | 65.00% | = 896.31 | 20.00% | =2827.4 | .01% | =41827. | |

***C) Number of pools distribution***

| | | |
|---|---|---|
| Lower Support | = | 0 |
| Upper Support | = | 39 |
| Expectation | = | 9.68113 |
| Standard Deviation | = | 6.06573 |

***D) Summary statistics for 4,000 simulations***

| | | |
|---|---|---|
| Play Resource | ( B cu m ) | |
| Minimum | = | .0000000E+00 |
| Maximum | = | 88.45324 |
| Expectation | = | 19.64719 |
| Standard Deviation | = | 14.26852 |

***Empirical distribution***

| *Greater than percentage* | *Play potential* | *Greater than percentage* | *Play potential* | *Greater than percentage* | *Play potential* |
|---|---|---|---|---|---|
| 100.00 | .00000E+00 | 55.00 | 15.118 | 10.00 | 39.259 |
| 95.00 | 2.0462 | 50.00 | 16.913 | 8.00 | 41.636 |
| 90.00 | 3.7767 | 45.00 | 18.805 | 6.00 | 44.377 |
| 85.00 | 5.2121 | 40.00 | 20.708 | 5.00 | 46.125 |
| 80.00 | 6.7709 | 35.00 | 22.870 | 4.00 | 47.935 |
| 75.00 | 8.3232 | 30.00 | 25.281 | 2.00 | 56.281 |
| 70.00 | 10.083 | 25.00 | 27.924 | 1.00 | 63.176 |
| 65.00 | 11.639 | 20.00 | 31.190 | .01 | 87.401 |
| 60.00 | 13.520 | 15.00 | 34.899 | .00 | 88.348 |

## PETRIMES MODULE PSUM

***Monte Carlo sum simulation pool size distribution***

UAI ..... **C5069902**
PLAY ..... **All oil plays**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Hydrocarbon Assessment Project
Run date ..... Wed., Feb. 10, 1999, 9:25 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store in data base? | > | Y |
| Oil (o) or gas (g)? | > | O |
| British or S.I. unit of measurement? | > | Si |
| Recoverable resources? | > | N |
| Do you compute conditional potential? | > | N |

***A) Basic information***

| | | |
|---|---|---|
| Type of resource | = | Oil in-place |
| System of measurement | = | S.I. |
| Unit of measurement | = | M cu m (19) |

***B) Play potential distribution***

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Summary | MEAN | = | 35.356 | S.D. | = | 26.360 | | |
| Statistics | M cu m | | | | | | | |
| Upper percentiles | 100.00% | = | .26049 | 55.00% | = | 22.331 | 8.00% | = 79.421 |
| | 99.00% | = | 2.6692 | 50.00% | = | 25.778 | 6.00% | = 83.338 |
| | 95.00% | = | 6.1935 | 45.00% | = | 30.255 | 5.00% | = 85.769 |
| | 90.00% | = | 8.2957 | 40.00% | = | 35.876 | 4.00% | = 88.858 |
| | 85.00% | = | 10.235 | 35.00% | = | 41.825 | 2.00% | = 95.461 |
| | 80.00% | = | 12.090 | 30.00% | = | 48.267 | 1.00% | = 100.97 |
| | 75.00% | = | 13.848 | 25.00% | = | 54.705 | .01% | = 130.86 |
| | 70.00% | = | 15.603 | 20.00% | = | 61.714 | .00% | = 133.53 |
| | 65.00% | = | 17.592 | 15.00% | = | 68.121 | | |
| | 60.00% | = | 19.649 | 10.00% | = | 76.017 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Summary | MEAN | = | 22.781 | S.D. | = | 22.666 | | |
| Statistics | M cu m | | | | | | | |
| Upper percentiles | 100.00% | = | .00000E+00 | 45.00% | = | 19.036 | 8.00% | = 58.894 |
| | 80.00% | = | 3.2428 | 40.00% | = | 22.360 | 6.00% | = 65.001 |
| | 75.00% | = | 5.3183 | 35.00% | = | 25.746 | 5.00% | = 68.595 |
| | 70.00% | = | 7.5177 | 30.00% | = | 29.313 | 4.00% | = 71.985 |
| | 65.00% | = | 9.5438 | 25.00% | = | 33.722 | 2.00% | = 84.207 |
| | 60.00% | = | 11.822 | 20.00% | = | 39.023 | 1.00% | = 94.959 |
| | 55.00% | = | 14.124 | 15.00% | = | 45.287 | .01% | = 170.86 |
| | 50.00% | = | 16.507 | 10.00% | = | 54.242 | .00% | = 184.55 |

***C) Number of plays distribution***

| | | |
|---|---|---|
| Lower Support | = | 2 |
| Upper Support | = | 2 |
| Expectation | = | 2.00000 |
| Standard Deviation | = | .00000 |

***D) Summary statistics for 4,000 simulations***

| | |
|---|---|
| Basin Resource | (M cu m ) |
| Minimum | = 1.004136 |
| Maximum | = 230.8910 |
| Expectation | = 59.07602 |
| Standard Deviation | = 35.11600 |

***Empirical distribution***

| *Greater than percentage* | *Basin potential* |
|---|---|
| 100.00 | 1.0041 |
| 99.00 | 6.6484 |
| 95.00 | 12.995 |
| 90.00 | 18.044 |
| 85.00 | 22.758 |
| 80.00 | 26.648 |
| 75.00 | 31.401 |
| 70.00 | 35.550 |
| 65.00 | 39.943 |
| 60.00 | 44.584 |
| 55.00 | 48.811 |
| 50.00 | 53.735 |
| 45.00 | 58.499 |
| 40.00 | 63.556 |
| 35.00 | 68.987 |
| 30.00 | 75.052 |
| 25.00 | 81.907 |
| 20.00 | 88.392 |
| 15.00 | 96.063 |
| 10.00 | 107.81 |
| 8.00 | 113.08 |
| 6.00 | 119.34 |
| 5.00 | 123.39 |
| 4.00 | 128.82 |
| 2.00 | 141.76 |
| 1.00 | 158.26 |
| .01 | 228.51 |
| .00 | 230.65 |

## PETRIMES MODULE PSUM

***Monte Carlo sum simulation pool size distribution***

UAI ..... **C5009902**
PLAY ..... **All gas plays**
Assessor ..... Peter Hannigan
Geologist ..... Peter Hannigan
Remarks ..... Kandik Assessment Project
Run date ..... Tue., Feb. 9, 1999, 11:18 a.m.

***User supplied parameters***

| | | |
|---|---|---|
| Do you want to store in data base? | > | Y |
| Oil (o) or gas (g)? | > | G |
| British or S.I. unit of measurement? | > | Si |
| Recoverable resources? | > | N |
| Do you compute conditional potential? | > | N |

***A) Basic information***

| | | |
|---|---|---|
| Type of resource | = | Gas in-place |
| System of measurement | = | S.I. |
| Unit of measurement | = | M cu m (19) |

***B) Play potential distribution***

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Summary | MEAN | = | 8.0121 | S.D. | = | 5.9917 | | |
| Statistics | B cu m | | | | | | | |
| Upper percentiles | 100.00% | = | .53164E-01 | 55.00% | = | 5.0684 | 8.00% | = 18.034 |
| | 99.00% | = | .58677 | 50.00% | = | 5.8628 | 6.00% | = 18.966 |
| | 95.00% | = | 1.3841 | 45.00% | = | 6.8648 | 5.00% | = 19.469 |
| | 90.00% | = | 1.8623 | 40.00% | = | 8.1568 | 4.00% | = 20.131 |
| | 85.00% | = | 2.3044 | 35.00% | = | 9.5152 | 2.00% | = 21.757 |
| | 80.00% | = | 2.7130 | 30.00% | = | 10.897 | 1.00% | = 23.032 |
| | 75.00% | = | 3.1337 | 25.00% | = | 12.386 | .01% | = 29.965 |
| | 70.00% | = | 3.5305 | 20.00% | = | 13.987 | .00% | = 30.657 |
| | 65.00% | = | 3.9703 | 15.00% | = | 15.414 | | |
| | 60.00% | = | 4.4512 | 10.00% | = | 17.255 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Summary | MEAN | = | 11.899 | S.D. | = | 8.3877 | | |
| Statistics | B cu m | | | | | | | |
| Upper percentiles | 100.00% | = | .00000E+00 | 55.00% | = | 9.2813 | 10.00% | = 23.576 |
| | 95.00% | = | 1.3471 | 50.00% | = | 10.346 | 8.00% | = 24.782 |
| | 90.00% | = | 2.4531 | 45.00% | = | 11.517 | 6.00% | = 26.703 |
| | 85.00% | = | 3.4132 | 40.00% | = | 12.676 | 5.00% | = 27.741 |
| | 80.00% | = | 4.2462 | 35.00% | = | 13.871 | 4.00% | = 29.131 |
| | 75.00% | = | 5.2509 | 30.00% | = | 15.184 | 2.00% | = 32.587 |
| | 70.00% | = | 6.2718 | 25.00% | = | 16.898 | 1.00% | = 37.087 |
| | 65.00% | = | 7.1735 | 20.00% | = | 18.813 | .01% | = 50.187 |
| | 60.00% | = | 8.1729 | 15.00% | = | 21.016 | .00% | = 52.640 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Summary | MEAN | = | 19.647 | S.D. | = | 14.269 | | |
| Statistics | B cu m | | | | | | | |
| Upper percentiles | 100.00% | = | .00000E+00 | 55.00% | = | 15.118 | 10.00% | = 39.259 |
| | 95.00% | = | 2.0462 | 50.00% | = | 16.913 | 8.00% | = 41.636 |
| | 90.00% | = | 3.7767 | 45.00% | = | 18.805 | 6.00% | = 44.377 |
| | 85.00% | = | 5.2121 | 40.00% | = | 20.708 | 5.00% | = 46.125 |
| | 80.00% | = | 6.7709 | 35.00% | = | 22.870 | 4.00% | = 47.935 |
| | 75.00% | = | 8.3232 | 30.00% | = | 25.281 | 2.00% | = 56.281 |
| | 70.00% | = | 10.083 | 25.00% | = | 27.924 | 1.00% | = 63.176 |
| | 65.00% | = | 11.639 | 20.00% | = | 31.190 | .01% | = 87.401 |
| | 60.00% | = | 13.520 | 15.00% | = | 34.899 | .00% | = 88.348 |

### *C) Number of plays distribution*

| | | |
|---|---|---|
| Lower Support | = | 3 |
| Upper Support | = | 3 |
| Expectation | = | 3.00000 |
| Standard Deviation | = | .00000 |

### *D) Summary statistics for 4,000 simulations*

| | | |
|---|---|---|
| Basin Resource: | ( B cu m ) | |
| Minimum | = | 3.575542 |
| Maximum | = | 127.3692 |
| Expectation | = | 39.82506 |
| Standard Deviation | = | 17.71990 |

### *Empirical distribution*

| *Greater than percentage* | *Basin potential* |
|---|---|
| 100.00 | 3.5755 |
| 99.00 | 8.7087 |
| 95.00 | 14.364 |
| 90.00 | 18.606 |
| 85.00 | 21.788 |
| 80.00 | 24.371 |
| 75.00 | 26.736 |
| 70.00 | 29.342 |
| 65.00 | 31.304 |
| 60.00 | 33.410 |
| 55.00 | 35.507 |
| 50.00 | 37.792 |
| 45.00 | 40.209 |
| 40.00 | 42.599 |
| 35.00 | 45.007 |
| 30.00 | 47.562 |
| 25.00 | 50.351 |
| 20.00 | 53.837 |
| 15.00 | 57.578 |
| 10.00 | 63.604 |
| 8.00 | 66.507 |
| 6.00 | 69.935 |
| 5.00 | 72.304 |
| 4.00 | 74.742 |
| 2.00 | 81.795 |
| 1.00 | 88.927 |
| .01 | 125.89 |
| .00 | 127.22 |

# APPENDIX 4

## SEISMIC LINE C-3 INEXCO OIL COMPANY 1973
## INTERPRETATION NATIONAL ENERGY BOARD 1999