

Kaiser Bottom-Fishing Report

The Diamond Exploration Cycle

Copyright 2001 by John A Kaiser

Key Milestones and Success Probability Table

Project Status (Milestone reached – Followup work)	Theoretical Project Value (at \$2B UPV)	Leverage	Odds	Chance (Probability)	Time Frame Arctic	Time Frame non-Arctic
M0: Grassroots land position – Generating targets	\$10-20M	100-200	99-199:1	0.5-1%	1 year	6 mths
M1: Targets –Drilling for kimberlite	\$20-50M	40-100	39-99:1	1-2.5%	6 mths	3 mths
M2: Kimberlite–Testing for diamonds	\$50-100M	20-40	19-39:1	2.5-5%	6 mths	3 mths
M3: Diamondiferous kimberlite – Mini-bulk sample best ones for grade	\$100-200M	10-20	9-19:1	5-10%	1 year	6 mths
M4: Diamond Grade – Bulk sampling best ones for commercial value	\$200-500M	4-10	3-9:1	10-25%	1 year	6 mths
M5: Grade & Value – prefeasibility study to determine economics	\$500-1,000M	2-4	1-3:1	25-50%	6 mths	6 mths
M6: Economic pipe – permitting & final feasibility study	\$1-2B	1-2	0-1:1	50-100%	18 mths	1 year
M7: Mine Approval – Construction leading to production	\$2B	1	0:1	100%	2 years	1 year
M8: Production – what next?						

Milestone #0 – is the land position prospective?

Milestone #0 Checklist	Best Answer	Implications of answer
<i>Regional Potential</i>		
Is property on a craton?	Yes	Potential very low if not
Is craton of Archean age?	Yes	Preferable, but maybe not necessary
Was there a major thermal event?	No	Diamond stability field intact
Is the craton exposed at surface?	Yes	Maximum range of pipe age
If a platform, what is the age of the surface strata?	Variable	Limits age of accessible pipes
Have kimberlites been found on craton?	Yes	Craton has deep mantle roots
Are the kimberlites diamondiferous?	Yes	Populated diamond stability field
Do alluvial diamond deposits exist?	Yes	Diamondiferous kimberlite present
Does the craton host world class diamond pipes?	Yes	Where there is one there will be more
What percentage of the craton does the junior control?	100%	More is better
<i>Local Potential</i>		
Is property on thickest part of craton?	Yes	Highest diamond potential
Is property close to the craton margin?	No	Lowest diamond potential
Does area drain into alluvial diamond bearing rivers?	Yes	Local diamond source
Is property within a regional kimberlite indicator mineral anomaly?	Yes	Highest pipe potential
Does the anomaly include diamond indicator minerals?	Yes	Highest diamond potential
Do the garnets from till have kelyphitic rims?	Yes	Did not travel far from source
What is the average overburden thickness?	Variable	Shallower is better
Are there any nearby regional structural features?	Yes	Best kimberlite cluster potential

Kaiser Bottom-Fishing Report

Milestone #1 – generating kimberlite targets

Milestone #1 Checklist	Best Answer	Implications of answer
Is target within an indicator mineral train?	Yes	Kimberlite source nearby
Is the target at the head of a train or dispersion fan?	Yes	Kimberlite pinpointed
Is the glacial history well understood?	Yes	Greater confidence for inferred head
Does the train include diamond indicator minerals?	Yes	Kimberlite may be diamondiferous
Do the indicator minerals include eclogitic garnets?	Yes	May have eclogitic diamonds
Do the indicator minerals include G10 pyrope garnets?	Yes	May have peridotitic diamonds
Does the target have a geophysical signature?	Yes	Kimberlite pinpointed
Is the geophysical target supported by multiple data sets?	Yes	Reduce risk of false anomalies
How deep is the top of the geophysical anomaly?	Variable	Shallower is better
Does non-outcropping target coincide with a topographical low?	Yes	Preferentially weathered or gouged out
Is there a cluster of targets?	Yes	Kimberlites occur in clusters
Are the targets close to a structural feature?	Yes	Better for deep rooted intrusives

Milestone #2 - hitting a kimberlite pipe

Milestone #2 Checklist	Best Answer	Implications
Is it a group 1 kimberlite?	Yes	Best diamond potential
Does it have crater facies?	Yes	Pipe intact, greatest tonnage potential
Does it have diatreme facies?	Yes	Good tonnage at depth potential
Does it have hypabyssal facies?	Variable	Could be a dyk or root zonee
How big is the pipe's surface area?	Variable	Bigger is better for tonnage
How deep was kimberlite intersected?	Variable	Deeper means more tonnage
How deep is the top of the kimberlite?	Variable	Shallow is better for open-pitting
How accessible is the kimberlite?	Variable	Accessibility dictates sampling ease
What is the tonnage limit for the kimberlite?	Variable	Bigger is better

Tonnage Estimates for Craters and Diatremes

Surface Area			Crater Depth (m)			Diatreme Depth (m)		
Ha	acres	Diameter	100	200	300	100	200	300
1	2.5	113	1,675,000	3,350,000	5,025,000	2,500,000	5,000,000	7,500,000
2	4.9	160	3,350,000	6,700,000	10,050,000	5,000,000	10,000,000	15,000,000
5	12.4	252	8,375,000	16,750,000	25,125,000	12,500,000	25,000,000	37,500,000
10	24.7	357	16,750,000	33,500,000	50,250,000	25,000,000	50,000,000	75,000,000
20	49.4	505	33,500,000	67,000,000	100,500,000	50,000,000	100,000,000	150,000,000
30	74.1	618	50,250,000	100,500,000	150,750,000	75,000,000	150,000,000	225,000,000
50	123.5	798	83,750,000	167,500,000	251,250,000	125,000,000	250,000,000	375,000,000
100	247.0	1128	167,500,000	335,000,000	502,500,000	250,000,000	500,000,000	750,000,000

Use this table to estimate a circular pipe's size potential. Note that the crater numbers assume angled walls while the diatreme assumes a cylindrical shape. If you know the diameter (metres) of a circular target, calculate the hectare area as follows: $0.8 \times \text{diameter squared} \div 10000$, or use the diameter column in the table.

Kaiser Bottom-Fishing Report

Milestone #3 – demonstrating diamond content

Milestone #3 Checklist	Best Answer	Implications
Is the pipe diamondiferous?	Yes	Necessary condition
What is the macro reporting standard?	Variable	Sieve based square mesh sizes best
Are micro diamond counts based only on longest dimension?	No	If yes, management ignorant or flaky
Does company divide micro weight by sample weight to get grade?	No	If yes, mgmt ignorant about diamonds
Is sample large enough to be meaningful?	>100 kg	Best is 300 kg or more
Are there counts for 0.1-0.5, 0.5-1.0 & >1.0 mm sieve ranges?	Yes	Can compare size curve to others
Has petrographic work been done on sample interval?	Yes	Need to be aware of facies and phases
Is there evidence of facies or magmatic phase differences?	No	If yes micro diamond data distorted
How does size distribution curve look?	Shallow	Compare with Hearne or Snap Lake
What percentage of macros are fragments?	0%	Less distortion of size profile
Have any individual stones been identified?	Yes	Shows good size profile
What is the weight of the larger stones?	Variable	Presence of big stones is good
What is the weight of the 1 mm plus fraction?	Variable	The more the better
Are many of the micro diamonds coloured?	No	Yes could mean poor quality macros
What is the breakdown of crystal types?	Variable	Prefer majority octahedra
Is there evidence of resorption?	No	No loss of diamond weight

Milestone #4 – getting a grade by mini-bulk sample

Milestone #4 Checklist	Best Answer	Implications
What was the screen size used to recover diamonds?	1.5 mm	Stones below that size aren't commercial
What was the largest stone recovered?	Variable	Bigger is better
Was the pipe geometry defined by delineation drilling?	Yes	Can estimate resource tonnage
Has the internal geometry been defined?	Yes	Grade and value of geologic units varies
Was there grade variation between sample locations?	No	Want uniform diamond distribution
What was the crystal type breakdown?	100%	Octahedrons are best
Is the parcel large enough for valuation?	Yes	Give early value indication
What does the stone size distribution profile look like?	Variable	Gradual size frequency decline desired
How many stones were recovered?	Variable	Gives average stone size
What percentage of stones were clear & colourless?	100%	Indicates gem quality
What percentage of weight was clear & colourless?	100%	Can reveal quality-size skewing

Square Mesh Micro Diamond Size Distributions

	Bulk Grade	Core kg	#<0.5 mm	#/1000 kg	.5-1.0 mm	#/1000 kg	>1.0 mm	#/1000 kg
Winspear Snap Lake	1.78 ct/t	1,201	3,730	3,106	815	679	44	36.6
MPV Tuzo	2.20 ct/t	278	642	2,309	40	144	15	54.0
MPV Hearne	1.71 ct/t	300	680	2,267	62	207	21	70.0
MPV 5034	1.64 ct/t	548	2,335	4,261	92	168	35	63.9
MPV Tesla	0.35 ct/t	245	174	710	14	57	0	0.0

Plot the normalized counts against size range using a log scale for the counts. The higher the curve and the shallower the slope, the better. Plot new square mesh micro-diamond results and compare to the above to get a feel for grade potential. Do not use longest dimension based counts – their correlation with macro grade is random.

Kaiser Bottom-Fishing Report

Milestone #5 – getting a grade and value

Milestone #5 Checklist	Best Answer	Implications
What is the grade of the pipe?	Variable	Higher is better
Are there zones with major grade differences?	Variable	High grade could help with payback
What is the total value of the diamond parcel?	Variable	Higher is better
If a modeled value was given, what is the error margin?	<10%	Beware of big error margins
Does the size and spacing of bulk sample reflect pipe size?	Yes	Larger pipes require bigger samples
Is the value skewed by a few exceptional stones?	No	Isolated stones statistically irrelevant
What is the value percentage attributable to 0.75+ ct stones?	100%	Big, quality stones always in demand
Is the value distributed evenly over the size spectrum?	Variable	All stone sizes are contributing
What is the quality-size profile of the pipe?	Variable	Want to see potential for big stones
Is there a deterioration of quality with increasing size?	No	Gem Quality % must be stable

Milestone #6 & #7– completing a pre-feasibility study and securing a development permit

Milestones #6-7 Checklist	Best Answer	Implications
Is the junior carried from here onward?	Yes	No financing dilution risk
What pipes are candidates for production?	Variable	
How many need to be mined simultaneously?	One	Less permitting hassle
What will be the production rate of the milling facility?	Variable	
Will the operation be underground or open-pit mining?	Open-Pit	Lower cost
How high is the stripping ratio?	Low	Beware of deep overburden
What will be the operating cost?	Variable	
What will be the capital cost?	Variable	Higher in remote, sensitive settings
Has a project description been filed?	Yes	Permitting underway
Are there any sticky environmental obstacles?	No	
Is the area subject to native land claims?	No	
Is there a title risk?	No	
Is approval likely and how long to get it?	Yes	Less than 18 months is good

Milestone #8 – Production Startup

Milestone #8 Checklist	Best Answer	Implications
Does the junior receive diamond production in kind?	Yes	Can capture source premium
Is a diamond marketing deal in place?	Yes	
Is there potential for a source branding premium?	Yes	Canadian diamonds preferred
How does production grade and value compare with projections?	+100%	
Is the theft security system reliable?	Yes	
How long before payback?	Soon	
What next?		

For more information about the Kaiser Bottom-Fishing Report contact us by phone at (925) 631-9748, by fax at (925) 631-9753, by mail at PO Box 6456, Moraga, CA, 94570-6456, by email at canspec@value.net, or our web site at www.canspecresearch.com.