

# The Shell Petroleum Development Company of Nigeria Limited

## Internal Investment Proposal

### Summary Information

Directorate	Technical Directorate				
Group equity interest	100% in SPDC, whereas SPDC is the Joint Venture (JV) operator of an unincorporated JV with a 30% interest.				
Other shareholders / partners	Nigeria National Petroleum Company (NNPC: 55%), Total: 10%, Nigeria Agip Oil Company (NAOC: 5%) in SPDC-JV				
Amount	USD 13.42 million Shell share, MOD, 50/50 (USD 44.73 million 100% JV)				
Project	Utorogu K Sands NAG Development (Pre FID)				
Main commitments					
		Utorogu KLAK-2 US \$ mln (MOD) (100% JV)	Utorogu KUAF-2 US \$ mln (MOD) (100% JV)	Total (100% JV) US \$ mln (MOD)	Total (Shell Share) US \$ mln (MOD)
	Drilling	13.63	15.57	29.20	8.76
	Completion & testing/ Suspension of KUAF-2	6.36	1.33	7.69	2.31
	Location preparation	4.50	2.40	6.90	2.07
	SCD	0.51	0.43	0.94	0.28
	<b>Total</b>	<b>25.00</b>	<b>19.73</b>	<b>44.73</b>	<b>13.42</b>
Source and form of financing	This investment will be financed with JV funding and Shell share capital expenditure will be met by SPDC’s own cash flow. Formal JV partners’ approval will therefore be obtained.				
Summary cash flow	See economics grid				
Summary economics	At Ranking PSV (\$70/bbl RT11)		NPV7% (\$m)	VIR7%	RTEP (%)
	Base Case Pre-FID		-9.2	NA	NA
	Value of information (VOI)		39.6	NA	NA

### ***Section 1: The proposal (management summary)***

This pre-FID Investment Proposal is required to obtain commitment to appraise the target Utorogu K sands starting Q3, 2011

Approval is sought to drill two appraisal wells, KLAK-2 and KUAF-2 proposed to prove about 1.0 Tcf expectation gas volume identified in the untested step out area of the target reservoirs (K6000Y, K6400Y and K7000Y) and develop about 125.3 Bscf of gas in Utorogu Field. This activity is in line with the PAR2 recommendation (May, 2010) to appraise the target reservoirs as part of the Utorogu K Sands NAG development project feasibility study, reduce identified subsurface uncertainties before going into the next phase of the opportunity maturation work. The two appraisal wells, currently on the 2011 short term drilling sequence (Q3 and Q4, 2011) are estimated to cost US\$13.42 million 50/50 MOD Shell Share (US\$ 44.73 JV 100%).

The target reservoirs are expected to deliver gas volume required to keep the Utorogu gas plant full in the short-term and sustain gas supply to the domestic market. The notional further gas development plan is to drill 4 NAG wells from existing locations, lay flowlines and hookup to existing Gas plant in 2014 subject to the outcome of the proposed appraisal drilling. The estimated cost of this development is US\$47.9million 50/50 MOD Shell Share (US\$ 159.67 JV 100%) subject to the appraisal results with an expected FID in Q4, 2012.

The first appraisal well (KLAK-2) is planned to test the structure at the crest (from UTOR-022 location), confirm gas presence, fluid composition and evaluate reservoir connectivity. In an appraisal success case, KLAK-2 is proposed to develop about 125.3 Bscf of Non associated Gas with technical potential of 70 MMscf/d from K6000Y. The drilling of the second well (KUAF-2) is contingent on the result of KLAK-2. If the target reservoirs are found to be gas bearing and in individual reservoir situation (i.e. unconnected reservoirs), KUAF-2 will be drilled to test the flank for oil-rim presence and firm up hydrocarbon column.

The contingency plan if the area under appraisal is found out to be wet, is to sidetrack KLAK-2 to drain the proved area. The main appraisal hole (KLAK-2) and the sidetrack are estimated to cost about US\$8.49 million 50/50 MOD Shell Share (US\$ 28.3 JV 100%) and this will be funded from the budget for KAUF-2.

#### **Appraisal Work Scope:**

The scope of the pre-FID expenditure will cover for the following:

- a. Location Preparation
- b. Drilling
- c. Completion & Testing
- d. Well suspension (KUAF-2)
- e. Sustainable Community Development (SCD)

### ***Section 2: Value proposition and strategic and financial context***

The target K sands present an opportunity to add 1.0 Tcf to the gas volume initially in-place with appraisal scope. When realized, this volume will support the plan to develop more gas to keep the Utorogu Gas Plant full and sustain domestic supply in the short term.

## Summary Economics

The base economics was evaluated on a forward-looking and cost only basis using 50/50 cost estimates for the appraisal activity with the assumption of successful appraisal outcome.

**Table 1: Economics Grid - Pre-FID**

PV Reference Date: 1/7/2011	NPV (\$/S \$ mln)		VIR	RTEP	UTC (RT \$/boe)		Payout-Time (RT)	Maximum Exposure (RT)
Cash flow forward from: 1/1/2011	0%	7%	7%	%	0%	7%		AT
<b>Base Case*</b>								
RV (\$70/bbl RT11)	-9.2	-9.2	NA	NA	NA	NA	NA	\$9.5 (2011)
BEP (\$/bbl)					NA	NA		
<b>Sensitivities (using RV RT)</b>								
1.5% cost markup due to BVA issues		-9.9	NA					
Pre-FID as CAPEX		-2.4	-0.18					
Side-track to proved area**		1.5	0.05	8%				

\*Cost only, no SV & HV impact

\*\* Appraisal failure, individual reservoirs case

## Key Project Parameter Data (Shell Share)

Parameter	Unit	BP10 RV	Low	Mid	High	Comments
Capex (MOD)	US\$ mln	13.6	NA	NA	NA	BP10 Appraisal cost only
Investment Opex (MOD)	US\$ mln	NA	NA	13.4	NA	Pre-FID only
Production Volume	mln boe	NA	NA	NA	NA	
Start Up Date	mmm-yy	NA	NA	NA	NA	
Production in first 12 months	mln boe			NA		

This appraisal is supported by the value of information (VOI) analysis that was carried out using Precision tree5.0 software from the Palisades decision tools suite. The range of appraisal outcomes<sup>1</sup> are presented in a Decision tree (Appendix 2- Fig.2) and the following decisions were assessed.

- Whether to or not to carry out an appraisal for Utorogu K-sands and
- Whether to or not to Side-track the 1<sup>st</sup> appraisal well to Proved area if the KLAKE-2 appraisal fails i.e. Oil is found<sup>2</sup> rather than gas or Dry hole

.Appendix 2-Fig. 1 (PrecisionTree Policy Suggestion- optimal decision tree) shows the result of the evaluation of the decision tree. The result is in favor of the planned appraisal well(s) and also support the side-track of the KLAKE-2 appraisal well to the proved area in the event of appraisal failure.

The value of information (VOI) = US\$39.6mln (RT11, Shell share @ 7% DR)

The Cost of information (COI)<sup>3</sup> = US\$13.4mln (RT11, Shell share @ 7% DR)

<sup>1</sup> The production forecast and Probability of success (POS) for the outcomes were provided by the project team

<sup>2</sup> Although finding oil is treated as failure wrt this project's objective, finding oil is success for SPDC and it is assumed the oil find will be matured as a different project from this Utorogu K-sand NAG development project. Hence Zero value from the potential oil development has been ascribed to this project.

<sup>3</sup> The rule of thumb is that the VOI should be > than COI

A sensitivity on the POS for 'Yes-Gas bearing' shows that a POS of ~1% is required change the decision to 'do not appraise' i.e. develop proved area only.

### **Economics Assumptions**

- Oil PSV includes Forcados offset –
  - \$0.82/bbl, \$1.36bbl and \$1.87bbl @ SV, RV and HV respectively
- 2011 Domgas PSV based on Nigeria Gas Master Plan (NGMP) as advised by gas commercial
- Oil and condensate were assumed to be taxable under PPT
- Gas assumed to be taxable under CITA with AGFA (Associated Gas Framework Agreement) incentive
- 31/12/2010 ARPR (Annual Review of Petroleum Resources) OPEX for Utorogu gas plant \$1.01/boe and SPDC generic fixed OPEX was used for new facilities.
- SPDC generic OPEX assumptions:
  - Oil fixed OPEX - 3% of cum. oil CAPEX ,Gas fixed OPEX – 3.5% of cum. gas CAPEX
- NDDC levy of 3% total expenditure.
- Education tax of 2% assessable profit.
- GHV of 1000btu/scf
- Abandonment cost is estimated at 10% of total project RT CAPEX
- SCD was computed as 2.5% of total CAPEX
- Low CO<sub>2</sub> blending volumes assumed to be available at no additional cost to utorogu K-sand project from an SPDC source

### ***Section 3: Risks, opportunities and alternatives***

The key risks to this investment are mainly technical and subsurface in nature. They are -

- a. Structural Definition & Gas presence in target area
- b. Reservoir connectivity
- c. Fluid distribution and
- d. Fluid composition

Mitigation: The proposed appraisal wells are expected to provide data required to reduce these risks.

### ***Opportunities***

The potential upside in gas volume (about 1.0 Tcf) expected from the target Utorogu K sands supports the current strategy to keep the Utorogu Gas Plant full in the short term and sustain supply to the Domestic market where the Nigerian Federal government has expressed significant interest.

### ***Alternatives***

Alternatives considered are described under the value of information (VOI) analysis summary (reference Section -2).

#### ***Section 4: Corporate structure, and governance***

The project, currently at Feasibility stage will be managed in line with the ORP. It fits within the existing SPDC corporate structure and governance.

#### ***Section 5: Functional Support and consistency with Group and Business Standards***

This proposal complies with Group Business Principles, policies and standards. Full functional support covering SCD is provided for in the appraisal work scope.

#### ***Section 6: Project management, monitoring and review***

<b>Assurance Events/Gates</b>	<b>Date</b>
PIN/DG1	Aug 18, 2009
ITR	Mar 29-31, 2010
PAR 2	May 26-28, 2010
Look Ahead – DG2	Q1, 2012

#### ***Section 7: Budget provision***

The project is in BP10 base plan and approved JV 2011 programme.

#### ***Section 8: Group financial reporting impact***

The financial impact of this proposal on Shell Group financial is as outlined in the table below:

<b>US\$ Million</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>Total Commitment</b>	<b>13.42</b>					
<b>Cash Flow</b>						
SCD Expenditure	0.28					
Pre-FID Expenditure (OPEX)	13.14					
Capital Expenditure						
Operating Expenditure	0.40					
Cash flow From Operations	(11.85)	2.63				
Cash Surplus/(Deficit)	(11.85)	2.63				
<b>Profit and Loss</b>						
NIBIAT +/-	(9.22)					
<b>Balance Sheet</b>						
Avg Capital Employed	1.32	1.32				

#### ***Section 9: Disclosure***

Material disclosures, if any, will be done in line with the Group and SPDC Disclosure policies and guidelines.

#### ***Section 10: Financing***

This investment is expected to be financed with JV partners funding (within the IPP/Domgas budget), and Shell Share of capital expenditure will be met by SPDC's own cash flow.

**Section 11: Taxation**

There are no unusual taxation features at this stage.

**Section 12: Key Parameters**

The following is the main aspect of this proposal:

Approval for \$13.42mln, MOD, Shell Share (i.e. \$44.73mln, 100% JV) to cover Utorogu K sands NAG Development Pre-FID activities (appraisal) costs.

**Section 13: Signatures**

This Proposal is submitted to UIG VP Technical for approval.

Supported by:

Approved by :

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Bernard Bos (FUI/F)

Bart Lismont (UIG/T)

Date ....../....../....

Date ....../....../....

*Initiator:*

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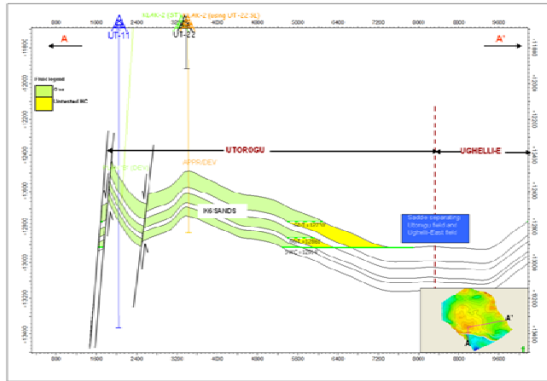
*Odeghesan, Oluseyi (UIG/T/DFDG)*

Date: 01/04/2011

## Appendices:

### 1. Utorogu K sands appraisal work scope

## K Sands Appraisal – Work Scope

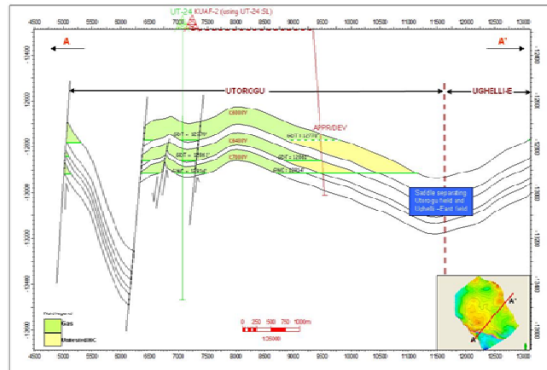


### Proposed 2 Appraisal wells

1. KLAKE-2 is planned to test the structure at the crest (from UTOR-022 location)

- a. To confirm gas presence (about 1 Tcf),
- b. Evaluate reservoir connectivity and
- c. Fluid composition

If gas is absent, KLAKE-2 is proposed to sidetrack and develop the proved area.



2. KUAF-2 is planned to test the structure at the flank (from UTOR-024 location)

- a. To test the flank for oil-rim presence and,
- b. firm up hydrocarbon column

KUAF-2 shall only be drilled

- If KLAKE-2 confirms gas presence in unconnected reservoirs

Appendix 2

Fig. 1: PrecisionTree Policy Suggestion - Optimal Decision Tree

Utorogu K-sands analysis result – PrecisionTree Policy suggestion (Optimal decision tree).

decision tree

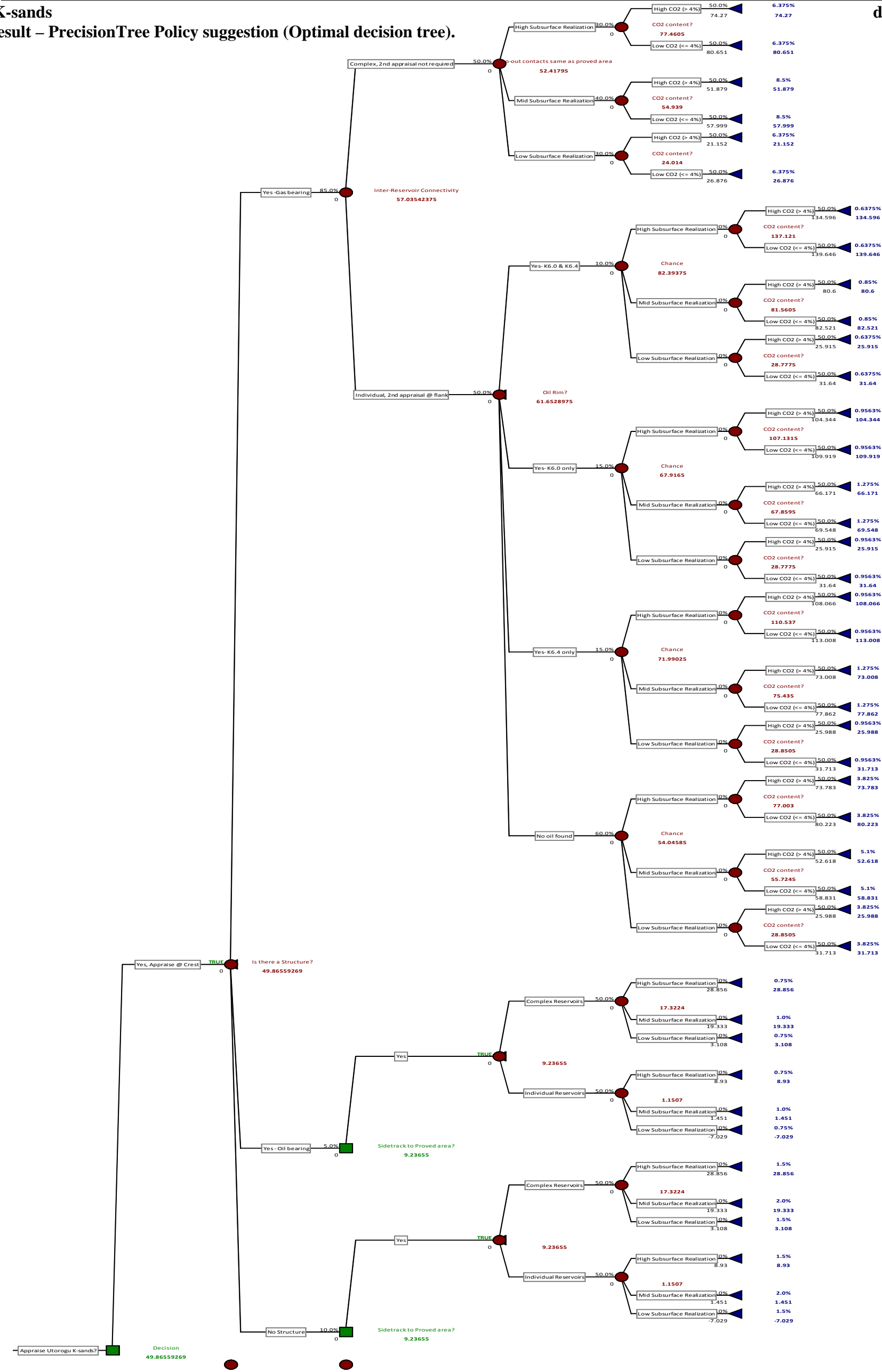




Fig. 2– Utorogu K-Sands Decision Tree.

