

STAFF ANALYSIS
OF THE
SOUTH WHITE ROSE EXTENSION
DEVELOPMENT PLAN
AMENDMENT APPLICATION

ISBN

978-897101-31-5

Table of Contents

	<u>Page</u>
1.0 PURPOSE.....	1
2.0 EXECUTIVE SUMMARY	2
3.0 BACKGROUND	6
3.1 THE APPLICATION	6
3.2 HISTORY/CONTEXT	7
4.0 RESOURCE MANAGEMENT	10
4.1 RESOURCE MANAGEMENT REVIEW	10
4.2 PETROPHYSICAL/GEOLOGICAL/GEOPHYSICAL MODEL REVIEW	11
4.2.1 <i>Petrophysics</i>	11
4.2.2 <i>Reservoir Geologic Modeling</i>	12
4.3 OIL IN PLACE, GAS IN PLACE AND RESERVE ESTIMATES	16
4.4 RESERVOIR SIMULATION MODEL REVIEW	17
4.5 PRODUCTION FORECAST.....	20
4.6 DEVELOPMENT STRATEGY	26
4.7 GENERAL DISCUSSION.....	29
4.8 CONCLUSIONS AND RECOMMENDATION	33
5.0 OPERATIONS AND SAFETY.....	35
5.1 CONSTRUCTION AND INSTALLATION PHASE	35
5.2 RISK ANALYSIS	36
5.3 MODIFICATIONS TO FACILITIES	38
5.4 EXISTING PLANS AND PROCEDURES	38
5.5 CONCLUSIONS AND RECOMMENDATIONS	39
6.0 PROTECTION OF THE ENVIRONMENT	41
7.0 PUBLIC COMMENTS	44
7.1 PAUL HUNT	44
APPENDIX A: PUBLIC COMMENTS	46
APPENDIX B: GLOSSARY	51

List of Figures

Figure 3-1: Map of White Rose Development Area (Husky)	9
Figure 4-1: White Rose Field Oil Production.....	10
Figure 4-2: Board’s SWRX sector model: top structural surface and interpreted faults (Source: C-NLOPB).....	13
Figure 4-3: Structural cross section from F-04 to F-04Z showing porosity scale up from log to reservoir scale. (Source: C-NLOPB)	14
Figure 4-4: Example of porosity distribution (on top of sub layer 10) of SWRX model (Source: C-NLOPB).....	15
Figure 4-5: SWRX Reservoir Simulation model sub-blocks.....	18
Figure 4.6: Full Field White Rose Reservoir Simulation Model – Active Cells	19
Figure 4-7: SWRX Oil Production Forecast	20
Figure 4.8: White Rose Field Oil Production Forecast, with and without SWRX.....	21
Figure 4-9: SWRX Gas Production Forecast	22
Figure 4-10: Comparison of the SWRX and White Rose South Avalon Pool Sector Gas Oil Ratios (Husky 2006)	22
Figure 4-11: White Rose Field Gas Production Forecast, with and without SWRX	23
Figure 4-12: Comparison of the SWRX and White Rose South Avalon Pool Sector Water Cut (Husky 2006)	24
Figure 4-13: SWRX Oil Rate, Water Cut and GOR Forecast.....	25
Figure 4-14: White Rose Field Water Production Forecast, with and without SWRX	25
Figure 4-15: SWRX Proposed Development Wells (after Husky 2006).....	26
Figure 4-16: SWRX area Net Pay (after Husky).....	27
Figure 4-17: SWRX producers oil rates and cumulative production totals	28
Figure 4-18: White Rose Field Actual vs. Simulation Production.....	29

List of Tables

Table 4-1: Parameters and Assumptions used to determine resources/reserves for the SWRX area16
**Table 4-2: Comparison of Husky and C-NLOPB Probabilistic (Volumetric) Resources in Place, SWRX
area17**
Table 4-3: Comparison of Husky and C-NLOPB Oil Reserves, SWRX area17

1.0 PURPOSE

The purpose of this Staff Analysis is to assess Husky's South White Rose Extension (SWRX) Development Plan Amendment Application and to make a recommendation to the Board. Staff's analysis considered safety, environment and resource management aspects of the Amendment as well as public comments received during the public review period.

This Staff Analysis does not consider any Benefits aspects of the proposed project. Benefits are assessed in a separate Benefits Plan Amendment Staff Analysis document. The Board will review and make its decision on this document prior to making a decision on the Development Plan Amendment. This approach is consistent with 45(2) of the Accord Acts.

2.0 EXECUTIVE SUMMARY

On September 29, 2006, Husky Oil Operations Limited (Proponent) submitted to the Canada-Newfoundland and Labrador Offshore Petroleum Board (Board) on behalf of the ownership of Production Licence (PL) 1006 the following documents (the Application):

- White Rose Development Plan Amendment – South White Rose Extension Tie-back (September 2006); and,
- Review of the White Rose Benefits Plan and its Application to the South White Rose Extension Tie-back (September 2006)

The documents propose an expansion to the White Rose Development within Significant Discovery Licences 1043 and 1044. The expansion involves a subsea tie-back to the SeaRose FPSO through the existing Southern Glory Hole (SGH) and utilizing a new glory hole constructed approximately 4km south of the SGH. The Proponent estimates that 24 million barrels of oil is recoverable from the Southern Extension pool and that the proposed project will cost about \$595 million.

Staff reviewed the documents and advised the Proponent that it constituted a Development Plan Amendment Application and in October 2006 informed the Proponent that additional information would be required to complete the Application. On January 8, 2007, the Proponent was advised the document was complete.

Public review was for the period of January 12, 2007 to February 16, 2007; two comments were received.

Staff met with the Proponent's personnel to assess the merits of addressing all or several potential developments within a single application rather than dealing with the SWRX area only. This could provide a more comprehensive development plan for the White

Rose and North Amethyst Fields and may improve regulatory efficiency in processing the North Amethyst Development Plan and Amendments to the White Rose Development Plan. It was noted by the Proponent that preparing a single application will lead to delay in developing outlying areas as delineation drilling had not been completed as well the required economic and technical assessments, required in support of an application, had not been performed. These delays could have a negative impact on production. Staff considered these factors and were satisfied that the current Application should be processed.

Staff reviewed the Application to determine whether the proposed development would affect the environmental or safety obligations and undertakings of the White Rose Development Plan Decision 2001.01.

With respect to the environment, Staff determined that the project described in the Application was outside the scope of the environmental assessment in the White Rose Comprehensive Study Report and that a further screening level assessment pursuant to the *Canadian Environmental Assessment Act*¹ (CEA Act) was required and was undertaken. C-NLOPB, Department of Fisheries and Oceans and Environment Canada determined that the Environmental Assessment (Screening) report and its Addendum provided an acceptable assessment of the environmental interactions of the activities associated with the SWRX. Also, with the application of mitigation measures, environmental effects of the project are not likely to be significant. They also determined that the Proponent must implement a follow-up program pursuant to the CEA Act, that includes monitoring of drilling and production discharges associated with the SWRX.

With respect to safety, staff acknowledges that the Proponent is not planning to use any unconventional technology with this proposed tie-back project. The use of glory holes as a means of protecting subsea equipment is an acceptable methodology for subsea

¹ 1992, c. 37

development as approved in the original White Rose Development Plan. Safety risks to personnel will arise during the various construction and installation phases of the development, including the glory hole excavation program, the drilling program, the subsea flowline installation program and the diving program to tie in the flowlines to the manifolds in the glory holes. However, each of these programs will require a “Work Authorization” from the C-NLOPB as specified by the Atlantic Accord Implementation Acts. The Board’s Safety staff will perform a safety assessment of these programs in accordance with established procedures. The safety standards for the proposed construction and installation activities are based on experience with similar work authorizations. These activities do not raise any safety concerns from the Staff’s perspective particularly as the Proponent has demonstrated the ability to successfully execute such programs in the past. Accordingly, no safety concerns were identified which would preclude Staff from recommending approval of the Application.

Staff also performed a technical review of the proposed project from a resource management perspective and note the following conclusions:

- (a) The Proponent has conducted a comprehensive assessment of the information available in support of this Application and Staff concurs with the proposed depletion strategy, which consists of five development wells (3 horizontal and 2 water injectors) with pressure support from both water injection wells and from the regional aquifer. In the event that there is insufficient support from the aquifer, well slots will be available to drill water injection wells.
- (b) The Proponent’s Application provides flexibility to accommodate potential future reserves which may be identified in the SWRX area. The proposed glory hole will be large enough to install an additional 8 well manifold if required.

- (c) Gas lift has not been included in the modeling for the producers in the SWRX area. However, according to information provided by the Proponent, gas lift lines will be installed in the sub-sea facilities and the gas lift capability will be provided in the producing wells for the SWRX area.
- (d) A large volume of gas is expected to be produced to recover oil during the early phase of production from the SWRX area. As there will be limited excess gas handling capacity during this period, gas management will be important. Staff will continue to monitor this situation as field development progresses.
- (e) Following submission of information required by Condition 19 in Decision 2001.01, (which is expected in December 2007) it is recommended that the Board ask the Proponent for a comprehensive plan for all the known oil and gas resources within the White Rose and North Amethyst Fields.

Thus, from a resource management perspective, Staff concur with the proposed Application and recommend approval.

Accordingly, the following is recommended:

The Board approve the Application subject to the following:

- (1) The Proponent, no later than six months prior to commencing drilling operations at the SWRX drill centre, shall submit for the approval of the Chief Conservation Officer an amended Environmental Effects Monitoring program design that considers drilling and production activities associated with the SWRX drill centre.

3.0 BACKGROUND

3.1 The Application

On September 29, 2006, Husky Oil Operations Limited (Proponent) submitted to the Canada-Newfoundland and Labrador Offshore Petroleum Board (Board) on behalf of the ownership of Production Licence (PL) 1006 the following documents (the Application) :

- White Rose Development Plan Amendment – South White Rose Extension Tie-back (September 2006); and,
- Review of the White Rose Benefits Plan and its Application to the South White Rose Extension Tie-back (September 2006)

The Application proposes an expansion to the White Rose Development within Significant Discovery Licences 1043 and 1044. The expansion involves a subsea tie-back to the SeaRose FPSO through the existing Southern Glory Hole (SGH) and utilizing a new glory hole constructed approximately 4km south of the SGH. The Proponent estimates that 24 million barrels of oil is recoverable from the Southern Extension pool and that this proposed project will cost about \$595 million. These capital costs are estimated by the Proponent as follows:

Drilling and completions	\$308 million
Subsea Systems	\$201 million
Project Management and Engineering	\$48 million
Glory Construction	\$33 million
FPSO modifications	\$5 million

Staff reviewed the Application and requested additional information in a letter dated October 26, 2006. The Proponent responded with additional information on December

20, 2006. Based on Staff's assessment of this information, it was determined that further information was required. On January 5, 2007, the Proponent responded and the documents were complete on January 8, 2007.

The Board made the Application, and supplemental information, available to the public for comment on its website for the period January 12, 2007 to February 16, 2007. Two comments were received. Staff considered these comments during its review of the Application.

3.2 History/Context

The White Rose Field was discovered in 1984 by the drilling and testing of the Husky et al Whiterose N-22 exploratory well. The field is located approximately 350 km east of St. John's, on the eastern edge of the Jeanne d'Arc Basin in an area where the water depth ranges between 115 and 130 meters. Following the discovery, eight delineation wells were drilled to define the structure and three seismic surveys were conducted. This information helped to confirm the presence and extent of hydrocarbons in the Ben Nevis Formation and other formations within the field.

A note of clarification is required regarding the naming convention used in the Application. The reservoir section was termed the "Avalon Formation" in the Proponent's original application, and in the Board's Decision 2001.01. It is now believed the reservoir section lies upon the mid-Aptian unconformity, is middle Aptian-Albian in age, and is an overall fining-upward package within a transgressive systems tract, and is now interpreted to be the "Ben Nevis Formation".

The recoverable oil reserves in the White Rose Field are estimated, and expressed at a 50 percent probability level by the Board, to be 283 million barrels (45 million m³). Most of the hydrocarbons are contained in the Ben Nevis Formation. Pressure measurements and

fluid contacts indicate that the oil and gas accumulation in the Ben Nevis Formation are divided into four separate oil pools, each with an associated gas cap: the South Avalon pool, the North Avalon pool, the West Avalon pool and the SWRX pool (See Figure 3.1). Commercial oil production began at the South Avalon Pool on November 12, 2005 and the Proponent has stated that plans are underway to develop reserves in the North and West Avalon pools and adjacent North Amethyst Field. This Application deals with the development of the SWRX pool.

In terms of natural gas and natural gas liquids, the Board estimates, at a 50 percent probability, that the White Rose Field contains recoverable resources of 2.7 TCF (76.7 x 10⁹ m³), and 96 million barrels (15.3 million m³) respectively, however, the Proponent does not propose in this Application to exploit these resources at this time.

These reserve/resource estimates have not been updated to reflect information acquired from recent drilling and production operations in the field. In particular, the Board's current estimates for the White Rose Field do not account for the SWRX area. Staff are currently assessing production and drilling information, and updating geological and engineering models in preparation for a review of the recoverable resource/reserve estimates.

At present, the White Rose Significant Discovery Area incorporates fourteen Significant Discovery Licences (SDL) with two different interests owners – Husky at 72.5% and Petro-Canada at 27.5%. This percentage breakdown also applies to PL1006 (See Figure 3.1).

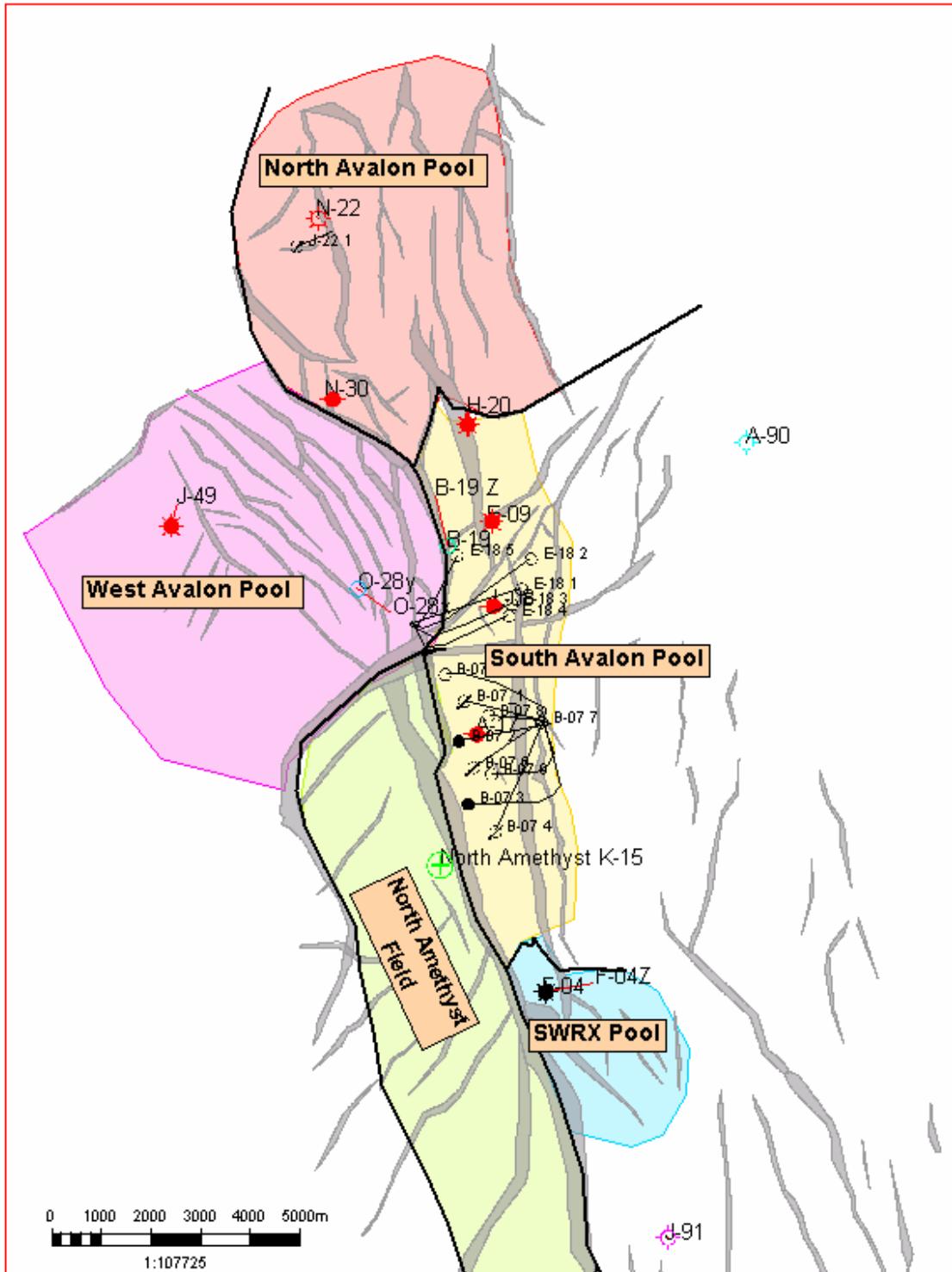


Figure 3-1: Map of White Rose Development Area (C-NLOPB)

4.0 RESOURCE MANAGEMENT

4.1 Resource Management Review

Staff reviewed the Application and the Proponent’s electronic copies of their seismic data and reservoir simulation model and also conducted a review of reservoir, geological and production data acquired to date. As of February 28, 2007, fifteen development wells have been drilled into, and 6.64 million m³ (41.8 million barrels) of oil (Figure 4-1) have been produced from, the White Rose South Avalon pool. Also, six new delineation wells have been drilled in the field. This has provided a substantial quantity of new information to assess reservoir and facility performance and to construct geological and reservoir simulation models.

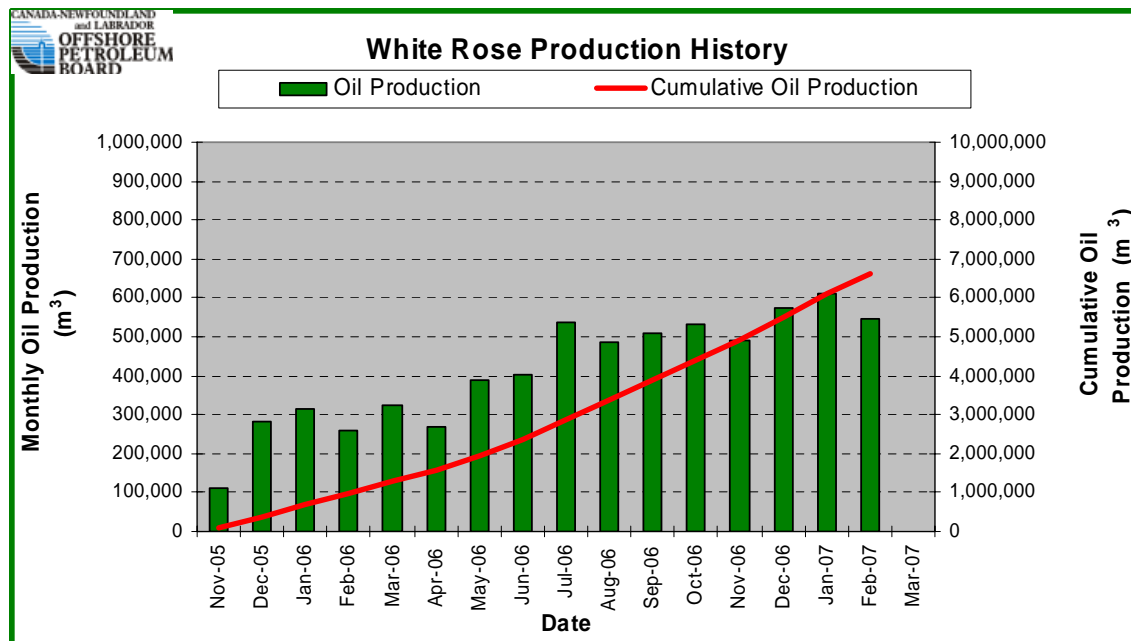


Figure 4-1: White Rose Field Oil Production

4.2 Petrophysical/Geological/Geophysical Model Review

4.2.1 Petrophysics

The Proponent has conducted a comprehensive logging and coring program while drilling the exploration, delineation and development wells in the White Rose Field. In the Application, the Proponent summarized their petrophysical interpretation of the Ben Nevis reservoir for all wells in the approved development area and for the White Rose F-04 and White Rose F-04Z delineation wells south of the developed region. The Proponent supplied supplemental information on the methodology, assumptions and criteria used in their petrophysical analysis.

Staff reviewed the petrophysical data and determined that the Proponent's petrophysical interpretation matches Staff's assessment with slight differences attributed to different methodology, assumptions and criteria used in interpreting the data. For example, porosities reported by the Proponent for the oil zone in the F-04 well and the oil and water zones in the F-04Z well in the SWRX region range from 1.0-1.5 porosity units higher than those interpreted by Staff for the oil bearing section of the reservoir in the F-04 well and water bearing section in the F-04Z well. This may account in part for the higher oil in place assessed by the Proponent than carried by the Board presented later in this report. However, such differences did not have any material effect on the assessment of the Application.

Based on its analyses, Staff concluded that the petrophysical interpretation presented by the Proponent is reasonable and appropriate to evaluate this Application.

4.2.2 Reservoir Geologic Modeling

Staff continues to build and update their geological models for the White Rose Field using the 3D modeling software package Petrel (Schlumberger). The Board's models cover the entire development, including the South, North and West Avalon pools. Specific effort has been put into the construction of a sector model of the SWRX area for this evaluation. With this sector model, Staff has evaluated the oil and gas in place and oil reserves presented by the Proponent for the SWRX area.

The sector model of the SWRX area is bound by geophysically controlled structural map surfaces of the top and bottom of the reservoir as supplied to the Board by the Proponent, and adjusted based on information acquired from wells drilled in the field. Fault mapping in the Board's model is derived from fault polygons supplied by the Proponent, modified to suit the most recent and applicable structural input surfaces.

The surfaces and fault polygon sets were imported and manipulated in Petrel (Figure 4-2). Well data, in the form of the Board's petrophysical analysis, was also imported into the modeling software.

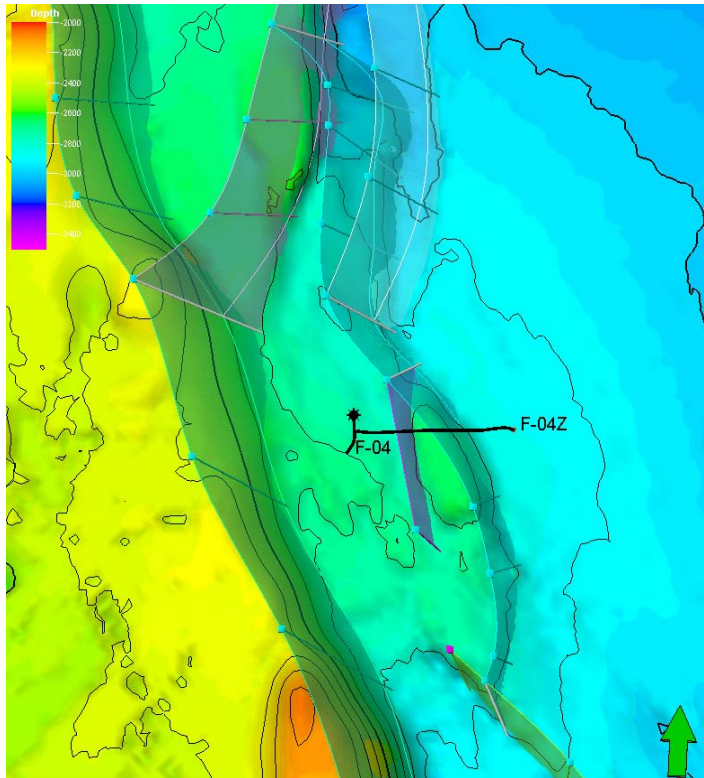


Figure 4-2: Board's SWRX sector model: top structural surface and interpreted faults (Source: C-NLOPB)

A 3D, sloping fault geo-cellular model was constructed with the above data, with cell sizes of approximately 100 x 100 x 4 metres. Key reservoir properties for the sector model (ie. porosity and water saturation) were scaled up from the two wells within the sector (F-04, and F-04Z) from log scale (0.1524 metres/sample), to reservoir scale (approx 4 metres/sample) in Petrel (Figure 4-3). Using Sequential Gaussian Simulation (SGS), the scaled up well parameters for porosity and water saturation were distributed throughout the model, maintaining the statistical distribution of the original data, and the inverse correlation coefficient relationship between the porosity and water saturation data (Figure 4-4). Other parameters key to the resource/reserve calculations (ie. oil formation volume factor (B_o), gas formation volume factor (B_g), gas-oil ratio (GOR), recovery etc.) are fixed scalar quantities, and are entered into the software.

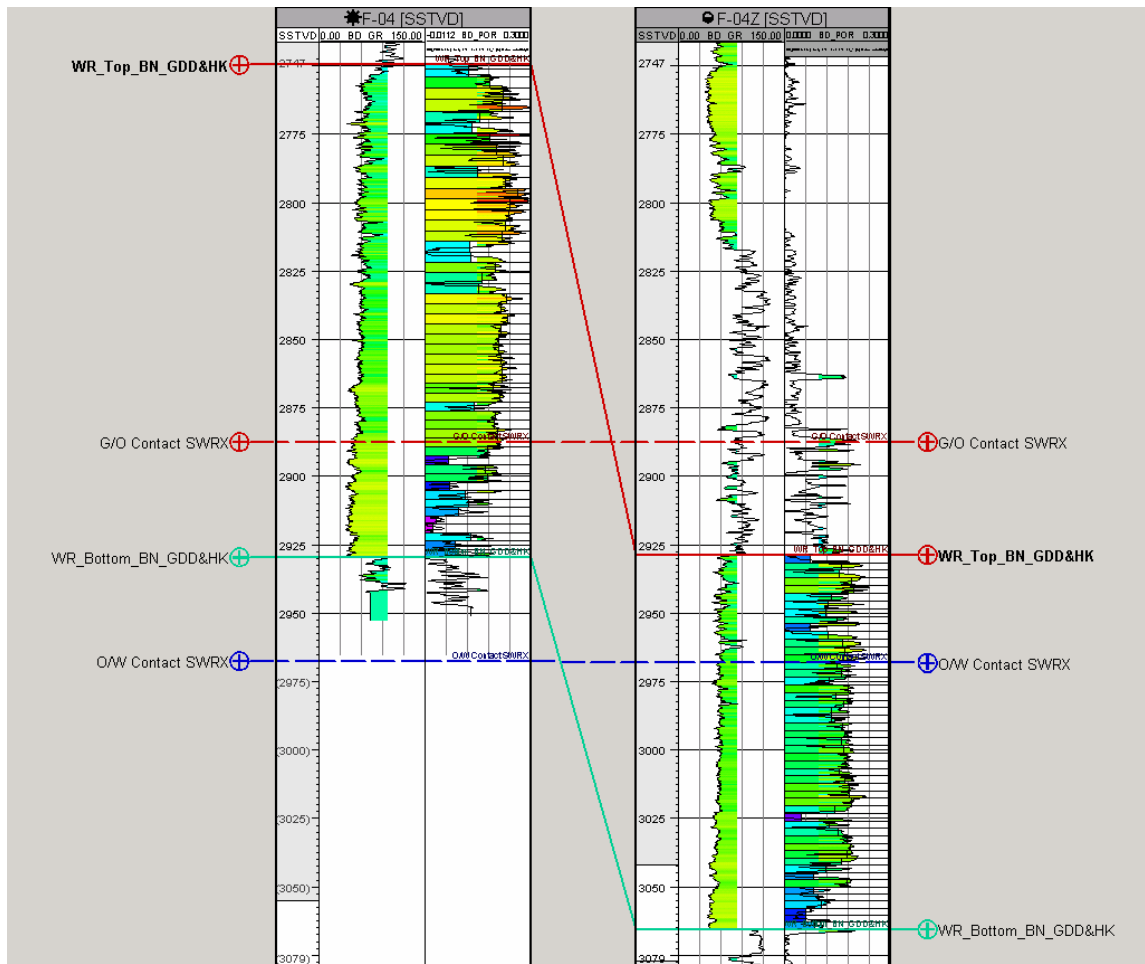


Figure 4-3: Structural cross section from F-04 to F-04Z showing porosity scale up from log to reservoir scale. (Source: C-NLOPB)

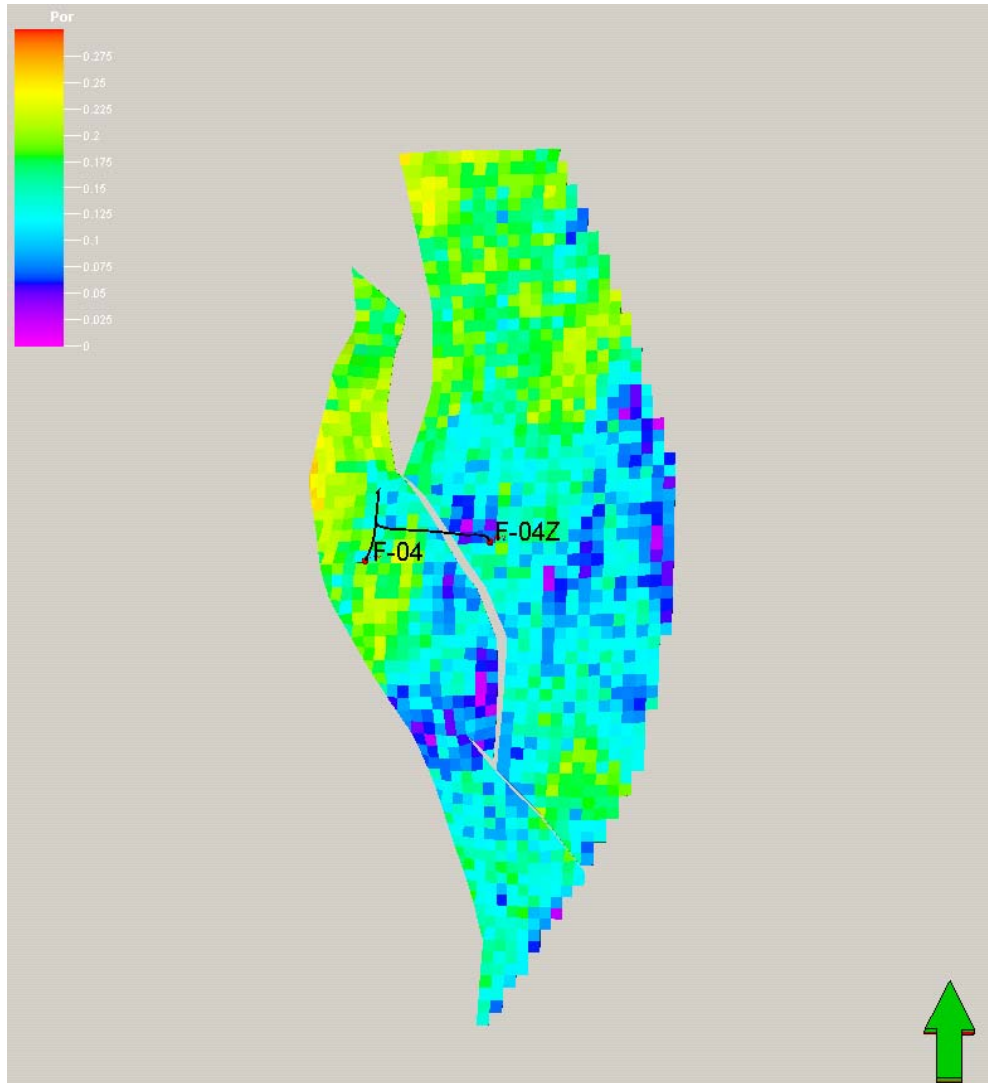


Figure 4-4: Example of porosity distribution (on top of sub layer 10) of SWRX model (Source: C-NLOPB)

The Proponent has supplied geophysically controlled structural interpretations, used in support of the Application, to Staff for input into the Board's models. These surfaces were audited and verified by the Board's geophysical staff. The Proponent continues to work on its geophysical and geologic models for the White Rose Field, which is typical for any field under production. The geologic interpretation of the South Avalon Pool has changed very little since the original Development Plan and Staff believes that the

geological model used by the Proponent for the reservoir studies is reasonable and appropriate to evaluate this Application.

4.3 Oil In Place, Gas In Place and Reserve Estimates

Consistent with Board practice for reserve/resource determinations, fifty separate porosity and corresponding water saturation realizations, each controlled by a random number statistical seed, were used for the Board’s SWRX sector model. This provides a statistical range for the hydrocarbon pore volume determination (HCPV). Scalar quantities (Table 4-1), convert $HCPV_{oil}$ and $HCPV_{gas}$ to oil and gas in place and recoverable oil. The recovery factors assigned were not completely based on simulation studies as these are viewed to be optimistic. Rather, the recovery factors are based on the studies taking into account the Staff’s engineering and geologic judgement.

Oil formation volume factor (Rm^3/STm^3)	1.35
Gas formation volume factor (Rm^3/Sm^3)	0.0047
Gas Oil Ratio (m^3/m^3)	150
P90 Oil Recovery (fraction)	0.21
P50 Oil Recovery (fraction)	0.26
P10 Oil Recovery (fraction)	0.31

Table 4-1: Parameters and Assumptions used to determine resources/reserves for the SWRX area

Staff assessed the oil-in-place for the SWRX area of the field presented by the Proponent and the resource estimates based on the Board’s geological model. A comparison of the Proponent’s, and the Board’s volumetric oil-in-place estimates, for the SWRX area, is shown in Table 4-2.

	P90		P50		P10	
	Husky	C-NLOPB	Husky	C-NLOPB	Husky	C-NLOPB
OOIP (Million bbls)	66	71	91	83	120	93
OOIP (Mm ³)	10.5	11	14.5	13	19	15
OGIP (Gas Cap BCF)	130	217	175	234	220	262
OGIP (Gas Cap (Bm ³))	4	6.1	5	6.6	6	7.4
OGIP (Solution BCF)	N/A	60	62	70	N/A	78
OGIP (Solution (Mm ³))	N/A	1.7	1.8	2.0	N/A	2.2

Table 4-2: Comparison of Husky and C-NLOPB Probabilistic (Volumetric) Resources in Place, SWRX area

The Board's reserve estimates are in close agreement with the Proponent in the SWRX area (Table 4-3).

	P90		P50		P10	
	Husky	C-NLOPB	Husky	C-NLOPB	Husky	C-NLOPB
Million bbls	17	15	24	21.6	31	28.7
Million m ³	2.7	2.4	4	3.4	5	4.6

Table 4-3: Comparison of Husky and C-NLOPB Oil Reserves, SWRX area

4.4 Reservoir Simulation Model Review

The Proponent has constructed a reservoir simulation model of the White Rose Field. This model was submitted to the Board in July 2006 in support of the White Rose Development Plan Amendment Application (Decision 2007.01) to increase the Annual Oil Production Rate and was used to support the current Application. It is based on the

Proponent's 2006 geological model, which has been updated to include all wells in the SWRX area. The simulation model has been history matched to production data to the end of June 2006.

In the simulation model, the SWRX area is sub-divided into four sub-blocks with the F-04 region including Block 1, 3, and 4 while the F-04Z block is represented by Block 2 (Figure 4-5).

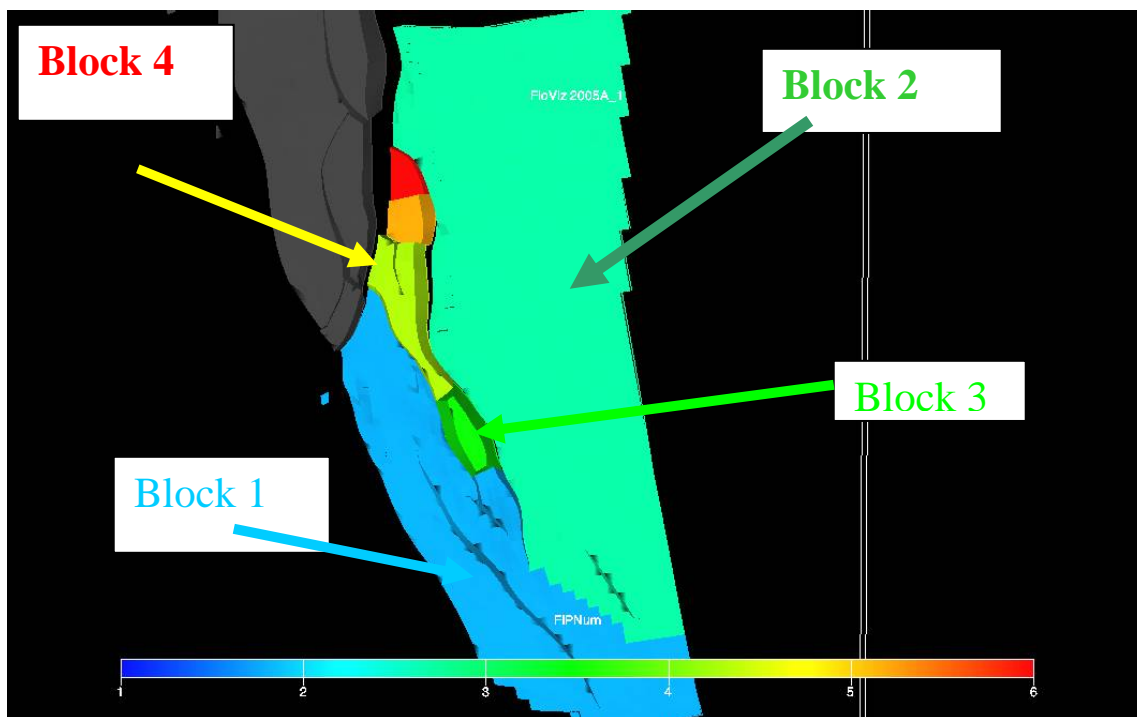


Figure 4-5: SWRX Reservoir Simulation model sub-blocks

The model incorporating the SWRX, consists of 83 by 171 grids with 174 layers for a total of 2,469,582 cells. The number of active cells is 260,657 (Figure 4.6). Staff reviewed the fluid and petrophysical data and assumptions used to construct the reservoir simulation model and believe the data and the assumptions used are reasonable and appropriate to evaluate this Application. Staff notes that for the SWRX area gas lift was

not included in the simulation model for this development. However, without the use of gas lift, the simulation results may be conservative.

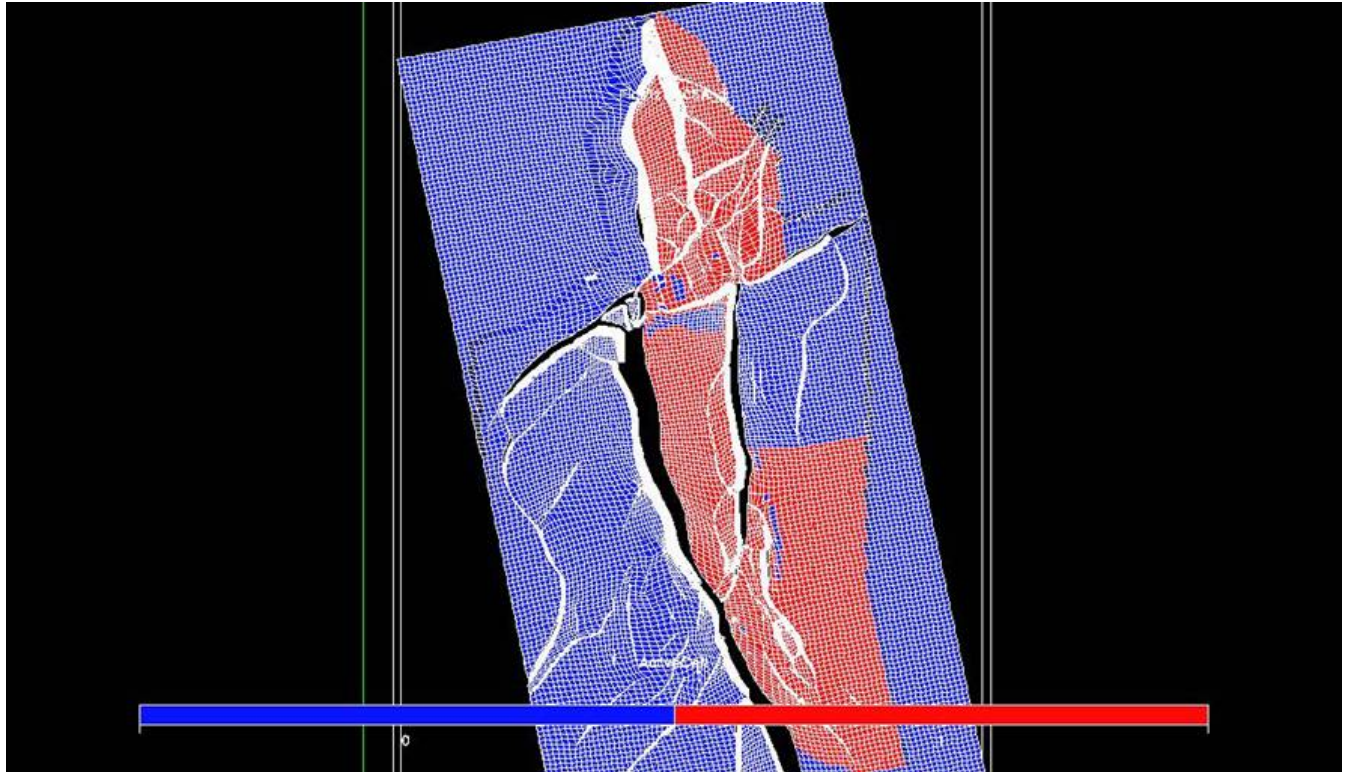


Figure 4.6: Full Field White Rose Reservoir Simulation Model – Active Cells

4.5 Production Forecast

In the reservoir simulation model, production from the SWRX area begins in January 2010 from three horizontal producers supported by two water injectors (WSP1, WSP2 WSP3, WSI2 and WSI4). Production is expected to reach 18,000 bbls/d (2850 m³/d) (Figure 4-7). Based on discussions with the Proponent, initiation of production could be as late as the 4th quarter 2010.

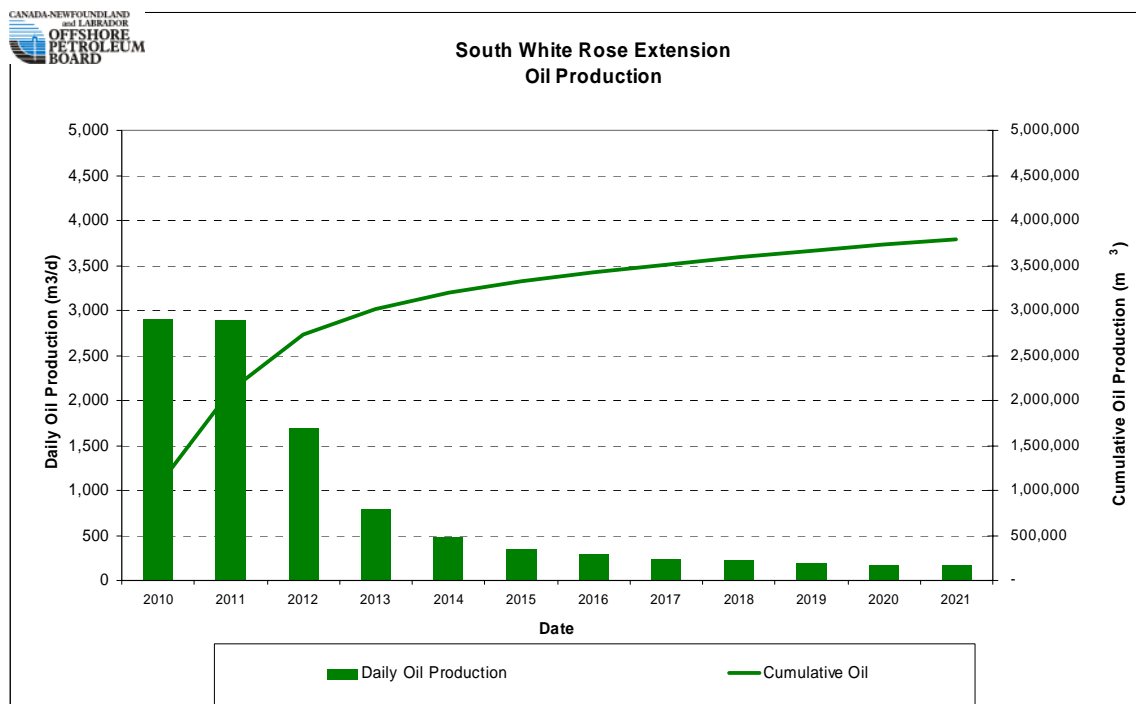


Figure 4-7: SWRX Oil Production Forecast

When the SWRX area wells come into production, the South Avalon Pool oil production rate is expected to be in decline and producing at about 77,000 bbls/d (12,260 m³/d). The contribution of the SWRX area production will slow the production decline from plateau in the White Rose Field (Figure 4-8).

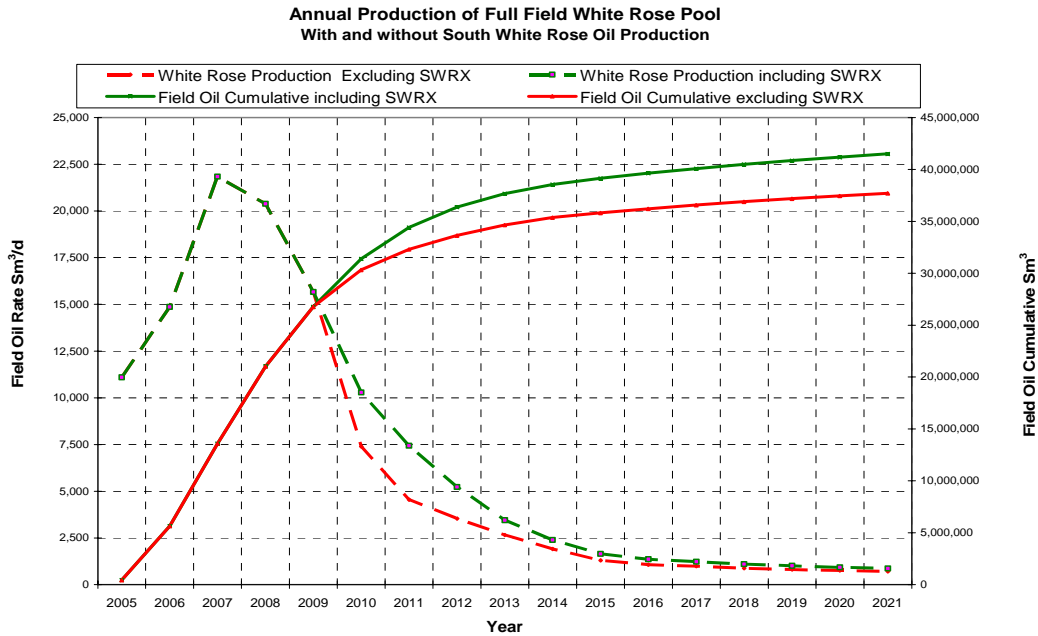


Figure 4.8: White Rose Field Oil Production Forecast, with and without SWRX

The SWRX area oil production will account for 10% of the White Rose Field production. To recover this oil, it is predicted that substantial quantities of gas and water will be produced.

Gas production from the SWRX area is expected to increase during the first three years of oil production due to the overlying gas cap (Figure 4-9). The quantity of gas produced in relation to the sweep efficiency is predicted to be much higher than in other sectors of the field (Figure 4-10). This figure shows that much more gas needs to be processed in comparison to other sectors in the White Rose South Avalon pool.

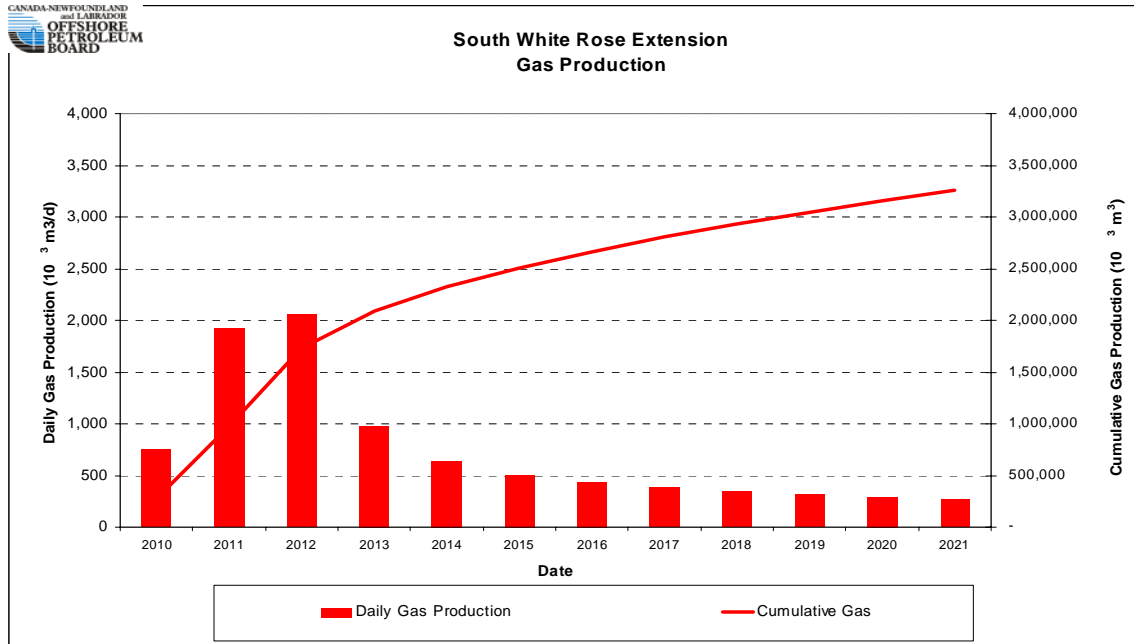


Figure 4-9: SWRX Gas Production Forecast

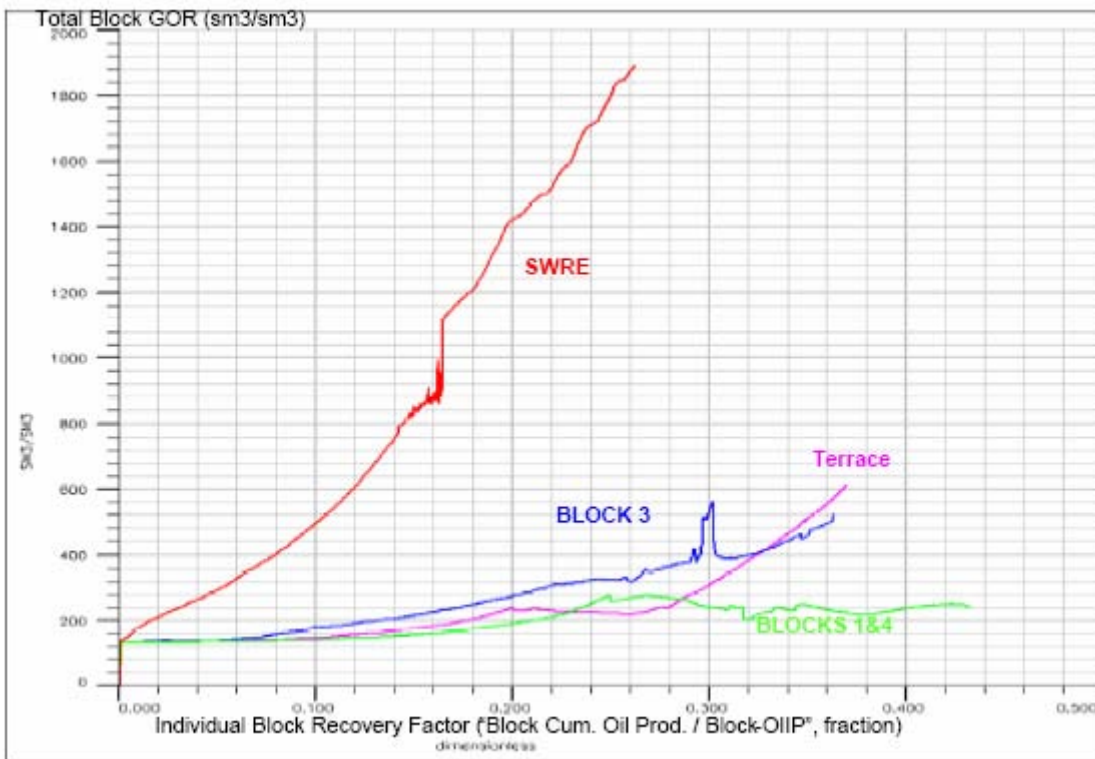


Figure 4-10: Comparison of the SWRX and White Rose South Avalon Pool Sector Gas Oil Ratios (Husky 2006)

The gas handling capacity of the White Rose production facility is 4.2 million m³/d (149 million cubic feet). With production from the SWRX area, gas production is predicted to be within the facility gas handling capability (Figure 4-11). However, during the period of 2010 to 2012, there is limited excess gas handling capacity. Gas management will be important during this period, in particular for any additional production projects that may be implemented.

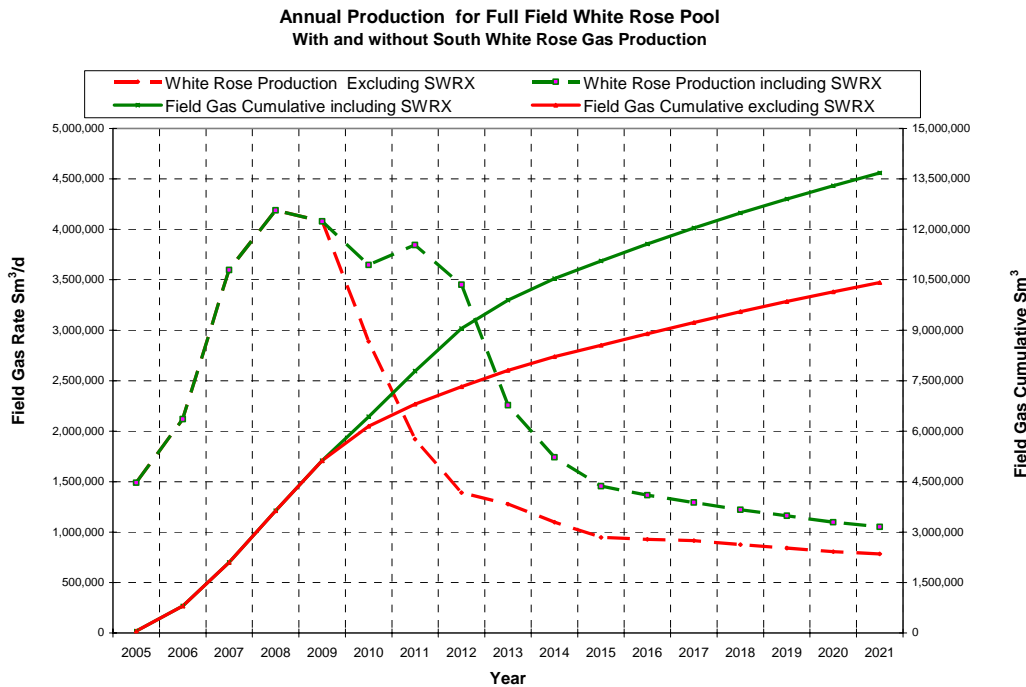


Figure 4-11: White Rose Field Gas Production Forecast, with and without SWRX

Gas production from the SWRX area is predicted to constitute 25% of the White Rose Field gas production (Figure 4-11). This gas will be re-injected into the North Avalon pool for future use. According to the Proponent, this gas can be accommodated in the North Avalon Pool gas storage license area. The performance of the gas storage area continues to be monitored by Staff. To date no issues have been identified.

According to the Proponent, the SWRX area will reach 50% water cut before producing 20% of its original oil in place. This is a significantly higher water cut for equivalent stages of recovery when compared to other areas of the White Rose Field (Figure 4-12).

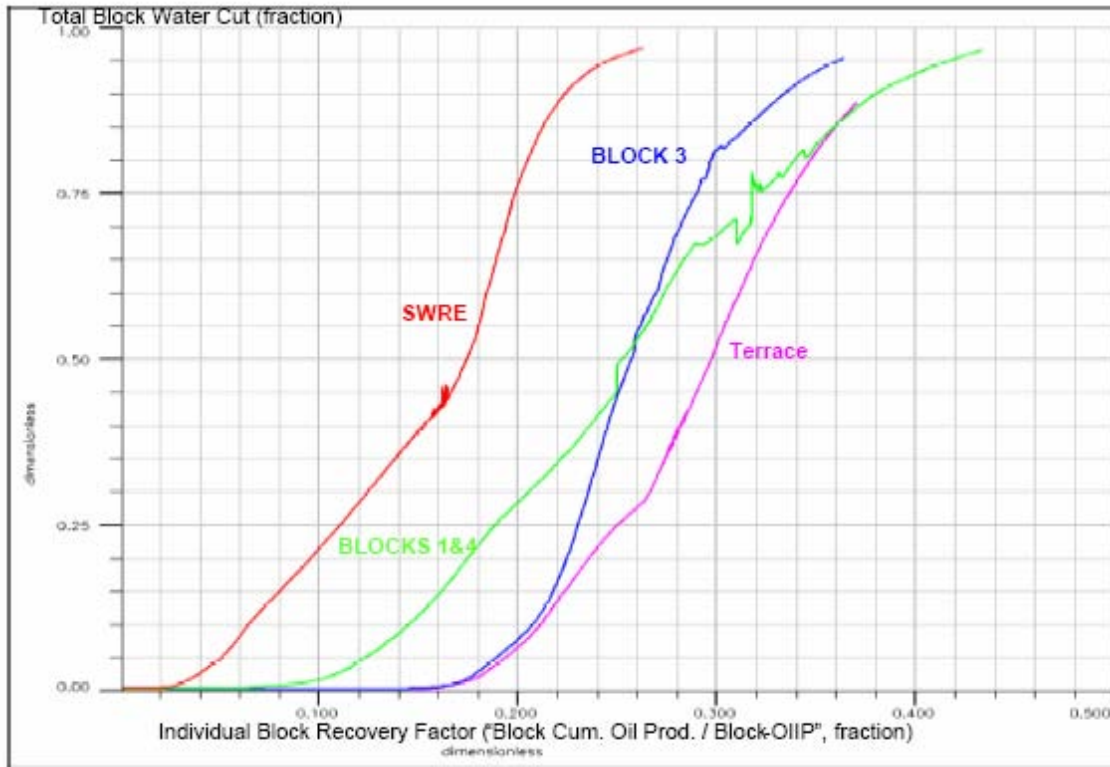


Figure 4-12: Comparison of the SWRX and White Rose South Avalon Pool Sector Water Cut (Husky 2006)

Oil production decline in the SWRX area occurs with the onset of water breakthrough rather than onset of gas production (Figure 4-13). The water handling capacity of the White Rose production facility is 28,000 m³/d. With production from the SWRX area, the maximum water production is predicted to be 21,000 m³/d. The water production from SWRX area represents 20% of the total water production (Figure 4-14).

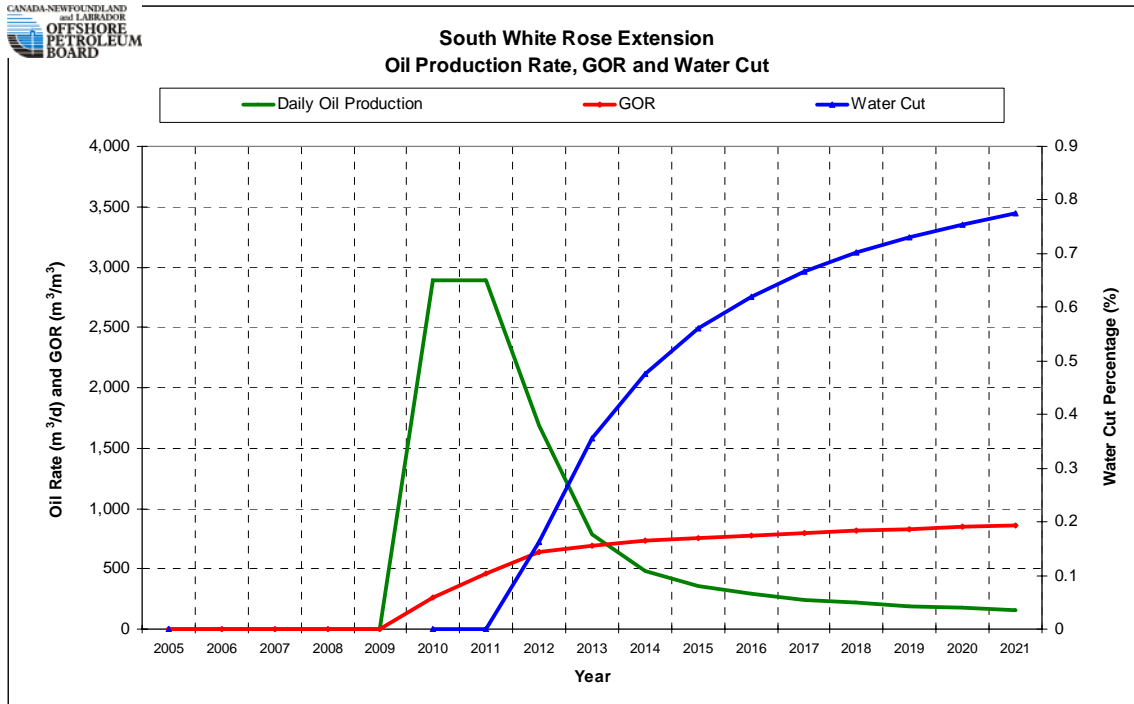


Figure 4-13: SWRX Oil Rate, Water Cut and GOR Forecast

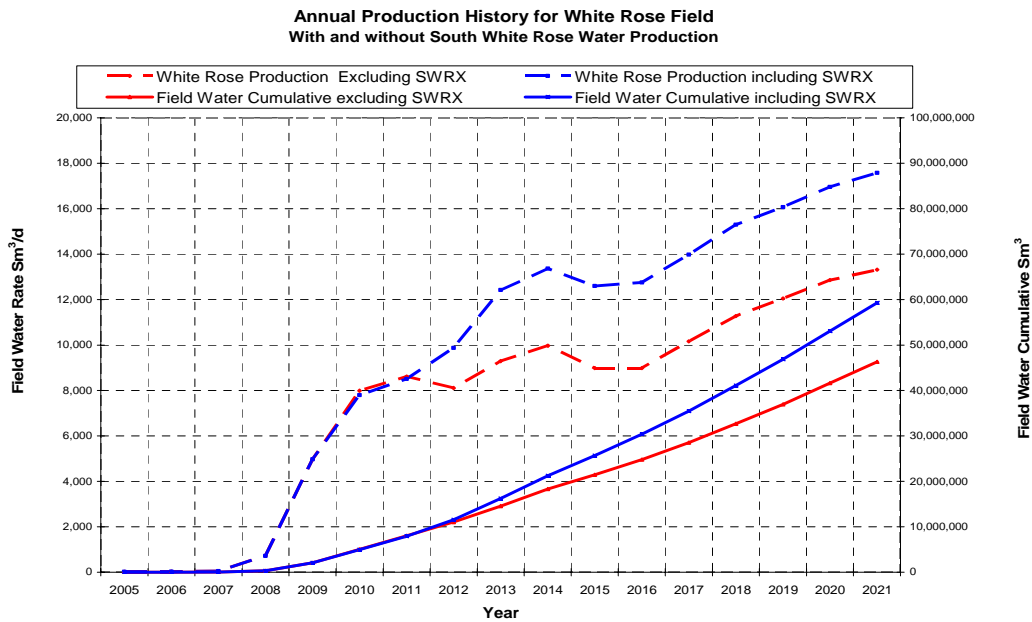


Figure 4-14: White Rose Field Water Production Forecast, with and without SWRX

4.6 Development Strategy

The Proponent proposes to use three horizontal oil producers (WSP1, WSP2 and WSP3) for developing the SWRX area. Two water injectors (WSI2 and WSI3) support production from well WSP2 in the F-04 block (Figure 4-15). No water injection wells are planned for the F-04Z block and southern area of F-04 block. Production from these areas is anticipated to be supported by the regional aquifer.

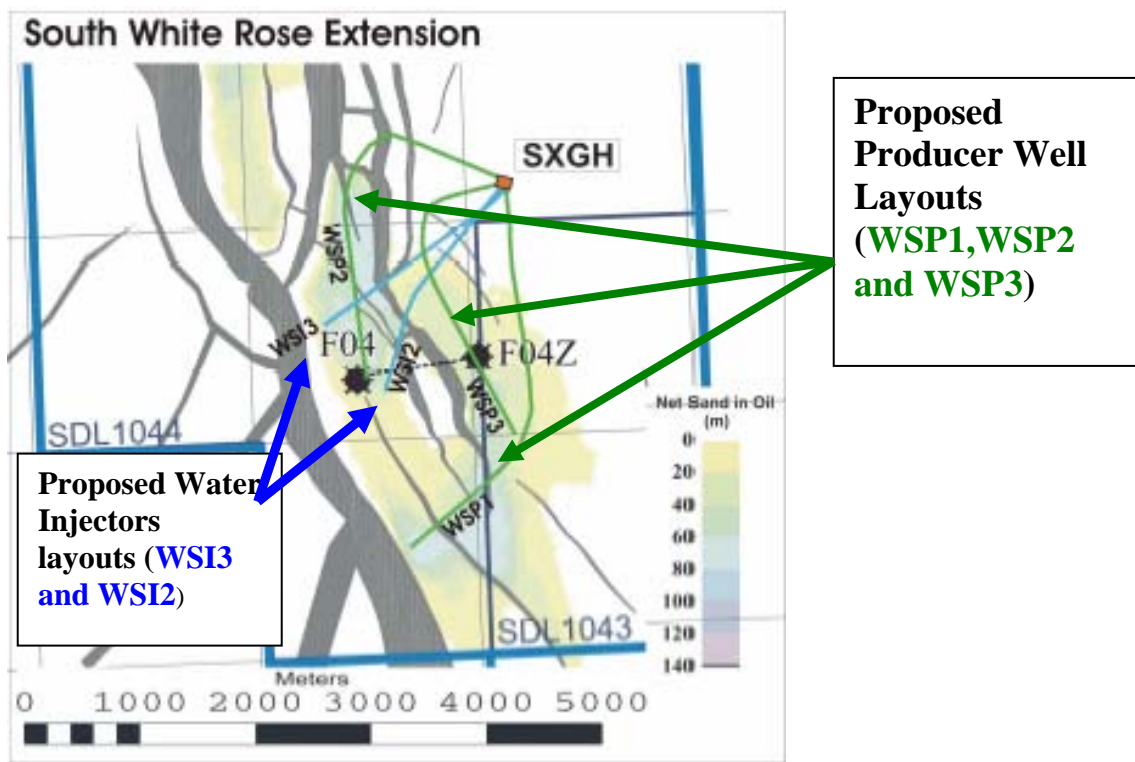


Figure 4-15: SWRX Proposed Development Wells (after Husky 2006)

According to the Proponent, following numerous simulations, the proposed locations of the producers and injectors were selected to maximize oil recovery. Due to the geometry and nature of the reservoir, there were few options for well placement. The location of the producers are coincidental with areas of thick net pay in the SWRX area (Figure 4-16). Staff notes trajectory for the horizontal production wells are complex, particularly

WSPI, but the Proponent has demonstrated their ability to drill such wells with development drilling in the White Rose South Avalon pool. According to the Proponent they are continuing efforts to optimize well locations, based on drilling capability.

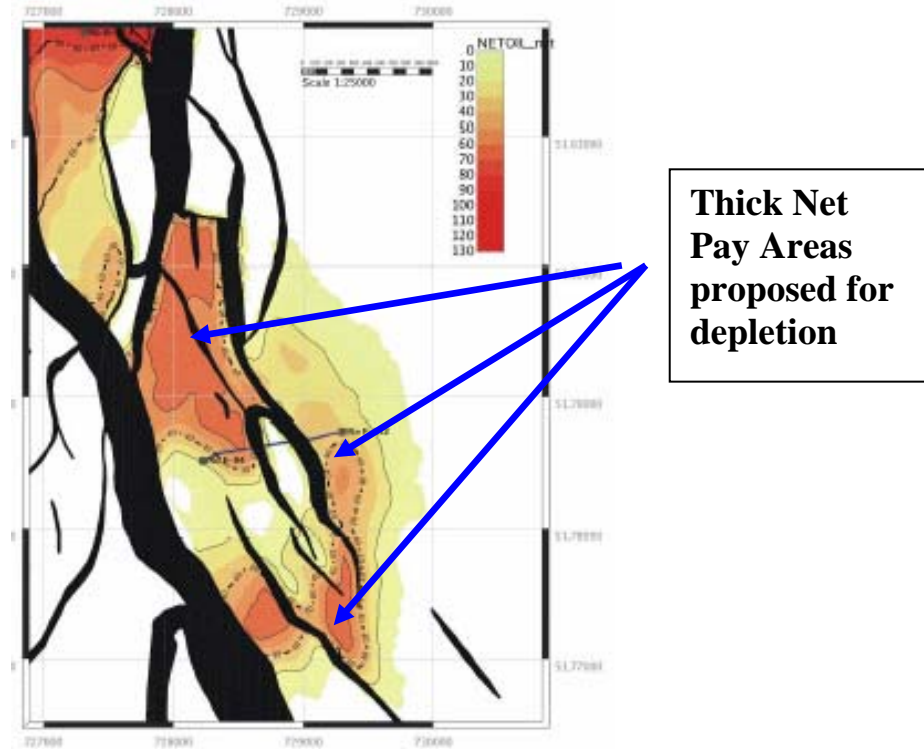


Figure 4-16: SWRX area Net Pay (after Husky)

The WSP2 producer is predicted to produce 2.1 million m³ (13.2 million barrels) of oil. This represents 50 % of the reserves that are expected to be recovered from the SWRX area, while the remaining two producers are expected to recover about 25% each. (Figure 4-17)

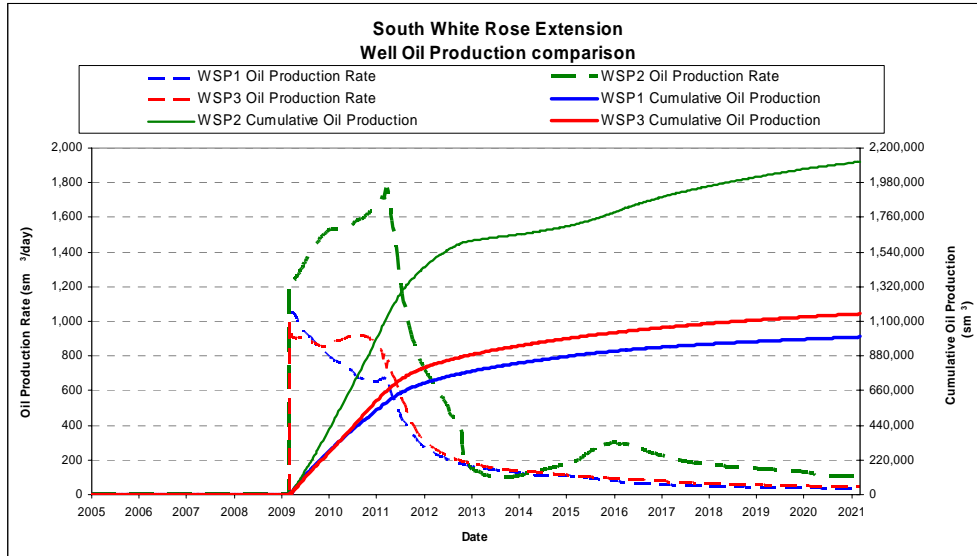


Figure 4-17: SWRX producers oil rates and cumulative production totals

Staff ran the reservoir simulation model provided by the Proponent to assess the effectiveness of the proposed depletion scheme and also, to assess the effect of the aquifer and alternate depletion scenarios.

Staff agrees with the Proponent’s proposal to use both water injection and the regional aquifer to deplete the oil reserves in the SWRX region. Water injection is working well in the White Rose South Avalon Pool. In general, oil, gas and water production from the White Rose Field is in good agreement with that predicted by the Proponent’s reservoir simulation model since first oil in 2005 (Figure 4-18).

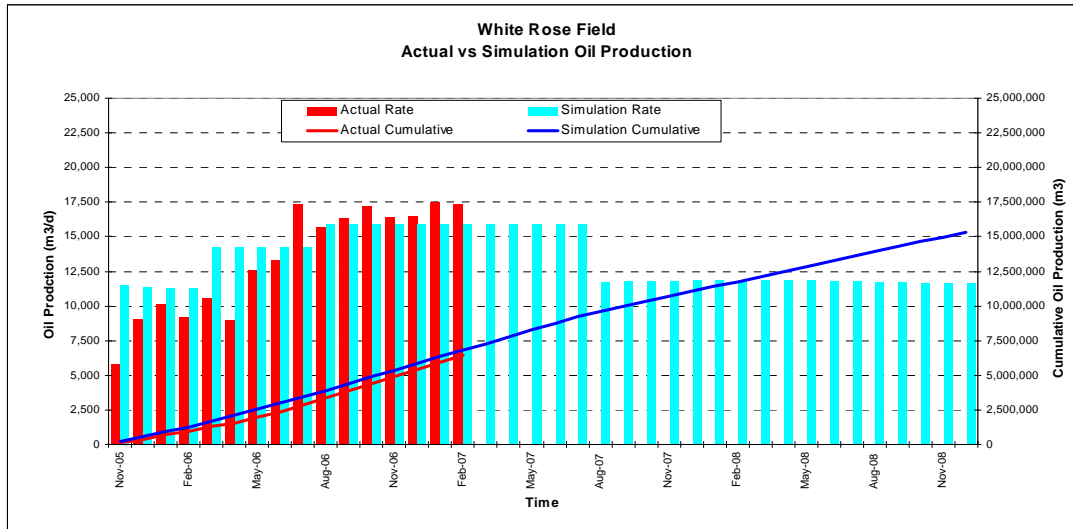


Figure 4-18: White Rose Field Actual vs. Simulation Production

4.7 General Discussion

The White Rose Field Development Plan approved by the Board in its Decision Report 2001.01 provided facilities for development beyond that needed to develop the White Rose South Avalon Pool. These include:

- FPSO turret system flexibility to accommodate future oil production from the deferred oil accumulations, gas production and export of gas. The turret has provisions to accommodate an additional production center, which can accommodate two production flow line risers, one water injection riser and one gas lift riser. The gas injection passage and swivel design was designed to accommodate future gas production from the gas injection wells.
- Spare production/export gas swivels designed for future export of gas treated to meet typical pipeline specification.

- Flexibility in the subsea system designed for changing production requirements including additional wells, tie-in of new production centers and production of gas from the gas injection wells.
- The ability to install twin production risers and water injection and gas-lift risers, to accommodate oil development in the West and North Avalon pools.
- The control system is designed to control up to 33 production, gas injection and water injection wells.

In the White Rose Development Plan, the Proponent noted that to develop the White Rose West Avalon Pool, two to four development wells with associate injection wells will be required. It also described flexibility to be incorporated into the subsea system to allow potential future development of the southeastern area of the pool. Any decision to drill in the southeastern area would be dependent on drilling and production results from the South Avalon pool and excess FPSO production capacity availability. Any decision to develop the western and northern area of the West Avalon pool would be dependent on drilling and production results from the southeastern area and information from the North Avalon pool. Further, the Proponent estimated that two to three production wells would be required to recover the oil in the White Rose North Avalon Pool. Any decisions on the viability or timing of drilling oil production wells in the North Avalon pool will not likely be made until after initial reservoir response to the gas injection has been evaluated.

Since Approval of the White Rose Development Plan, the Proponent has drilled six delineation wells; two in each of the northern and southern regions of the White Rose South Avalon Pool and two in the White Rose West Avalon Pool. Further delineation wells are planned for the White Rose West Avalon Pool and the White Rose North Avalon Pool. The Proponent has also drilled an exploration well on the North Amethyst

Prospect, to the west of the White Rose Field South Avalon Pool area, which encountered oil and gas.

According to information submitted by the Proponent as part of its environmental screening assessment, the Proponent has identified up to five additional drill centers and 54 wells potentially required to develop the oil resources within the White Rose and North Amethyst Fields. These include:

- White Rose South Avalon Pool Extension: one drill center with maximum of 16 wells, which is the focus of this report
- White Rose West Avalon Pool: two drill centers with maximum of 18 wells
- White Rose North Avalon Pool: one drill center with maximum of 4 wells
- North Amethyst Field: one drill center with maximum of 16 wells

The Proponent is assessing the development potential of these areas, as new information is acquired from ongoing delineation drilling and production activities.

The drilling results and production performance to date has been encouraging. The Proponent has acquired information and conducted analyses to support this Application for the SWRX area. Staff met with the Proponent's personnel to assess the merits of addressing all or several of these potential developments within a single application rather than deal with the SWRX area only. This could provide a more comprehensive development plan for the White Rose and North Amethyst Fields and may improve regulatory efficiency in processing the North Amethyst Development Plan and Amendments to the White Rose Development Plan. It was noted by the Proponent that preparing a single application will lead to delay in developing outlying areas as delineation drilling has not been completed and the required economic and technical assessments required in support of an application has not been performed. These delays

could have a negative impact on production. Staff considered these factors and were satisfied that the current Application should be processed.

In its Decision Report 2001.01 approving development of the White Rose Field Avalon South oil reserves, the Board required, among other conditions of approval, the following:

Condition 13:

Should the results of drilling indicate any significant change in the premises upon which the present Development Plan is based, the Proponent is required to submit for the Board's approval an amended plan that takes this new information into account. The Board will establish the date by which such a submission must be made considering the timing of the availability of new information.

Condition 19:

Within two years from initiation of production from the South Avalon pool, the Proponent submit a report, acceptable to the Board, on the following:

- (i) an assessment of the development potential of the West and North Avalon oil pools and if warranted, proposals for drilling and evaluating the accumulations; and,**
- (ii) an updated evaluation of the White Rose field gas resources, along with a description of activities to be undertaken, including drilling schedule and locations for delineation or pre-development wells.**

The staff acknowledges that the Proponent has been diligent in conducting delineation drilling activities and assessing development potential of undeveloped areas of the White Rose Field. The White Rose Field is complex with many development opportunities. If the upside case oil resource development, as outline in the Environmental screening study, is realized, the facilities and wells required to develop the White Rose Field oil and gas resources will be much greater than that originally approved by the Board in its Decision Report 2001.01. This may require redesign of the subsea facilities and the well control system, which is presently designed for 33 wells and modification and expansion

of the production facilities. As the productive life of the field could be extended, it is important that the production plans provide for optimizing oil and gas recovery within the life of the production facilities and maintenance programs for facilities are robust to extend facility life in line with production needs. Following submission of information required by Condition 19 in Decision 2001.01 (which is expected in December 2007), it is recommended that the Board consider requesting the Proponent to provide a comprehensive plan for all the known oil and gas resources within the White Rose and North Amethyst Fields.

4.8 Conclusions and Recommendation

Staff acknowledges that the Proponent has conducted a comprehensive assessment of the information available in support of this Application and concurs with the proposed depletion strategy.

The following are Staff's conclusions regarding the resource management elements of the Application:

- (a) The Proponent has conducted a comprehensive assessment of the information available in support of this Application and Staff concurs with the proposed depletion strategy, which consists of five development wells (3 horizontal and 2 water injectors) with pressure support from water injection wells and the regional aquifer. Staff reviewed the geophysical and regional geological information and believe that the aquifer covers a large area. While there are no apparent geological features that may impede pressure support, there is a risk that the pressure support from the aquifer may not be sufficient to maintain production. In the event that there is insufficient support from the aquifer, well slots will be available to drill additional water injection wells.

- (b) The Proponent's Application provides flexibility to accommodate potential future reserves which may be identified in the SWRX area. The proposed glory hole will be large enough to install an additional 8 well manifold if required.
- (c) Gas lift has not been included in the modeling for the producers in the SWRX area. However, according to information provided by the Proponent, gas lift lines will be installed in the sub-sea facilities and the gas lift capability will be provided in the producing wells for the SWRX area.
- (d) A large volume of gas is expected to be produced to recover oil during the early phase of production from the SWRX area. As there will be limited excess gas handling capacity during this period, gas management will be important. Staff will continue to monitor this situation as field development progresses.
- (e) Following submission of information required by Condition 19 in Decision 2001.01, (which is expected in December 2007), it is recommended that the Board consider requesting the Proponent to provide a comprehensive plan for all the known oil and gas resources within the White Rose and North Amethyst Fields.

Thus, from a resource management perspective, Staff concur with the proposed Application and recommend approval.

5.0 OPERATIONS AND SAFETY

The safety review of the Application focused on an assessment of the Proponent's conceptual plans for tying back SWRX to the *SeaRose FPSO* via existing facilities.

The plan to develop this area by excavating a glory hole, tying in the production and water injection manifolds via subsea flowlines and a subsea electro-hydraulic control umbilical and drilling the development wells utilizing a semi-submersible drilling installation is consistent with the approach approved in the original development plan. In this regard, the Proponent is not planning to use any unconventional technology.

Consistent with this approach, the Proponent is planning to use a glory hole as the means of protecting the subsea templates, wellheads, production trees and manifolds against scouring icebergs. This is an acceptable methodology for subsea developments as approved in the original White Rose Development Plan. The Proponent designed the subsea system in the existing southern drill center with sufficient flexibility to accommodate the tie-in of new production centers. This allows SWRX to be tied back to the *SeaRose FPSO* via the southern drill center.

5.1 Construction and Installation Phase

Safety risks to personnel will arise during the various construction and installation phases of the development, including the glory hole excavation program, the drilling program, the subsea flowline installation program and the diving program to tie in the flowlines to the manifolds in the glory holes. Each of these programs will require a "Work Authorization" from the C-NLOPB as specified by the Atlantic Accord Implementation Acts. The Board's Safety staff will perform a safety assessment of each of these programs. The safety assessment examines the adequacy of the Proponent's safety plan for each proposed activity to confirm that the Proponent has identified and adequately

addressed all safety hazards. The safety standards for the proposed construction and installation activities are based on experience with similar work authorizations. In particular, the C-NLOPB will require the Proponent to address the simultaneous operations issues associated with tie-in activities in the southern drill center. Otherwise, the construction activities associated with the proposed southern extension do not raise any new safety concerns from the Staff's perspective particularly as the Proponent has demonstrated the ability to successfully execute such programs in the past.

5.2 Risk Analysis

The Proponent conducted a study to determine the impact on risk to the safety of personnel or facilities due to the South White Rose extension. The results of this assessment are provided in the report *Safety Assessment of South White Rose Expansion Project, Atkins Report No. 5033902-RP-015 Rev 1* (Atkins Report) issued to Husky Oil Operations Ltd. dated October, 2006. The quantitative risk analysis concluded that the risk remained within the target levels for safety identified for the project in the original White Rose development safety studies. Notwithstanding this finding, the study identified a number of recommendations for consideration as the project proceeds into the detailed engineering phase. These included: (excerpts from Atkins report)

- (1) *As the SWRX Project progresses it is recommended that the safety assessment be updated to reflect any changes that may occur to the design. It is particularly important that assumptions made within the study are reviewed and updated to ensure that the conclusions drawn remain valid.*
- (2) *A review of the traffic management procedures at the White Rose field should be undertaken by Husky to ensure that there are sufficient measures in place to protect the SWRX equipment, and any MODU working at the SWRX Glory Hole, from vessels passing through the field.*
- (3) *A White Rose specific field traffic survey should be undertaken to provide a better understanding of the vessels that may pass through the field. The results of this study should be used to develop a ship collision assessment that determines the*

collision risk to the FPSO as well as any MODU that may be operating in the field.

- (4) Husky should also review in more detail the potential for icebergs to cause damage or scouring of equipment in the SWRX Glory Hole or flowlines. This review should also include the Ice Management procedures to ensure that the SWRX equipment can be protected to a similar level as existing subsea equipment.*
- (5) The project should review the impact on blowdown rates for the SDC production /test and gas lift lines as a result of the inclusion of the SWRX pool. Any increase in the blowdown rates and time may affect the time taken to release the riser buoy via the QCDC system in the turret during a controlled disconnect operation.*
- (6) The ESD shut down times for the SWRX facilities should also be reviewed to ensure that the time to close valves at SWRX is optimized and does not prolong the period of packing that may occur at the FPSO after the riser ESD valves have closed in the turret.*
- (7) The BOP dropped object frequency is based on historical, generic records of such incidents. This frequency should be reviewed to ensure that specific incidents of dropped BOPs at the White Rose field are taken into account and the frequency revised in future revisions of this report if appropriate.*
- (8) The potential for MODU mooring chains to damage the flowlines or umbilicals has previously been assessed by the White Rose project. However, the potential damage that drifting anchors could cause to the flowlines or umbilical has not been assessed and should be reviewed to ensure that the potential frequency of damage is acceptable.*

The Atkin's report also noted that the assessment is based on the Global Santa Fe (GSF) Grand Banks as this MODU has performed operations at the White Rose Field. Should a different MODU be used, the assessment should be reviewed and updated to ensure that the specific MODU risk is assessed.

These recommendations must be dealt with by the Proponent as it moves from the FEED phase through the detailed engineering design phase. Staff will confirm that each of these matters are addressed and closed out by the Proponent in due course. As part of this process, the Proponent will be required to keep the Board's Chief Safety Officer updated

on the progress of these matters as the design phase proceeds. The Proponent will also be required to keep Staff informed of the detailed schedule for the project, including a schedule for any ongoing or future safety studies.

5.3 Modifications to Facilities

As the project moves into the detailed engineering phase, it is possible that minor modifications will have to be made to the various control systems (hardware and/or software) on board the *SeaRose FPSO* as well as the hydraulic systems and the chemical injection systems. Minor modifications may also be required to the subsea systems in the existing southern drill center. Any modifications will require an independent assessment by the Certifying Authority and approval by both the Chief Safety Officer and the Certifying Authority pursuant to sub-section 67(1) of the *Newfoundland Offshore Petroleum Installation Regulations*. In this regard, the “scope of work” for the Certificate of Fitness will have to be modified by the Proponent to capture any modifications that may be required to any of the systems or facilities as a result of the tie-in of the SWRX and to include any new subsea systems and flowlines to be installed in connection with the expansion.

It will also be necessary for the Proponent to integrate any modifications into existing systems, policies and procedures and to provide any necessary training to personnel in respect of any new systems or upgrades.

5.4 Existing Plans and Procedures

The Proponent’s ice management plan will need to be amended in due course to expand the ice management zone around the *SeaRose FPSO* to include the facilities in the SWRX glory hole. Modifications to the *SeaRose FPSO* safety zone will also be necessary. All operational changes of this nature including any necessary updates to the *SeaRose Safety*

Plan must be effected in accordance with the Proponent's management of change process.

5.5 Conclusions and Recommendations

No safety concerns were identified which would preclude Staff from recommending approval of the Application. Any activities in connection with this Application can be managed in accordance with established safety processes and procedures

Accordingly, Staff recommends that the Application be approved. Staff will ensure that the following matters will be followed up with the Proponent in due course as the project proceeds:

- (1) When the project advances to the detailed engineering design phase, the Proponent must advise the Chief Safety Officer of the manner in which the recommendations arising from the Atkin's report have been addressed.
- (2) The scope of work of the Certifying Authority in respect of the White Rose project must be amended to include a review of any new subsea systems and flowlines to be installed as well as any modifications to either the *SeaRose FPSO* or existing subsea systems.
- (3) The Proponent must provide, within 120 days of commencing detailed engineering design, a summary of any upgrades that may be required to the *SeaRose FPSO* or existing subsea systems as well as a summary of the new subsea equipment to be added as part of the expansion. The Proponent's plans for testing and integrating these modifications into existing systems and procedures should be described together with the Proponent's plans for training personnel in respect of any new systems or upgrades.

- (4) When the project proceeds to the detailed engineering design phase, the Proponent must keep Staff informed of the detailed schedule for the project, including a schedule for any ongoing or future safety studies.

- (5) As a matter of course, updates to the SeaRose Safety Plan to reflect the south White Rose extension must be submitted to the Chief Safety Officer for approval. Any necessary changes to the ice management plan, the safety zone around the *SeaRose FPSO* and any other operational updates to existing plans, processes and procedures must be made by the Proponent in accordance with its management of change process.

6.0 PROTECTION OF THE ENVIRONMENT

Environmental Affairs staff reviewed the Application to determine whether it raised any environmental concerns that were not previously assessed in the White Rose Comprehensive Study Report (CSR)² or in Decision 2001.01³. Staff determined that the project described in the Application was outside the scope of the assessment in the White Rose CSR and that a further screening level assessment pursuant to the *Canadian Environmental Assessment Act*⁴ (CEA Act) was required and undertaken. The C-NLOPB is a Responsible Authority pursuant to the CEA Act. In addition, an authorization for the harmful alteration, disruption and destruction of fish habitat from the Department of Fisheries and Oceans (DFO) and an ocean disposal permit from Environment Canada (EC) will be required for the construction of the drill centre, so DFO and EC also are Responsible Authorities and cooperated in the conduct of the assessment.

In fulfillment of the requirements of the CEA Act, the Proponent submitted a project description⁵ on January 13, 2006 of all project activities associated with the construction, installation, operation, modification, and abandonment of the proposed SWRX. In consideration of potential future development activities at or near the White Rose Field, the project description also included the construction and operation of an additional three drill centres, the drilling of up to 38 additional wells, and sub-sea installations with tieback to the FPSO. These additional drill centres considered in the environmental assessment are not included in the current Development Plan Amendment and any construction or operations arising from these additional drill centres will require separate approvals from the Board.

² Husky Oil Operations Limited. “*White Rose Comprehensive Study Report*”. (2001). 94 p.

³ C-NLOPB. *Decision 2001.01 Application for Approval White Rose Canada-Newfoundland Benefits Plan; White Rose Development Plan*. (2001). 185 p.

⁴ 1992, c. 37

⁵ Husky Energy. *White Rose Development Project New Drill Centre and Construction Operations Program: Project Description*. (2006).

Following receipt of the project description the C-NLOPB, DFO and EC prepared a scoping document⁶ that outlines the scope of the project, scope of assessment and factors to be included in the assessment.

On September 6, 2006, the Proponent submitted an environmental assessment (EA) report⁷ to the C-NLOPB. The EA report assessed the construction and operation of four drill centres, the installation of sub-sea equipment and its tieback to the FPSO, and the drilling of up to 30 wells. During the preparation of the EA report, the Proponent consulted with the Fish, Food and Allied Workers Union (FFAWU), One Ocean, commercial fish processors, DFO, EC and non-governmental organizations regarding the proposed project activities. The EA report summarizes these consultation sessions and reports on comments and issues raised.

Staff and federal and provincial departments with expertise in environmental and fisheries management provided comment on the report. The FFAWU and One Ocean also submitted comments.

The Proponent subsequently submitted an addendum to the EA report⁸ (Addendum) to reflect the potential addition of an extra drill centre. The total activities covered by the assessment thereby became the construction and operation of up to five drill centres, with sub-sea tie back to the FPSO, and the drilling of up to 54 wells. Comments on the Addendum were received from DFO, EC and One Ocean.

Documentation associated with the screening was posted on the Board's web-based environmental assessment registry, enabling members of the public to provide comment

⁶ White Rose Drill Centre Construction/Operation Program Scoping Document. March 28, 2006. C-NLOPB

⁷ Husky White Rose Development Project: New Drill Centre Construction and Operation Program Environmental Assessment. LGL. 2006.

⁸ Husky White Rose Development Project: New Drill Centre Construction and Operation Program Environmental Assessment Addendum. LGL. 2007

at any time in the screening process. There were no comments received from the general public.

Comments received throughout the EA review process were forwarded to the Proponent and were satisfactorily addressed.

C-NLOPB, DFO and EC determined that the EA (Screening) report and its Addendum provided an acceptable assessment of the environmental interactions of the activities associated with the SWRX, and that, with the application of mitigation measures, environmental effects of the project are not likely to be significant. They also determined that the Proponent must implement a follow-up program pursuant to the CEA Act, that includes monitoring of drilling and production discharges associated with the SWRX.

The approved White Rose Environmental Protection Plan includes an Environmental Effects Monitoring (EEM) program to monitor drilling and production discharges associated with the White Rose project. The Proponent will be required to amend its EEM program to account for SWRX activities

Accordingly, Staff recommends that the Application be approved in accordance with the following:

The Proponent, no later than six months prior to commencing drilling operations at the SWRX drill centre, shall submit for the approval of the Chief Conservation Officer an amended Environmental Effects Monitoring program design that considers drilling and production activities associated with the SWRX drill centre.

7.0 PUBLIC COMMENTS

The Board had a public comment period from January 12, 2007 to February 16, 2007 and received two comments – Paul Hunt and NOIA. A response to the Paul Hunt comment is below while a response to the NOIA comment is in the Benefits Plan Staff Analysis document.

7.1 Paul Hunt

This review is being conducted in accordance with the Development Plan guidelines, February 2006. Matters respecting Newfoundland and Labrador Benefits are assessed in accordance with the Newfoundland and Labrador Benefits Plan Guidelines, February 2006. Both guidelines are published on our website at www.cnlopb.nl.ca. The guidelines have been developed, in consultation with both Ministers responsible for the Newfoundland and Labrador offshore area, to assist all stakeholders involved in the development plan approval process. Chapter Six of the Development Plan Guidelines specifically deals with Public Reviews, the role of the Board and participation by the public.

Given the importance of development to the Province of Newfoundland and Labrador, a public review is considered a necessary component of the approval process. Prior to deciding on the written public comment form of public review, the Board seriously considered its obligations under the Atlantic Accord legislation in the context of this Application. The level of public review is determined on the basis of public interest. As a full public review had been completed on the original Development Plan, which had examined the benefits, human safety and environmental aspects of the development in detail, the Board determined a full public hearing was not required for this amendment. Accordingly, the Board determined that in this case, the public interest would be better served by seeking written comments concerning this amendment rather than holding a formal public hearing. In making the determination that written comments would best

serve the public interest, the Board considered a number of factors which included, among others, whether a limited review would be fair and accessible to the public and whether the opinion of the stakeholders as previously stated in the public review would be affected by this amendment.

Staff acknowledges that the original White Rose Development Plan Application was subject to a formal hearing by a Commissioner. The mandate of the Commissioner was established by the terms of reference developed by the Board prior to the commencement of the hearing. As this tie-back application is an amendment to the approved White Rose Development Plan, the Board concluded it was appropriate to conduct the review of this amendment in accordance with the original terms of reference. Hence, the scope of this review was not expanded.

While every aspect of operations in the offshore oil industry is completed with the authorization and oversight of the Board, the Board must operate strictly within the authority given to it by the Atlantic Accord legislation. This authority includes the responsibility to provide advice and recommendations to both the federal and provincial governments as required. However, the Board cannot exceed its authority nor alter its mandate. The making or changing of relevant legislation is the sole prerogative of governments. The issues of energy policy, royalty regimes and revenue sharing are not matters which the Board can dictate and were determined to be outside the terms of reference for this amendment.

Appendix A: Public Comments

February 14, 2007

P. O. Box 37
Frenchman's Cove, NL
A0L1E0

CNLOPB

White Rose SWRX DPA Comments
Canada-Newfoundland and Labrador Offshore Petroleum Board
5th Floor, TD Place
140 Water St., St. John's, NL
A1C 6H6
709-778-1400
E-mail: swrxcomments@cnlopb.nl.ca

I am glad to have the opportunity to comment on the South White Rose Tie Back and I would be even happier if the CNLOPB would adhere to the law when conducting such processes.

The original public review of the White Rose Development Application was flawed in that the public review commission was denied the right to fully understand and consider all aspects of the proposed development by the issuance of the limitation clause imposed on the commissioner's terms of reference.

The legislated review process explicitly intends to disclose all facets of the impending development so as the public and review commission can recommend or advise their elected officials as to the appropriate course of action. The elected officials, the government, mere representatives of the public trust are obliged to act in the best interest of their constituents and in accordance to the law.

The CNLOPB has subverted the rights of democracy, freedom of choice and freedom of speech by issuing the limitation clause contained within the terms of reference for public reviews of development applications.

Why does the concept to full disclosure and public debate offend the regulator and industry? What are you afraid of?

In the context of maximizing the social and economic benefits from such projects, what harm can come from enlightening and empowering the public to make recommendations, collective or otherwise?

Likewise, this blatant ignorance of the law and democracy continues through this current process

This application is for lands exterior to the production license currently in place and, as such, is subject to a public review. I can not ponder any circumstance suggesting that a full public review is not in the public's best interest.

It appears that the White Rose project, like the Hibernia and Terra Nova developments, was intentionally marginalized and misrepresented from the onset in order to circumvent any contemplation of increased and expanded development within this province. The continued marginalization prevented the consideration of a viable down stream secondary processing sector that would have optimized the social and economic benefits for this province.

The CNLOPB's cavalier attitude and disregard of the law allowed this injustice to continue.

It is also highly suspect that this proposed development could merely be an attempt to access the large gas cap present in the south field. The proponents have a long track record of contending that such expenditures requires extraordinary volumes of resource and, in this present case, there is only 22 to 25 million barrels of oil said to exist within the new land blocks.

To date there has been no public review or consideration pertaining to the possible mode of development, royalty structure or processing destination for the untapped natural gas reserves.

The Law

The basis for all regulatory approvals relating to oil and gas development on the Grand Banks of Newfoundland is subject to the full force of the Atlantic Accord Acts.

The preamble to the implementing legislations is the Canada Newfoundland Atlantic Accord Memorandum of Agreement. This document outlines the purposes of the Accord legislation and contained therein, The Purposes of the Accord, section 2, paragraph d; *to recognize the equality of both governments in the management of the resource, and ensure that the pace and manor of development optimize the social and economic benefits to Canada as a whole and to Newfoundland and Labrador in Particular.*

This purpose is self explanatory and was included, in part, to safeguard Newfoundland and Labrador from being thrust into a bad deal(s) such as the infamous, one sided, Upper Churchill River Hydro Development. As a result all our power is exported for a dismal return and we are unable to develop industry by utilizing our resource.

Subsequently, the enacting legislation, the **Canada Newfoundland Labrador Atlantic Accord Implementation Act**, made special provisions to engage and empower the public through a comprehensive public review of development applications. The specific section is;

44. (1) Subject to a directive issued under subsection 42(1), the board shall conduct a public review in relation to a potential development of a pool or field *unless the board is of the opinion that the public hearing is not required on a ground the board considers to be in the public interest.*

(2) Where a public review is conducted in relation to a potential development of a pool or field, the board may

(a) establish terms of reference and a timetable that will permit a comprehensive review of all aspects of the development, including those within the authority of the Parliament of Canada or of the Legislature;

The original Public Review for the White Rose Development Plan is in direct contravention of the legislation and, in accordance to the legislation, is illegal.

The fundamental right of Newfoundlanders and Labradoreans to have all aspects of the development considered has been subverted. The right of the public and the public review commission to consider issues pertaining to royalty regime, energy policy and revenue sharing were stricken by way of an illegal limitation clause.

This clause is contained within the Public Review Commissions Terms of Reference for the White Rose Development Application;

5: Limitation

The Commissioner's mandate shall not include an examination of questions of energy policy, jurisdiction, the fiscal or royalty regime of governments, the division of revenues between the Government of Canada and the Government of Newfoundland and Labrador, or matters which go beyond the potential or proposed development of the White Rose Significant Discovery Area.

In accordance with the Accord acts, and Administrative Law, the board can not deviate from the letter of the legislation. The powers of the board are described in the **Canada Newfoundland and Labrador Atlantic Accord Implementation Act** and are as follows.

Functions of board

17. (1) The board shall perform the duties and functions that are conferred or imposed on the board under the Atlantic Accord or this Act.

(2) The board may make recommendations to both governments with respect to proposed amendments to this Act, the federal Act and regulations made under those Acts.

Neither this act nor any other act empowers the CNLOPB or government to assume a blank check approach and deviate from the spirit and intent of the act.

The issuance of a limitation clause that subverts the explicit intent of section 44(2)a is a blatant misuse of power that served to;

- Impose a deal on an unenlightened population in the midst of social and economic distress.
- Destabilize the industry by providing illegal regulatory approval(s) for a major project(s).

The right of the population and the public review commission to consider all aspects of a development of a field or pool of oil is paramount to fulfilling the intent of the guiding legislation as described the Atlantic Accord MOA, previously referred to in this submission.

Furthermore the right of industry to a stable regulatory system has been compromised by a misguided regulatory approval process.

The later point is somewhat mute in that the industrial partners do have a responsibility to ensure that any deals entered into are in full compliance of the laws. In consideration of their economic might and ability to access the best legal advice, industry willingly accepted this subverted regulatory process and therefore equally culpable in this injustice

Call for public comments

The current call for public comment also contains false and misleading statements about the role and authority of the CNLOPB. Within the preface statement of this invitation for public comments the regulator sets a “terms of reference” that prohibits discussion on the most important considerations. The section reads as follows;

This opportunity for comment is limited to the merits of the application and does not involve an assessment of fiscal issues such as royalties, corporate tax or other matters which are beyond the mandate of the Board.

What circumstance empowers the CNLOPB to deviate from the enacting legislation? The section that empowers the CNLOPB with regard to a review states; **a comprehensive review of all aspects of the development, including those within the authority of the Parliament of Canada or of the Legislature;**

Furthermore the MOA stated explicitly that a project optimize the social and economic benefits to Canada as a whole and Newfoundland and Labrador in particular. By subverting section 44 via gag orders the primary intent of the legislation has been rendered inert from the beginning.

The CNLOPB, the Regulator, is bound by the legislation and under no circumstance can it deviate from its explicit intent.

The recommendations that come from a public review are not intended to advise the CNLOPB but are focused towards government departments as aids in decision making. Therefore the board has unwittingly, or otherwise, prevented successive governments from acting on complete information.

To claim that considerations such as energy policy, royalty regime and revenue sharing are issues that are beyond the mandate of the board, the CNLOPB is subverting the spirit and intent of the legislation. The discussion and consideration of such matters are of the most vital importance in ensuring that the original and guiding principals of the Accord Acts are adhered to.

It is of paramount importance in empowering Newfoundland and Labrador residents to fully understand the lasting impact that a development will or will not have on their economy.

It is of paramount importance in empowering Newfoundland and Labrador residents to decide if they want to accept a proposal or demand more.

By denying the level of disclosure as ordered by the Atlantic Accord Public Review of development applications the CNLOPB has hijacked democracy.

The development of the oil and gas fields contained within the offshore jurisdiction of Newfoundland and Labrador is important. To date three projects have been granted regulatory approval through subverted and unlawful processes.

The great hope of the people to achieve a downstream industry, an equitable royalty regime (equivalent to that of Norway) and the ability to benefit from full technology transfer has not materialized.

The three current projects represent the loins share of the oil known to exist and the related projects have miraculously grown in volume from their purported meager and marginal beginnings.

Newfoundlanders and Labradoreans are capable of making an informed decision when given complete information. Our trade's people work in all aspects of the oil and gas industry world wide and know what has materialized in other jurisdictions. They also know now, long after the fact, that we were misled by the apparent marginalization of the resource potential.

This province has been denied the right of self determination as intended by the Accord Acts. There are ample hydrocarbon resources being produced to warrant secondary processing in Newfoundland and Labrador. If the public were allowed to fully participate in the regulatory review process from the beginning we could have had conditions attached to the regulatory approvals that would render realistic royalty rents and a downstream processing industry.

Subsequently we ended up with is an offshore oil development without an escalator clause to safeguard against misrepresented quantities and capacities.

The CNLOPB has effectively undermined the legislation they are obliged to uphold. Successive governments have allowed this atrocity to continue. However neither the regulator nor the government has the right or authority to retard the explicit intent of legislation. Such acts are in direct violation of administrative law.

Administrative law is based on the principle that government action, whatever form it takes, must (strictly speaking) be legal, and that citizens who are affected by unlawful acts of government officials must have effective remedies if the Canadian system of public administration is to be accepted and maintained.

Therefore, based upon the arguments listed above, I call upon the government of Newfoundland and Labrador and the Government of Canada to initiate a judicial review or a public inquiry, with the full powers of the public inquiries act, of all regulatory approvals rendered by the CNLOPB.

Furthermore I call on government to allow an adequate time frame for such a review so as all matters can be fully studied or investigated and with adequate intervener funding for groups or individuals wanting to participate.

Paul Hunt

Appendix B: Glossary

Aquifer

A porous rock that is water bearing.

bbls (Barrels)

1 bbl = 0.15898 m³

BNA

Ben Nevis and Avalon

BOARD

The Canada-Newfoundland and Labrador Offshore Petroleum Board

BOP

Blow out preventer

C-NLOPB

Canada-Newfoundland and Labrador Offshore Petroleum Board

Certifying Authorities

Bodies licensed by the Board to conduct examination of designs, plans and facilities and to issue Certificates of Fitness.

Completion

The activities necessary to prepare a well for the production of oil and gas or injection of a fluid.

Delineation well

Well drilled to determine the extent of a reservoir.

Development well

Well drilled for the purpose of production or observation or for the injection or disposal of fluid into or from a petroleum accumulation.

ESD

Emergency shutdown system

Fault

In the geological sense, a break in the continuity of rock types.

FEED

Front end engineering and design.

Flooding

The injection of water or gas into or adjacent to, a productive formation or reservoir to increase oil recovery.

Injection

The process of pumping gas or water into an oil-producing reservoir to provide a driving mechanism for increased oil production.

Logging

A systematic recording of data from the driller's log, mud log, electrical well log, or radioactivity log.

mmbbls

Million barrels of oil

MODU

Mobile offshore drilling unit

m³

1 m³ = 6.2898 bbls

OGIP

Original gas in place

OOIP

Original oil in place

Petrel

Trademark of Schlumberger product group geologic modelling software.

Petrophysics

Study of reservoir properties from various logging methods.

Pool

A natural underground reservoir containing or appearing to contain an accumulation of petroleum that is separated or appears to be separated from any such other accumulation

Produced water

Water associated with oil and gas reservoirs that is produced along with the oil and gas.

Production platform

An offshore structure equipped to produce and process oil and gas.

Production well

A well drilled and completed for the purpose of producing crude oil or natural gas.

Proven Reserves

Hydrocarbons that have been confirmed by drilling and testing or where sufficient geological and geophysical data exist to project the existence of hydrocarbons in adjacent fault blocks. A high confidence level is placed on recovery of these hydrocarbons.

Probable Reserves

Hydrocarbons that are projected to exist in fault blocks adjacent to those that have been tested by wells and into which the geologic trends may extend. Also, where fluid contacts have not been defined within the area drilled, these contacts may reasonably be projected to exist. However, additional drilling is required to substantiate the existence of hydrocarbons. These hydrocarbons may reasonably be expected to be recovered under normal operating conditions yet have a degree of risk, either geologic or reservoir performance related, associated with their exploitation.

QCDC

Quick connect/disconnect

Reserves

The volumes of hydrocarbons proven by drilling, testing and interpretation of geological, geophysical and engineering data, that are considered to be recoverable using current technology and under present and anticipated economic conditions. Hibernia, TerraNova, and Whiterose are classified as reserves.

Reservoir

A porous, permeable rock formation in which hydrocarbons have accumulated.

Reservoir pressure

The pressure of fluids in a reservoir.

Sandstone

A compacted sedimentary rock composed of detrital grains of sand size.

Seismic

Pertaining to or characteristic of earth vibration. Also, process whereby information regarding subsurface geological structures may be deduced from sound signals transmitted through the earth.

STOOIP

Stock tank original oil in place.

SDC

South drill centre