

Applications Nos.1394112 and 1409180

Alberta Energy And Utilities Board

**In the Matter of Application Nos. 1394112 and 1409180 to the Alberta Energy and
Utilities Board with respect to the Cold Lake Oil Sands Area – Clearwater Deposit**

SUBMISSION

OF

HUSKY OIL OPERATIONS LIMITED

September 5, 2006

Interest of Husky Oil Operations Limited

1. Husky Oil Operations Limited (Husky) believes that the Clearwater gas production adjacent to our oil sands leases in the Fisher area is harmful to bitumen recovery. We, therefore, ask that the Clearwater gas production be shut in until after the bitumen recovery is complete. The gas can be produced in the future.
2. Husky holds the oil sands rights in 56 sections of land in the Clearwater bitumen deposit in the Fisher area (Lease Nos. 718811A344 and 7188110343). We plan to file an application for a demonstration project to produce bitumen using a new experimental technology which is a Hybrid of Steam Assisted Gravity Drainage (HSAGD) where the conventional Steam Assisted Gravity Drainage (SAGD) process is supplemented by using Cyclic Steam Stimulation (CSS) wells. The acceleration of bitumen recovery expected from HSAGD is necessary for the project to be economic. The process also has the advantage of higher recoveries similar to SAGD operations.
3. Husky's initial plans include developing the most promising 15 sections in Township 69, Ranges 4 and 5 W4M, with a possibility to extend the process to the remainder of our lease (Figure 1). The Original Bitumen in Place is calculated to be 1.1 billion bbl in the initial development area and 2.5 billion bbl in the total lease area shown in Figure 1. It should be noted that our initial development area as well as the remainder of the lease is immediately north of CNRL's Primrose CSS operations.
4. Pressure monitoring wells drilled on our lands indicate that the bitumen zone is in communication with the nearby gas pools and that there is significant pressure depletion in the bitumen zone as a result of gas production. Pressure data is presented in Figure 2. The locations of the pressure monitoring wells are shown in Figure 3. Furthermore, a geological study was undertaken to delineate the gas-oil-contact (GOC) in the Clearwater gas pools in the area as shown in Figure 4. Wells that are currently producing from the Clearwater formation are also shown in Figure 4.
5. Husky agrees with CNRL that the pressure transient travels through the mobile water phase in the Clearwater formation^{1,2}. CNRL's evidence indicates that no pressure depletion will occur at a distance of 2.5 km after 10 years (Figure 3.2 in Reference 3). However, our observations from pressure monitoring wells indicate that the 04-06-069-04 W4M well which is 3 km away from the nearest GOC has experienced continuous pressure drop. The current pressure at this location is 104 kPa below the initial reservoir pressure after 11 years. Therefore, one can conclude that the hydraulic diffusivity in the Husky area is higher and closer to

¹ AEUB Application Numbers 1394112 and 1409180, Cold Lake Oil Sands Area : Clearwater Deposit, Evidence of Canadian Natural Resources Limited, July 4, 2006

² Vittoratos, E., et. al., "Cold Lake Cyclic Steam Stimulation: A Multiwell Process", SPE Reservoir Engineering, Feb. 1990

those values reported in the literature¹ than that calculated by CNRL in their evidence.

6. Below the same GOC the pressures in the bitumen zone can be as much as 1450 kPa below the initial reservoir pressure as in the 03-04-069-04 W4M location. There is a significant localized mud zone between the bottom two and the top two pressure recorders in this well which explains why the bottom of the formation is still close to the original reservoir pressure. However, even the pressure reading at 509 m which is below the shale barrier is still 47 kPa below the initial reservoir pressure. Husky considers the entire zone as prospective for HSAGD operations. This well is located towards the eastern edge of our lease where the net to gross pay thickness ratios are lower. Other similar wells on the eastern side of the lease that have experienced significant pressure drop are 14-09-069-04 W4M (342 kPa pressure drop) and 04-09-069-04 W4M (278 kPa pressure drop).
7. In areas to the west where there is more vertical continuity in the bitumen zone (e.g. 10-05-069-04 W4M, 16-07-069-04 W4M, 03-07-069-04 W4M and 04-06-069-04 W4M) the pressure decline can be observed throughout the whole zone. Consequently, observations that the bitumen zone is in communication with the nearby gas pools and that there is significant pressure drop in the bitumen zone are confirmed by pressure monitoring well locations shown in Figure 3.
8. Given the experimental nature of the new process, Husky is concerned that the loss of solution gas due to lower reservoir pressure caused by nearby gas production will be sufficient to adversely impact the bitumen recovery obtained by HSAGD. In order to have the least risk and most flexibility in implementing this process, Husky believes that the reservoir pressure must not be depleted any more than it has currently. If HSAGD is not successful, then Husky may convert the operation to CSS process which has been implemented in CNRL's Primrose reservoir located immediately south of our planned development area. Furthermore, CNRL's evidence clearly indicates the adverse effects of lower pressures on CSS operations in the Clearwater formation of the Primrose area.
9. Consequently, Husky requests that, in addition to those mentioned in CNRL's application, the gas producers from the Clearwater formation listed below be shut in so that we have the best opportunity to maximize bitumen recovery with the new experimental process. All of these wells produce from the gas pools with GOC's that are located on our lease or within a distance that has been shown to influence the pressures significantly in the bitumen zone in our leases as presented in Figure 4.
10. Husky requests the following wells be shut in:

00/02-24-068-04W4M/2	00/06-28-069-04W4M/3
00/03-25-068-04W4M/2	00/06-20-069-05W4M/0
00/10-26-068-04W4M/0	00/05-13-069-06W4M/0

00/10-33-068-04W4M/2
02/16-28-068-05 W4M/0
00/11-33-068-05 W4M/0
03/08-03-069-04W4M/2
00/05-10-069-04W4M/2

00/12-04-070-04W4M/2
00/05-16-070-05W4M/2
00/03-11-070-06W4M/2
00/06-21-070-05W4M/0
00/05-22-070-05W4M/2

Husky's participation at the hearing

11. Husky wishes to reserve the right to seat its own witness panel, and to cross-examine the applicant and intervener witness panels. Husky would also request the opportunity to submit final argument.

Communications

12. All Communications with Husky should be directed as follows:

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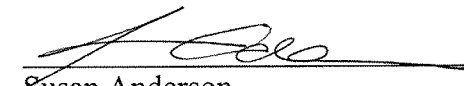
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All of which is respectfully submitted this 5th day of September, 2006

HUSKY OIL OPERATIONS LIMITED

Per:


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