

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

CANADIAN 88 ENERGY CORP.

APPLICATION TO AMEND THE APPROVAL FOR A SOUR GAS PROCESSING/SULPHUR RECOVERY FACILITY GARRINGTON FIELD

**Decision 99-29
ApplicationNo. 990177**

1 INTRODUCTION

1.1 Application

Canadian 88 Energy Corp. (Canadian 88) applied on 7 April 1999 to the Alberta Energy and Utilities Board (the Board/EUB) for a review of Board Decision 98-13 and associated Amended Approval No. 1996-128 for the Olds Garrington sour natural gas processing/sulphur recovery plant. Canadian 88 applied pursuant to Section 42 of the Energy Resources Act for an amendment to its approval on the basis of new circumstances that had arisen since the previous decision had been issued. The plant is located in Legal Subdivision 6, Section 18, Township 32, Range 1, West of the 5th Meridian.

In its application, Canadian 88 proposed to decrease the approved maximum raw gas inlet rate to the plant from 3400 thousand cubic metres per day ($10^3 \text{ m}^3/\text{d}$) to 2381 $10^3 \text{ m}^3/\text{d}$. The company also proposed to reduce the plant sulphur inlet from 600 tonnes per day (t/d) to 404.9 t/d. The proposed values reflected previously approved levels.

In addition, Canadian 88 proposed to reduce its approved quarterly sulphur recovery efficiency from 98.4 to 97.1 per cent, with an increase in recovery to 97.3 per cent, prior to 1 November 2000. The previously approved value for sulphur recovery efficiency was 96.5 per cent. Finally, Canadian 88 requested that the amended approval provide the company with the ability to expand the plant to the currently approved raw gas inlet and sulphur inlet values (i.e., 3400 $10^3 \text{ m}^3/\text{d}$ and 600 t/d respectively) until 30 June 2002.

1.2 Background

Canadian 88 submitted its previous Application No. 1007569 to the EUB on 25 April 1997. That application proposed to increase the raw gas inlet rate at the Olds Garrington plant from 2381 $10^3 \text{ m}^3/\text{d}$ to 3400 $10^3 \text{ m}^3/\text{d}$, while maintaining the approved sulphur inlet rate of 404.9 t/d and the sulphur recovery efficiency of 96.5 per cent on a quarterly basis.

Subsequently, on 23 December 1997 Canadian 88 amended its application to also increase the approved sulphur inlet to 600 t/d and the sulphur recovery efficiency to 98.4 per cent on a quarterly basis.

Application No. 1007569 was considered at a public hearing on 3 and 4 of March 1998, resulting in Decision 98-13 approving the application issued on 30 June 1998. The approval was conditional on Canadian 88 meeting undertakings made in its application and at the hearing. The new approval for the facility was issued on 9 July 1998.

The amended approval required a sulphur recovery efficiency of 98.4 per cent on a quarterly basis. Although no effective date for meeting the sulphur recovery requirement was set out in the 9 July 1998 approval, Canadian 88 stated during testimony at the 1998 hearing that the sulphur plant expansion and upgrade could be completed within 14 months of the decision. Following the issuance of the Board approval, Alberta Environment (AENV) issued its approval for the plant on 5 August 1998, with daily emission limits that corresponded to the project approved by the EUB. The AENV approval had an effective date of 1 September 1999 for the plant to meet the new emission limits.

During the early part of 1999, EUB staff requested a schedule from Canadian 88 for the applied-for sulphur plant upgrade. On 5 March 1999 the EUB received a response from Canadian 88 indicating that the sulphur plant upgrade would need to be delayed until gas deliverability to the plant improved.

On 10 March 1999 EUB staff responded and indicated that Canadian 88 must either meet its approved sulphur recovery efficiency by 1 September 1999 or apply for an amendment to its approval. That application, which is the subject of this hearing, was received by the EUB on 7 April 1999.

A prehearing meeting was held on 16 June 1999 to discuss the potential issues to be considered at the hearing, the informational needs of the parties, and timing. During the prehearing meeting, Canadian 88 requested an interim approval beyond 1 September 1999 in order that it could continue to operate the plant at its current sulphur recovery capability until a decision was made on its application. The Olds Area Residents Coalition (OARC) objected to this request based on its perception of the failure of Canadian 88 to meet its prior commitments. The prehearing decision (Attachment 1) restricted the sulphur inlet to a maximum of 330 t/d and lowered the sulphur recovery efficiency to a minimum quarterly sulphur recovery efficiency of 97.1 per cent until a decision could be reached on the application.

1.3 Interventions

The Board received a submission from OARC opposing the application. OARC comprises local landowners and residents who reside or own land in the vicinity of Canadian 88's facility and/or the Town of Olds. The Board also received written submissions from Samson Canada Ltd., Northstar Energy Corporation, and Precision Drilling Limited Partnership supporting the application.

1.4 Hearing

The application and intervention were considered at a hearing in Olds, Alberta, on 29 and 30 September and 1 October 1999 before Board Member B. F. Bietz, Ph.D., P.Biol., and Acting Board Members G. C. Dunn, P.Eng., and W. J. Schnitzler, P.Eng. Those who appeared at the hearing and abbreviations used in this report are listed in the following table:

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)

Canadian 88 Energy Corp. (Canadian 88)
F. M. Saville, Q.C.
L. Olthafer

Olds Area Residents Coalition (OARC)
G. S. Fitch

Alberta Energy and Utilities Board staff
W. Y. Kennedy, Board Counsel
B. K. Eastlick, P.Eng.
A. A. Beken, P.Eng., P.Geol.
J. L. Spangelo, P.Eng.

Witnesses

G. R. Gill, P.Eng.
M. Hawkings
M. D. Perlette
S. O. Ahmed, P.Eng.,
of Delta Hudson Engineering Ltd.
C.W. Chapman, P.Eng.,
of Chapman Petroleum Engineering Ltd.
G. E. Bohme, P.Eng.,
of Sulphur Experts Inc.

D. Hamilton
M. Hays
B. Latimer
G. Latimer
W. T. Oulton, P.Eng.,
B. G. Goar, P.Eng.,
of Goar, Allison & Associates Inc.
C. P. Outtrim, P.Eng.,
of Outtrim Szabo Associates Ltd.

Mr. O. Johnson appeared at the hearing and presented a submission but did not otherwise participate in the hearing.

2 BASIS FOR THE REVIEW AND ISSUES

In conducting a review under Section 42 of the Energy Resources Conservation Act, the Board must determine whether the proposed amendment is in the public interest, having regard to the social and economic effects of the proposed amendment and its effect on the environment. In doing so, the Board must have due regard for the relevant purpose provisions contained within the Oil and Gas Conservation Act and the Energy Resources Conservation Act.

In considering an application under Section 42 to amend an existing approval, the Board believes it necessary to first examine the new information or evidence that constitutes the grounds for the review. In doing so, the Board recognizes that the passage of time and changes in circumstance may cause the Board to revisit earlier decisions and potentially also reach different conclusions where appropriate. In this particular instance, the Board in a previous decision accepted an undertaking by Canadian 88 to upgrade sulphur recovery at the Olds Garrington gas plant. In that

decision, the Board also indicated, however, that based on the evidence presented at the hearing, it would likely have been prepared to require upgrading of the plant if this had not already been applied for by the company. *IL 88-13: Sulphur Recovery Guidelines — Gas Processing Operations* suggests where upgrading of plant sulphur recovery may be appropriate. This includes both a significant increase in plant processing capacity and/or a significant extension in the plant life. While these examples are neither exhaustive nor restrictive, they do provide guidance to parties as to the issues likely to be particularly relevant to the Board's decision.

Accordingly, having regard to the evidence put forth, the Board believes that the first issues it should consider in assessing the application are relevant changes in

- the relative size of the capacity expansion,
- the available gas supply and associated plant life, and
- related economic considerations.

Should the Board conclude, based on the above factors, that there may be sufficient justification to amend the approval, the Board would then consider whether such a change is in the public interest. In making its determination, the Board would also have due regard for the input received from the other participants in the hearing. The Board will also deal specifically with plant operations, including sulphur recovery efficiency, flaring, and public involvement.

3 CAPACITY EXPANSION

3.1 Views of the Applicant

Canadian 88 stated that the first phase of its approved plant expansion took place in September 1998. This phase included refurbishment and recommissioning of the second amine train and addition of 1490 kW (2000 horsepower [hp]) of gas compression. It also included the addition of liquids recovery equipment that had not as yet been commissioned and preliminary engineering work on the sulphur plant upgrade.

Canadian 88 stated that the increased deliverability it had anticipated from the reserves connected to the plant had not yet occurred, despite the drilling of some 21 wells in the past two years. The result was that the average volume produced to the plant was less than $1900 \text{ } 10^3 \text{ m}^3/\text{d}$. This was significantly lower than the inlet rate of $3400 \text{ } 10^3 \text{ m}^3/\text{d}$ requested from and approved by the Board in *Decision 98-13*. As a result, Canadian 88 had not yet undertaken the remaining phases of the approved expansion plan.

Canadian 88 remained optimistic that sufficient deliverability from its own reserves or other new third-party gas that may become available in due course will justify completing the proposed plant expansion. Therefore the company wished to maintain its approval to expand the plant until 30 June 2002. However, it stated that it was unrealistic to expect that in the near term it could improve deliverability to the extent that it could economically justify proceeding with the remainder of the proposed plant expansion at this time.

Canadian 88 stated that although no construction on the sulphur recovery upgrade had taken place, it had continued work on this part of the project. It explained that it had taken the company some 18 months to negotiate a suitable agreement with the SuperClaus technology provider.

During that time, the company noted, some engineering work related to the upgrade had also continued. Canadian 88 said that it expected an additional 10 months would be required to complete the sulphur recovery upgrade. The plant shutdown required for the upgrade would last two to three weeks and would occur in the latter portion of the 10-month period. It also noted that a plant shutdown during the winter months must be avoided.

Canadian 88 acknowledged that the expansion projects it had completed to date had resulted in an effective increase in the plant inlet capacity from 1970 to $2620 \times 10^3 \text{ m}^3/\text{d}$. Canadian 88 stated, however, that given the current sulphur plant bottleneck, it cannot process sour gas volumes at this higher rate. Therefore, it viewed this as only an increase in sweet gas processing capacity, which therefore did not warrant a review under *IL 88-13*.

In its application and again at the hearing, Canadian 88 took the position that while it had committed to eventually installing increased sulphur recovery at the plant, it had not committed to a particular date by which such an expansion would be accomplished. As a result, the company disagreed with the interpretation of EUB staff that such equipment should have been in place approximately 14 months after issuance of the approval, i.e., by 1 September 1999. The company believed that its previous estimate of 14 months to install sulphur recovery was provided as simply that, an estimate of required time. It was not, in the company's view, a commitment to install upgrading within that time period. The actual installation date, the company argued, would have to be a function of project economics.

3.2 Views of the Interveners

OARC pointed out that, in its view, the approved expansion of the plant is essentially 50 per cent complete. As a result, capacity on the front end of the plant has been increased by 32 per cent. OARC argued that since the plant is in the middle of a greater than 25 per cent expansion (the criterion set out in *IL 88-13*) and given the likelihood that the remainder of the expansion will proceed, plant sulphur recovery should be upgraded.

OARC submitted that Canadian 88's application to amend its approval should be denied and the company should be required to upgrade sulphur recovery to 98.4 per cent quarterly and 98.7 per cent annually, as per the original decision. Furthermore, OARC believed that the company should be required to achieve this within 12 months of the decision. In the interim, OARC argued that the 330 t/d maximum inlet sulphur limitation should be retained until the sulphur plant upgrade is complete.

OARC noted that its members had left the previous hearing believing that the company was prepared to voluntarily install sulphur upgrading and that it would do so within 14 months of issuance of the approval. OARC indicated that it did not find that either the Board's decision or the subsequent approval issued on 9 July 1998 was at all equivocal in setting out this requirement for Canadian 88.

3.3 Views of the Board

The Board notes that substantial process modifications to this plant have occurred since the issuance of the current approval. It is clear that Canadian 88 has invested significant capital and the plant now has the ability to process significant additional quantities of gas (33 per cent). Canadian 88 has clearly moved to optimize the use of its facility and, in fact, expand the operation. The Board notes that the additions completed since June 1998, including the addition of 1490 kW (2000 hp) of inlet compression, would have on their own required an EUB application and could have resulted in a review of other aspects of the Olds Garrington gas plant.

The Board notes, as summarized in Exhibit 12, that capacity utilization at the Olds Garrington plant has increased considerably since Canadian 88 acquired the facility. In 1994, the year before the Canadian 88 acquisition, raw gas inlet rates were in the 700 to 800 $10^3 \text{ m}^3/\text{d}$ range and the sulphur inlet was in the 150 to 200 t/d range. In the first seven months of 1999, however, the raw gas inlet was in the 1660 to 1860 $10^3 \text{ m}^3/\text{d}$ range and the inlet sulphur was 340 to 400 t/d. The Board views that the significance of increased capacity utilization, in this case more than a doubling relative to historical rates prior to 1995, must be considered along with plant modifications in determining sulphur recovery requirements for grandfathered plants.

The Board notes that the modifications to date only allows Canadian 88 to process additional volumes of gas provided that the combined inlet gas H_2S content is sufficiently low so that existing approval limits on sulphur inlet and current sulphur recovery capabilities are not exceeded. However, the Board does not believe that such a distinction would obviate the need to consider an amendment of the plant's sulphur recovery efficiency. In the Board's view, the level of change to plant operations is significant.

The Board also notes that Canadian 88 has argued that it had interpreted the Board's previous approval as requiring the company to upgrade sulphur recovery but not clearly stating when such an upgrade would be required. While the Board agrees that no specific date was set in the approval, it believes that a reasonable reading of both the decision and the approval should have led the company to the conclusion that the Board expected the company would proceed immediately to upgrade its sulphur recovery. The Board would have expected, had Canadian 88 had any question at all as to when the upgrade was to be completed, that the company would have requested clarification from the Board. The Board notes that the approval issued by Alberta Environment also clearly anticipated that sulphur recovery would be upgraded by 1 September 1999.

To avoid a similar problem in the future, should the Board, after reviewing all the evidence, require Canadian 88 to upgrade its sulphur recovery at the Olds Garrington plant, it will establish specific dates for completion of the new requirements. The Board notes Canadian 88's testimony that the upgrade could be installed within a period of 10 months, provided that the seventh and eighth months of the project did not fall during cold winter weather or spring road bans. Given the date of this decision report and assuming a prompt project start, the Board expects that the project could be reasonably completed on a 10-month schedule, or by 31 October 2000.

4 GAS SUPPLY AND PLANT LIFE

4.1 Views of the Applicant

Reserves Additions/Plant Life Extension

Canadian 88 submitted that it had been unable to increase gas deliverability to the extent it hoped and that the estimates of gas in place had remained essentially the same as those estimated in March 1998 (20.37 currently vs. 20.75 10^9 m³ in March 1998).

Canadian 88 stated that it had made a change in its interpretation of what reserves should be allocated to reserves connected prior to August 1988. At the time it applied for the plant expansion, its interpretation of the total recoverable gas reserves connected to the plant as of August 1988 were 15.54 10^9 m³. Additional reserves connected to the plant between August 1988 and August 1997 were thought to be 5.21 10^9 m³, a 34 per cent increase. Canadian 88 now believed that the total recoverable gas reserves connected to the plant as of August 1988 were 18.55 10^9 m³ and gas reserves added between August 1988 and February 1999 were 1.82 10^9 m³, a 10 per cent increase. The reduction in reserves added since August 1988 was due to reallocating reserve additions that were a result of new wells drilled into existing pools since August 1988 to reserves connected prior to August 1988.

Canadian 88 stated that the 1.82 10^9 m³ of reserve additions in relation to plant capacity of 2381 10^3 m³/d translates to an increase in the plant life index of 2.1 years. As a result, Canadian 88 did not believe that, to date, it had significantly increased available gas reserves for the plant and therefore had not triggered a review of the plant sulphur recovery. Canadian 88 acknowledged that total reserves (from existing and new pool additions) had increased by 2.9 10^9 m³ since the property was purchased in 1995.

Canadian 88 also submitted that as of 1 February 1999 the total remaining recoverable raw gas reserves connected to the plant were 5.75 10^9 m³. According to Canadian 88, 4.53 10^9 m³ (79 per cent) of this volume was made up of reserves connected to the plant prior to August 1988.

The applicant acknowledged that its previous estimates of remaining plant life had ranged from 25 years as of August 1988 to 35 years as of September 1997. These estimates, it noted, were based on the decline analysis and the economic and production cutoffs it had used at that time. The long plant life index was due to the very low production rate in 1988. Canadian 88 acknowledged that using the “remaining” recoverable reserves and the total plant capacity, the remaining plant life was 9.4 years as of 1988 and 7.3 years at present. Canadian 88 also agreed, however, that the remaining economic life of the plant might still be greater than 30 years, depending on the rate of reserve additions and declining production.

Deliverability

Canadian 88 submitted that its initial expectations with respect to increased deliverability were based mainly on the result of an initial horizontal well. This well (8-1-31-1 W5M) was drilled into an existing Wabamun pool and its initial production was far in excess of other wells producing in the pool. The productivity of subsequent wells, however, was below the company's

expectations. According to Canadian 88, attempts to develop the gas potential in the shallower, less sour potential uphole zones were also less successful than expected.

The company submitted that as of January 1999 the total deliverability of all the wells connected to the subject plant was approximately $1746 \times 10^3 \text{ m}^3/\text{d}$. It also confirmed that during that time there were no facility-related restrictions on these wells. Canadian 88 estimated an additional deliverability potential of $256 \times 10^3 \text{ m}^3/\text{d}$ from unconnected or shut-in reserves.

Horizontal Wells/Reserve Additions

Canadian 88 submitted that it has been drilling horizontal wells in the area in order to improve deliverability and hence the commercial viability of its operations in the area. The drilling programs were designed so that wellbores have the potential to intersect productive fractures in the Wabamun reservoir. However, it emphasized that this reservoir is very complex and difficult to predict.

Canadian 88 observed that successful horizontal wells would in some circumstances improve recovery from the subject gas pools but would primarily accelerate the rate of depletion. It also submitted that the disappointing deliverability of wells drilled in the last two years could in part be explained by the low reservoir pressures encountered. Canadian 88 said that pressure data indicated that portions of the pool were already being drained, at least to some extent, by existing wells and competitive wells in the same pools.

4.2 Views of the Interveners

In considering whether the new reserve additions should trigger a review of the plant's sulphur recovery requirements, OARC argued that the key issue was whether the reserves had resulted in a significant extension to plant life. Whether the additional reserves came from a new field or pool or one already connected to the plant was not, in its view, relevant. One of OARC's members suggested that his family had lived in their home 20 years before the plant was constructed next to them in the 1960s. They were anticipating that the plant was going to be shut down in the near future, only to learn that it could potentially continue to operate for another 30 years.

OARC evaluated this subject plant's economic life based on the reserves connected at different times and production rate decline plots. Using this approach and based on the reserves connected as of August 1988, OARC believed that the remaining economic life of the plant at that time was 13 years. Carrying out the same analysis for reserves connected to the plant as of March 1999, 10 years later, OARC estimated that there were still sufficient reserves connected to the plant to extend its economic life to somewhere between 17 and 37 years. The interveners observed that Canadian 88's own estimate of the remaining plant life at the time of the 1998 expansion application was 31.7 years. Based on this analysis, OARC submitted that the subject plant's life had clearly been significantly extended beyond earlier estimates and therefore the more stringent sulphur recovery requirements should apply.

4.3 Views of the Board

The Board believes that the impacts of new, additional wells on the recoverable reserves associated with the pools connected to the plant are difficult to quantify accurately without a well-by-well analysis. It is also difficult to precisely determine the plant's remaining life, given that there is no distinct or established trend in the performance for all the recently connected wells and for the additional wells that are still likely to be tied in. However, the Board notes that the company accepted that additional wells, at least in some circumstances, do increase the recovery of gas and therefore result in an extension to plant life. The Board also notes that available estimates, including those of the company, indicate remaining plant life of potentially 20 to 30 or more years. This has occurred despite the fact that since Canadian 88 purchased the plant and field in 1995, the plant has been processing significantly larger volumes of gas annually than it had for many years previously.

Canadian 88 argued that wells connected to the Olds Garrington plant subsequent to 1988 but located in pools that were recognized and connected to the plant at that time should not be considered as new reserves. The Board believes, however, that this particular distinction is not necessarily relevant to determining whether a significant increase in reserves has occurred. The Board believes that *IL 88-13* was not meant to leave continuing production from long-term reservoirs open ended simply because of the distinction of reservoirs connected or the technology used in 1988.

The Board notes that the reserve/plant life extension attributable to the "new" gas reserves was calculated by Canadian 88 by utilizing the approved plant capacity and volumes of reserves added since 1988. The history of the plant, however, indicates that the plant consistently processed gas at lower than approved volumes for many years. This case clearly demonstrates the administrative problems in trying to utilize a simplified plant life extension based primarily on a reserve additions/capacity calculation.

The Board concludes that regardless of the method used for estimating a plant life index, judgement must be applied as to whether a plant's life is now significantly longer than was anticipated in 1988. The Board believes that while variables such as fluctuations in commodity prices and the use of horizontal wells will have an effect on the rate of decline, it is reasonable to expect that some form of pool decline should be considered in assessing remaining life. As such the Board would suggest that practical remaining plant life, not just plant life index, must be considered in assessing the requirement for upgraded sulphur recovery.

The Board also notes Canadian 88's view that connecting lower H₂S content gas will extend the operations of the plant within the previously approved limits but would not result in any increase in cumulative emissions. The Board understands this position but believes the intent of *IL 88-13* was to enact, within a reasonable time frame, a system to maintain and upgrade plant technology to the standards of the day while balancing both commercial and environmental interests. If the addition of new reserves, sweet or sour, result in a significant plant life extension, then a review of the need for upgrading of sulphur recovery is warranted.

The Board believes, notwithstanding the uncertainties, that under any reasonable set of likely production strategies the plant will continue to operate as a sour gas processing facility for at least an additional 10 years and more likely for another 20 to 30 years. The Board views that the extension of the remaining plant life in this case is significant.

5.0 ECONOMIC CONSIDERATIONS

5.1 Views of the Applicant

Canadian 88 indicated that it had invested about \$12.5 million on the plant expansion. Plant modifications included reactivation of the second sweetening train and the addition of 1490 kW (2000 hp) of inlet compression, as well as implementation of some \$880 000 in measures to control emissions from the sour water flash tank and the amine flash gas contactor. Canadian 88 said that the remaining cost of completing the plant expansion, including the sulphur recovery upgrade, would be \$13.6 million.

Canadian 88 believed that it should not be forced to complete the plant upgrade if the additional capacity is not needed. It stated that if there was no incremental production to use the additional capacity, the expansion would clearly be uneconomic. Canadian 88 said that it would need an incremental $560 \times 10^3 \text{ m}^3/\text{d}$ of gas production to generate break-even economics for the additional expansion. It noted that it had assumed, based on sulphur prices, that the recovered sulphur had no value in its economic analysis.

Canadian 88 estimated that upgrading only the sulphur plant at the existing 404.9 t/d capacity to meet the approved higher sulphur recovery levels would cost approximately \$5.5 million. It argued that upgrading the sulphur recovery process alone was clearly not economic, as there would be no incremental production and associated revenue to generate a return on the \$5.5 million investment. Thus, the present value of upgrading the sulphur recovery unit would be a negative \$5.5 million. Canadian 88 did agree that completing the \$13.6 million expansion would at least present the opportunity to offset the cost of increased sulphur recovery with increased throughput.

5.2 Views of the Interveners

OARC stated that, based upon its review of the potential costs, \$5.5 million to achieve the approved sulphur recovery efficiencies appeared to be reasonable. It stated that it did not have enough information to evaluate Canadian 88's estimate of \$13.6 million to complete the approved expansion and upgrade of the plant, including expanding the sulphur recovery unit to 600 t/d.

5.3 Views of the Board

The Board believes that appropriate levels of sulphur recovery are a cost of business for sour gas processors and recognizes that in recent years the Alberta plant gate price of sulphur net of handling and transportation costs to primary markets has been near zero. Therefore the Board does not expect that upgrading sulphur recovery under foreseeable conditions would be an economic project in the conventional sense.

The Board notes that *IL 88-13* provides considerable discretion for case-by-case review of upgrading requirements for sour gas plants. In applying its discretion, the Board would be concerned if aggressive interpretation of *IL 88-13* requirements

- resulted in premature abandonment of producible sour reserves because remaining production could not justify the sulphur recovery upgrades; or
- discouraged operators from investing in projects to increase recovery from developed sour gas reserves.

In this case, the Board accepts that \$13.6 million would be required to expand the Olds Garrington gas plant to 600 t/d at 98.4 per cent quarterly sulphur recovery. It also accepts that an investment in the order of \$5.5 million would be required to upgrade the existing 404.9 t/d capacity sulphur recovery process to meet a 98.4 per cent quarterly sulphur recovery. In view of the current level of capacity utilization at the Olds Garrington gas plant and the significance of the remaining connected sour gas supplies, the Board does not believe that the costs of upgrading sulphur recovery would render continued operation of the plant uneconomic. Nor does the Board believe that a requirement to increase sulphur recovery at the Olds Garrington gas plant would result in premature abandonment of remaining sour gas reserves in the plant supply area.

The Board notes that while it sets the maximum daily sulphur inlet for a plant, the Board would not normally compel an operator to expand its facilities to the maximum production rate parameters. If a company chose not to proceed with an expansion, the Board would, however, expect the operator to make an application to amend approval limits to reflect the lower capacity.

6 PLANT OPERATIONS

6.1 Views of the Applicant

Canadian 88 stated that while the sulphur plant upgrade has been delayed, many of the improvements described in the original application and subsequent March 1998 hearing have been made and in turn have significantly improved plant operations. Canadian 88 stated that the improvements made during and following the September 1998 turnaround have led to a more stable operation and a reduction in impacts from flaring, noise, and odours.

Canadian 88 acknowledged that during 1998 the plant experienced a number of extraordinary operational difficulties. It attributed many of these difficulties to problems with the amine system and sulphur plant.

Canadian 88 also acknowledged that it had had difficulty meeting the approved sulphur recovery efficiency in 1998 and that it did not meet the approved minimum efficiency for three of the four quarters in 1998. The company also accepted that while actions could have been taken sooner, these were delayed, with the knowledge of EUB staff, to September 1998 so that other modifications could be made to the plant during the regularly scheduled plant shutdown.

Canadian 88 said that since then it has been able to rectify the previous problems and as a result had exceeded its approved sulphur recovery efficiency for each quarter during 1999. It believed that the sulphur recovery levels of 97.6 to 97.8 per cent reported to the EUB on the S-30 statement accurately reflected the sulphur recovery efficiency of the plant. The company noted that sulphur recovery efficiencies in this range had also been confirmed by two different models. Canadian 88 suggested that while another performance test would help to verify these numbers,

the test itself would add little value in diagnosing further sulphur recovery problems. The primary value in conducting such a test would be to alleviate public concern about the performance of the sulphur plant.

With regards to its relationship with the local community, Canadian 88 stated it was disappointed with the value it had received from having a Community Advisory Panel (CAP) when compared to gains it had made in other consultation efforts elsewhere in the province. Canadian 88 said it had expected that the investment and effort made to date in the plant and the improvements in the performance of the plant since it was purchased would have been reflected in an increased level of trust from community members of this group. In Canadian 88's view, the level of trust had actually decreased, so much so that it was uncomfortable with the CAP process. Canadian 88 stated that it was, however, prepared to continue to try to work with the CAP, as some level of constructive dialogue between the community and the company needed to be developed.

6.2 Views of the Interveners

OARC stated that its members have been and continue to be negatively affected by the operations of the Olds Garrington facility. Current concerns include emissions, odours, noise, and water runoff.

OARC stated that flaring and odours from the plant continue to be a concern and it believed that there was a relationship between plant emissions and livestock health in the area around the plant. OARC said that health issues, particularly respiratory problems in calves, were both serious and costly. In particular there was a strong concern that the ongoing use of antibiotics to combat the cattle respiratory problems they believed resulted from plant emissions would eventually lead to more resistant strains of infectious organisms. OARC indicated that on numerous occasions plant emissions had forced its members either to return indoors or, alternatively, to leave the area until air quality had improved. OARC therefore believed that the further reduction of levels of flared gases and other emissions was of critical importance. While it acknowledged that there had been some improvement in flaring and odours at the facility in 1999, OARC stated that these continued to be a significant concern.

OARC noted that while air emissions appeared to have improved in 1999, it did not believe that noise levels had. OARC also noted that it continued to have concerns with Canadian 88's methods of disposing of surface runoff water from the plant site.

After examination of Canadian 88's S-30 statements, OARC's technical expert suggested that there had been many acid gas flaring episodes exceeding 30 minutes duration, and in some cases lasting for hours. He stated that flaring of acid gas for periods longer than 30 minutes should be unacceptable because of the associated incomplete combustion of H₂S and hydrocarbons. He maintained that consideration should be given to using a separate flare stack with an incinerating tip for flaring acid gas in order to improve combustion efficiency. Furthermore, based on observations of nearby residents, OARC stated that it appeared that not all of the flaring episodes are being captured on the S-30 statement.

OARC contended that the historical poor sulphur recovery efficiencies achieved by the company at the Olds Garrington plant demonstrated a disregard by the company for the EUB's regulatory requirements. It believed that low recoveries had gone on far too long and action should have been taken to address the problems much sooner. OARC also believed that the 97.7 to 97.8 per cent sulphur recovery efficiency reported may be higher than what was actually occurring and should be confirmed.

OARC indicated that it saw value in the CAP process and would like it to continue. OARC stated that the CAP process had provided dialogue between the company and the community and had given the community access to information. Furthermore, OARC representatives believed that the process had helped to reduce misunderstandings between the company and the community and provided focus on the issues. OARC did note that although members had been assured that CAP would be a decision-making entity, this had not happened.

OARC suggested that Canadian 88's efforts in building trust between the company and the community needed a great deal of improvement. It expressed concern about a number of episodes where, in OARC's view, trust had been damaged. The most significant example, however, was its belief that the company had reneged on commitments made to the community to upgrade the sulphur recovery at the plant at the March 1998 hearing.

6.3 Views of the Board

The operational issues that the Board believes need to be addressed include acid gas flaring and emissions, sulphur recovery efficiency, noise, and community relations.

With regard to flaring and emissions, the Board finds unacceptable the past and apparently ongoing levels of off-site emissions resulting from facility operations and believes immediate action is required. The Board notes that in its 1998 decision the issue of ambient air quality guideline exceedances for emergency flare conditions was also addressed. At that time, Canadian 88 submitted that its estimates for hourly average ambient ground-level concentrations at full throughput were based on 15-minute flaring periods. The Board outlined its expectations in *Decision 98-13* that the company take the necessary steps to limit both the duration and total volumes of sour gas or acid gas flared. It appears to the Board that this has not been done.

Regardless of its decision on upgrading and expanding the sulphur plant, the Board will require Canadian 88 to provide detailed documented procedures to ensure that ambient ground-level guidelines for concentrations for SO₂ and H₂S are met during all periods where acid gas and raw gas are flared. Canadian 88 must submit proposed procedures for review by EUB staff by 31 March 2000. These procedures must address ground-level SO₂ and H₂S concentration limits by modelling flaring events of varying duration and under differing weather conditions. The modelling will be used to provide flaring duration limits, which will in turn be reflected in any subsequent approval issued by the EUB. In conjunction with the report outlining the company's flaring procedure, Canadian 88 must also report to the EUB on the feasibility of installing an emergency acid gas flare system designed to better manage acid gas flaring events and ensure adequate acid gas combustion efficiency.

With regard to whether Canadian 88 is capturing all flared gas volumes correctly on its S-30 statements, the Board notes that the purpose of the S-30 is to monitor sulphur recovery efficiency. In this case, however, it appears that both sweet and sour gas flaring are to some extent being captured on the report. Additionally, based on the observations of local residents, it appears that not all flared volumes are being captured. Therefore, in conjunction with the above ambient modelling project, the Board will also require Canadian 88 to maintain, subject to EUB audit, a daily log of all flaring events. The log must contain details of each flaring incident, including source volumes, method of measurement or estimating, duration of event, reasons for problems, and considerations for continuing plant operations, including public notification. The Board will ask staff to review this requirement on an annual basis to assess whether this level of detailed monitoring continues to be required. The Board will also require staff to review the monthly flaring performance at the Olds Garrington plant; if there are continued extended and/or frequent flaring events, staff will provide the Board with their recommendations regarding appropriate responses.

With regard to sulphur recovery, the Board finds unacceptable the failure of Canadian 88 to meet its required levels during three of the four quarters in 1998. The Board believes that Canadian 88 was well aware of both EUB and public concerns about sulphur recovery at this facility during the March 1998 hearing and as described in the corresponding decision report. As such, it should have taken action sooner to address problems that were evident as early as November 1997. The Board also notes that while in early 1999 the EUB staff did notify the company as to its production cuts if it failed to meet a further quarterly requirement, the Board believes that staff should also have taken action sooner. The Board notes that current EUB policy is to set out a production cut after a plant misses sulphur recovery requirements for two quarters in a 12-month period and expects that policy to be followed in the future.

The Board notes the concerns raised by the interveners about the accuracy of the sulphur recovery efficiency being reported by Canadian 88. While it is not convinced that there is a problem with accuracy, the Board agrees that there is value in conducting a performance test in order to provide assurance that the current values are being reported correctly. Therefore, the Board will require Canadian 88 to conduct a performance test on its sulphur plant by 30 April 2000.

With regard to plant noise levels, the Board will require Canadian 88 to confirm that plant sound emissions meet EUB requirements and will condition the approval accordingly.

With regard to community relations, the Board notes the improvements that were made at the Olds Garrington plant in 1998 and the effect that these improvements have had on operations in 1999. It appears from OARC testimony that these improvements have reduced negative impacts on nearby residents. However, while Canadian 88 has made considerable improvements to its operation in 1998, it appears to have failed at being able to translate these gains into building trust with the community.

Concerning the public consultation process, the Board is very disappointed that Canadian 88 is uncomfortable with the CAP process and that the company appears to see little value arising from its participation. While the Board recognizes that there are cases where irreconcilable differences between members of the public and their industrial neighbours may exist, the Board does not believe this to be the situation in this case. The Board notes that OARC, in fact, does continue to see value in the process, and the Board expects Canadian 88 to continue to support

and strengthen ongoing community consultation. Given that it is Canadian 88's intention that this plant will remain operational in this area for some time, the Board believes that the company must in some manner address its apparent failure to establish meaningful dialogue with area residents.

The Board fully expects Canadian 88 to continue with the public consultation process. Further, it expects that such consultations will be based on sincere dialogue and that the company will respond to community concerns in a meaningful and timely fashion.

7 DECISION

Based on the evidence provided and having regard to the significance of plant modifications implemented by Canadian 88, the incremental sour gas reserves connected to the plant since 1988, and the remaining plant life, the Board believes that upgrading the plant's sulphur recovery efficiency to current requirements is warranted and in the public interest. The Board believes that the intention of the grandfathering provision of *IL 88-13* was to prevent the loss of gas resources due to the imposition of unreasonable economic burdens on plants with little remaining life. The Board believes that Canadian 88's own evidence confirms that the plant life has in fact been extended significantly and furthermore that the company intends to work diligently to access additional deliverability and likely extend that life even further. Therefore, the Board is not prepared to vary the requirements for improved sulphur recovery efficiency at the Olds Garrington plant set out in *Decision 98-13*. Canadian 88 is required to upgrade its sulphur plant to meet a sulphur recovery efficiency of not less than 98.4 per cent on a quarterly basis and not less than 98.7 per cent on an annual basis by 31 October 2000. The Board will expect Canadian 88 to conduct a performance test within three months of commissioning the upgraded sulphur plant.

The Board will amend, as requested, the maximum daily raw gas inlet rate to $2381 \times 10^3 \text{ m}^3/\text{d}$. The Board will also amend the plant maximum sulphur inlet rate to 404.9 t/d.

The Board's practice is to provide approval only for schemes that are in the public interest and are likely to proceed within a few months following issuance of a favourable decision of the Board. The Board is not prepared to allow Canadian 88 to leave elements of its existing approval open until 30 June 2002, as requested, because doing so would enable Canadian 88 to expand the plant raw gas inlet rate to $3400 \times 10^3 \text{ m}^3/\text{d}$ or 600 t/d (1998 approval rates) at its convenience and without further approval. While the company has already received approval once for this level of expansion, that approval was based on an anticipated need for the expansion. The company has now argued and clearly established in this proceeding that the earlier perceived need for the expansion no longer exists.

With respect to sulphur recovery requirements in the interim period up to 31 October 2000, the Board believes that Canadian 88 must meet its commitments to minimize sulphur emissions and maximize sulphur recovery to the extent possible with its current facilities. The Board therefore expects that, given the delay in implementing improved sulphur recovery with respect to the 1998 hearing and *Decision 98-13*, some form of interim limitations on the Olds Garrington plant remains appropriate.

The Board views, as a minimum, that sulphur emissions from the Olds Garrington plant must not exceed levels that would have been achieved had the sulphur recovery upgrade work proceeded on a timely basis. Accordingly, during this interim period, Canadian 88 will operate the Olds Garrington gas plant to a maximum daily inlet sulphur rate of 404.9 t/d and will be required to sustain a quarterly average sulphur emission level of not more than 9.6 t/d from the flare and incinerator stacks. The quarterly emission limit will include emissions from sour and acid gas flaring, as well as emissions from the sulphur recovery unit incinerator stack. The Board further requires that Canadian 88 will sustain a 97.1 per cent minimum quarterly average sulphur recovery during this interim period.

8 TIMING AND CONDITIONS

The Board expects that Canadian 88 will act on a timely basis and in a diligent manner to address the requirements of this decision. The Board is concerned both with the previous delay in implementing improved sulphur recovery and associated issues related to the operating history of the Olds Garrington plant. These issues, in the Board's view, have contributed to heightened public alarm and mistrust of information provided by Canadian 88 and commitments made by the company. In the case of the Olds Garrington plant, the Board believes that timely compliance with regulatory requirements and the conditions of this decision are essential to reassuring the public and initiating a process of establishing trust in the community. Therefore:

- 1) Canadian 88 must demonstrate to EUB staff that sulphur recovery facilities at the Olds Garrington gas plant are capable of meeting the sulphur recovery requirement prescribed in this decision and that those facilities have been installed and commissioned not later than 31 October 2000. The Board requires Canadian 88 to submit monthly progress reports on the status of the sulphur recovery upgrade installation work commencing 1 January 2000 until such time as the upgraded facilities are operational and performance tested to verify recovery capabilities.
- 2) Canadian 88 will conduct a performance test on its existing sulphur recovery plant by 30 April 2000 and report those results to EUB staff and will conduct a performance test on the upgraded sulphur plant within three months of commissioning.
- 3) Canadian 88 will develop and implement appropriate sour and acid gas flaring management, measurement, and estimating procedures consistent with EUB *Guide 60: Upstream Petroleum Industry Flaring Guide*, Alberta Environment requirements, and Section 6 of this decision. Canadian 88 must submit its procedures and supporting calculations for review by Board staff not later than 31 March 2000. Board Field Surveillance and Operations staff will monitor plant operations and S-statements to verify compliance with the flaring procedures.
- 4) Canadian 88 must submit to the Board by 31 March 2000 a report on the feasibility of installing a separate emergency acid gas flare system designed to better manage acid gas flaring events.

- 5) Canadian 88 will maintain, subject to EUB audit, a daily log of all flaring events. The log must include details of each flaring incident, including source volumes, method of measurement or estimating, duration of event, reasons for problems, and considerations for continuing plant operations, including public notification.

DATED at Calgary, Alberta, on 7 December 1999.

ALBERTA ENERGY AND UTILITIES BOARD

[Original signed by]

B. F. Bietz, Ph.D., P.Biol.

Board Member

[Original signed by]

G. C. Dunn, P.Eng.

Acting Board Member

[Original signed by]

W. J. Schnitzler, P.Eng.

Acting Board Member

ATTACHMENT 1 TO DECISION 99-29**ALBERTA ENERGY AND UTILITIES BOARD****Calgary Alberta**

PRE-HEARING MEETING**GARRINGTON FIELD****CANADIAN 88 ENERGY CORP.****Memorandum of Decision****Application No. 990177**

1 INTRODUCTION

Canadian 88 Energy Corp. (Canadian 88), has applied pursuant to section 42 to amend its Approval No. 1996-128 for its sour natural gas processing facility in the Garrington Field located in Legal Subdivision 6, Section 18, Township 32, Range 1, West of the 5th Meridian.

Canadian 88 proposes to decrease the approved maximum raw gas inlet rate from $3400 \times 10^3 \text{m}^3$ per day to $2381 \times 10^3 \text{m}^3$ per day and its sulphur inlet from 600 tonnes per day to 404.9 tonnes per day. In addition, Canadian 88 proposes to reduce its approved quarterly sulphur recovery efficiency from 98.4 per cent to 97.1 per cent with an increase in recovery to 97.3 per cent prior to 1 November 2000. Furthermore Canadian 88 has requested that the ability to expand the plant under the current approval remain intact until 30 June 2002.

By way of a letter dated 12 May 1999 the Olds Area Residents Coalition (OARC) indicated it would oppose the application by Canadian 88.

In order to implement a more effective and efficient hearing, the Board held a pre-hearing meeting to discuss the issues to be considered at a public hearing, any informational needs and the timing for the hearing.

The pre-hearing meeting was held in Olds, Alberta, on 16 June 1999 before Board Member, B. F. Bietz, and Acting Board Members G. C. Dunn, and W. J. Schnitzler. A list of those who appeared at the pre-hearing meeting is given in the following table:

THOSE WHO APPEARED AT THE PRE-HEARING MEETING

Participants	Representatives
Canadian 88 Energy Corp. (Canadian 88)	Mr. Francis Saville, Q.C.
Olds Area Residents Coalition (OARC)	Mr. Gavin Fitch
Alberta Energy and Utilities Board staff Ms. Tania Donnelly, Board Counsel Mr. Kim Eastlick, P.Eng. Mr. Jim Spangelo, P.Eng.	

2 INFORMATION NEEDS

OARC indicated that it had made one request for information that was complied with promptly by the applicant. OARC was planning on meeting with an expert on sulphur recovery during the week of 21 June 1999 who would likely have additional informational needs regarding the gas plant. OARC indicated that any additional requests for information would be made by 25 June 1999. OARC would expect that Canadian 88 would respond to its requests within two to three weeks.

3 TIMING OF THE HEARING

3.1 Views of the Parties

Canadian 88 confirmed that the plant is operating under an Alberta Environment approval (Approval No. 152-01-05) with a 1 September 1999 deadline to meet stricter approval conditions relating to SO₂ emissions. This approval also has an annual sulphur recovery requirement of 98.7 per cent. Given these conditions, Canadian 88 indicated that a mid-July hearing date is acceptable to it. Canadian 88 said it would be amenable to a hearing date in September but would like some assurance that it will not be required to comply with the sulphur recovery requirement currently stated in its approvals.

OARC indicated that the middle to latter part of July was not a convenient time for its members as they would be heavily involved in various agricultural activities. In addition, it is seeking to retain expertise to challenge the cost estimates for sulphur recovery put forward by Canadian 88. The coalition said that it needed more time to obtain additional information from Canadian 88 and construct a proper report. OARC suggested that middle to late September would be a better time frame for the interveners.

3.2 Views of the Board

The Board notes the concerns of the interveners regarding a July hearing date both in terms of conflicts with farming operations and timing for expert consultation. The Board believes that the public interest would be better served if the hearing were held in mid to late September.

4 INTERIM OPERATING APPROVAL

4.1 Views of the Applicant

Canadian 88 stated it would need an interim approval so that it can continue to operate the plant at its current sulphur recovery capability until a decision is made on its application. Canadian 88 volunteered that while the plant cannot meet the higher sulphur recovery efficiency requirements set in the EUB and Alberta Environment approvals, it could meet a 9.6 tonnes sulphur per day requirement on a quarterly basis.

Canadian 88 stated that 9.6 tonnes per day of sulphur emissions would translate into a sulphur inlet rate of 370 tonnes per day at current sulphur recovery efficiencies. Canadian 88 had committed previously to operating within 410 tonnes per day, and thus a limit of 9.6 tonnes per day would be additionally restrictive to plant operations. Canadian 88 stated that it was prepared to accept an interim quarterly sulphur emission limit of 9.6 tonnes per day but requested a maximum daily emission limit of 14.2 tonnes per day as specified in the approval in effect prior to August 1998. Canadian 88 said that the Board should give consideration to the fact that no specific approval date for the higher sulphur recovery levels to be achieved was specified in its EUB approval.

4.2 Views of the Interveners

OARC stated that Canadian 88 should be penalized for not meeting the sulphur recovery commitments it had made as part of the original expansion hearing held in March 1998. OARC noted that the current approval states a sulphur recovery efficiency of 98.4 per cent. It did not believe that a sulphur emissions limit of 9.6 tonnes per day on a quarterly basis was a penalty and suggested that an emissions limit consistent with emission rates of 8.1 tonnes per day or less, achieved earlier in 1999, would be more appropriate. Furthermore it believed that the Alberta Environment approval conditions should apply even if this causes hardship on Canadian 88. The Coalition stated that Canadian 88 should have been aware of the expectations for action on sulphur recovery when the Alberta Environment license was issued in August 1998.

4.3 Views of the Board

Given the commitment made at the original hearing the Board believes it was reasonable to expect the effective date for improved sulphur recovery to be September 1999. The Board's decision was premised on this commitment. The Board concurs with Canadian 88 that an interim approval is warranted and as such has issued the attached amendment to approval No. 1996-128.

Given Canadian 88's original commitments and the existing approvals, the Board believes it would be reasonable for the interim to limit Canadian 88 to its proposed maximum daily emission limit of 9.6 tonnes per day until such time as the Board renders a decision on this application. Given that this is the emission limit currently contained in the Alberta Environment approval, the Board will recommend to Alberta Environment that the sulphur emission limit of 9.6 tonnes per day (19.2 tonnes SO₂ per day) and 0.51 tonnes sulphur per hour (1.02 tonnes SO₂ per hour) remain effective as of 1 September 1999. Furthermore the Board will recommend that

other Alberta Environment approval conditions, that are in effect today, remain as they currently stand until the Board has made its decision.

In addition, commencing 1 September 1999, the Board will expect Canadian 88 to limit the sulphur inlet to the plant to a maximum daily inlet of 330 tonnes per day and to achieve a minimum quarterly sulphur recovery efficiency of 97.1 per cent. This reflects an equivalent of 9.6 tonnes per day sulphur emissions with the plant operating at the minimum sulphur recovery efficiency of 97.1 per cent. This restriction will apply until such time as the Board renders a decision. Failure to meet this requirement will result in escalating consequences designed to ensure compliance. The S-30 Monthly Gas Processing Plant Sulphur Balance Report will be used to verify compliance with these conditions.

5 POTENTIAL ISSUES TO BE CONSIDERED AT THE HEARING

There was general agreement that the issues to be considered at the hearing should include:

- The need for the sulphur plant upgrade including gas supply
- The cost of the sulphur plant upgrade and the associated project economics
- The applicability of the Sulphur Recovery Guidelines (IL 88-13) and the effect of the proposed guideline review (GB 99-10) to the application.

6 DECISION

The Board has considered all of the comments of the participants, and is satisfied that a public hearing should be held commencing 29 September 1999. The Board will expect information requests of the applicant by the interveners will be filed with the company on or before 30 June 1999 and responses provided to all parties on or before 30 July 1999. Intervener submissions should be filed on or before 27 August 1999.

Until such time as the Board has rendered a decision on this application the sulphur inlet to this plant, as of 1 September 1999, shall be restricted to no more than 330 tonnes per day and the sulphur recovery efficiency shall be not less than 97.1 per cent on a quarterly basis. Failure by Canadian 88 to meet these requirements will result in additional curtailment of plant operations as required until compliance is achieved.

A Notice of Hearing will be issued to all of the affected parties in due course.

DATED at Calgary, Alberta, on 21 June 1999.

ALBERTA ENERGY AND UTILITIES BOARD

B. F. Bietz, Ph.D., P.Biol.

Board Member

G. C. Dunn, P.Eng.

Acting Board Member

W. J. Schnitzler, P.Eng.

Acting Board Member

**ALBERTA ENERGY AND UTILITIES BOARD
AMENDING APPROVAL NO. 1996-128**

Approval is hereby granted to Canadian 88 Energy Corp. for the following amendments to approval No. 1996-128 (previously issued on 9 July 1998) for a sulphur recovery gas processing facility located at 06-18-032-01 W5M in the Garrington field.

You shall comply with the Oil and Gas Conservation Act and Regulations as well as all applicable interim directives and the following conditions:

Clause 1 of Approval No. 1996-128 (issued 9 July 1998):

1. The facility shall be operated up to a maximum capacity of 3 400 thousand cubic metres per day (at 101.325 kilopascals and 15° Celsius) of plant feedstock (raw gas and condensate) containing not more than 600 tonnes per day sulphur equivalent.

Is amended to read:

1. The facility shall be operated up to a maximum capacity of 3 400 thousand cubic metres per day (at 101.325 kilopascals and 15° Celsius) of plant feedstock (raw gas and condensate) containing not more than 330 tonnes per day sulphur equivalent

Clause 4 of Approval No. 1996-128 (issued 9 July 1998):

4. The facility shall be operated so that not less than 98.4 per cent of the sulphur contained in the gas delivered to the facility on a quarterly basis, is recovered. This sulphur recovery efficiency is for each 3 month period based on a quarterly calendar reporting basis.

Is amended to read:

4. The facility shall be operated so that not less than 97.1 per cent of the sulphur contained in the gas delivered to the facility on a quarterly basis, is recovered. This sulphur recovery efficiency is for each 3 month period based on a quarterly calendar reporting basis.

Dated 21 June 1999

Signed _____

EUB use only Application Number 990177