

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

SHELL CANADA LIMITED APPLICATION FOR INCREASED THROUGHPUT SOUR GAS PLANT - CAROLINE FIELD

**Decision 97-5
Application No. 960230**

1 INTRODUCTION

1.1 Application

Shell Canada Limited (Shell) applied to the Alberta Energy and Utilities Board (the Board) to amend the Caroline gas plant (Caroline Complex) Approval No. 6319. The plant is located in Sections 34 and 35-34-6 W5M (Figure 1).

The Caroline Beaverhill Lake gas reservoir was discovered by Shell in January 1986. In July 1989 Shell applied to the Board to construct a sour gas plant in the Caroline area. This application was considered at a public hearing in April and May 1990 and a decision was reached in August 1990 (Decision Report D 90-8) to approve the plant subject to conditions outlined in Approval No. 6319.

Shell's existing Board approval sets out maximum limits for both raw gas and sulphur inlet, which restricts the overall plant throughput. After completing a performance test in the fall of 1995 and in the early part of 1996, Shell applied in February 1996, to increase the raw gas inlet by approximately 15 per cent and also increase the sulphur inlet by 21 per cent. No increase to the approved daily sulphur dioxide (SO₂) emission rate would be necessary. As a result, no changes to the Alberta Environmental Protection (AEP) Approval No. 92-AL-398 would be required. Attachment 1 is a summary of the Caroline plant's currently approved rates and the increased rates associated with the application.

If the application were approved, Shell would add additional cooling equipment to enhance gas processing during the warmer months. Some minor equipment modifications would also be associated with the approval.

1.2 Interventions

Several local groups and individuals submitted interventions to the Board opposing this application. These interventions raised a number of concerns, including the impact of the existing operation on the environment, health, and safety of the community and the prospect of aggravating those issues should the plant throughput be increased.

Interventions supporting the application were received from the Municipal District of Clearwater and Mr. R. Gabler.

1.3 Pre-Hearing Meeting

The Board held a pre-hearing meeting in Caroline, Alberta on 11 June 1996 to identify issues which should be considered at a hearing. A Memorandum of Decision (Attachment 2) with respect to this pre-hearing meeting was issued on 27 June 1996. The Memorandum of Decision stated that the Board believed the scope of the hearing should be limited to the possible impacts that may occur from the processing of the incremental raw sour gas.

The Board also identified a separate process that would address other more general public concerns about the Caroline facility and other oil and gas operations in the area. This interrogatory process was adopted in order that industry, the public, and the Board could work together to fully address broad public concerns in the area.

1.4 Hearing

The application was considered by the Board at a public hearing in Caroline, Alberta on 1-4 October 1996 before Board Members F. J. Mink, P.Eng. (Presiding Member), Gordon J. Miller, and J. D. Dilay, P.Eng. Those who appeared at the hearing are listed in Table 1.

TABLE 1 THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Shell Canada Limited (Shell) R. Low S. Denstedt	D. Collyer, P.Eng. K. Johnson, P.Eng. T. Moffat, P.Eng. J. Broadhurst, P.Eng. G. Granville B. Goliss A. Murray
W. and I. Johnston (Johnstons) H. Locke	W. Johnston I. Johnston M. Kostuch, D.V.M. D. Bates, M.D. Professor Emeritus, University of British Columbia

TABLE 1 THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Coalition of Citizens Impacted by the Caroline Shell Gas Plant (Coalition) G. Fitch L. Coderre	P. Dahlman E. Kelley G. Kelley J. Macklin L. McLeod D. McMurtry T. Oliver L. Paget S. Paget R. Watson
S. Roth, Ph.D.	of Ledan Consulting Ltd.
The Resident Members of the Caroline Industry/Resident Noise Committee (Brown) D. Brown	D. Brown
R. Gabler	R. Gabler
M.D. of Clearwater	R. (Russell) King
D. Jones	D. Jones
A. Feddema*	
J. Hermann* R. Czechowskyj	
Alberta Energy and Utilities Board Staff R. Heggie M. Semchuck, C.E.T. J. Spangelo, P.Eng. R. (Robin) King	

*A. Feddema and J. Hermann appeared for purposes of cross-examination only.

R. (Russell) King appeared at the start of the hearing for the Municipal District of Clearwater,

but did not participate in the hearing. R. Waymouth, representing Altana Exploration Company (Altana), appeared at the start of the hearing, but subsequently withdrew Altana's intervention.

J. Locke appeared at the start of the hearing, but Shell challenged his standing on the basis that he was not directly and adversely affected by the application. Given the information provided by Mr. Locke, the Board ruled that he was not an affected party and could not participate in the hearing.

2 ISSUES

Upon review and consideration of all the evidence filed at the hearing, the Board is satisfied that technical changes to the plant are satisfactory and that applied-for plant modifications would meet or exceed regulatory standards.

Having regard for the environmental and social impacts of the facility and the concerns raised by the participants, the Board believes the significant issues to be considered in this application are:

- environmental impacts,
- health effects,
- safety, and
- public opposition and consultation.

3 ENVIRONMENTAL IMPACTS

3.1 Air Quality

3.1.1 Incinerator Stack Emissions

Views of Shell

Shell stated that the proposed increased throughput of sour gas would result in a 21 per cent increase in sulphur inlet from 4513 to 5450 tonnes per day (t/d). The existing AEP approval had set SO₂ emission limits for the plant at 45 t/d¹ and 2.63 t/hour² from the incinerator stack.

If the application were approved, the average daily SO₂ emissions expected on an annual basis

¹ maximum daily SO₂ emission

² maximum hourly SO₂ emission

would increase from approximately 10.2 to 12.7 t/d (25 per cent). Shell noted that emissions of SO₂ would remain below the currently-approved, daily maximum level of 45 t/d. Thus, Shell did not apply for any amendments to its current AEP approved SO₂ emission limits. Shell further noted that, on average over the year, its daily emissions of 12.7 t/d of SO₂ would be considerably less than the approved daily maximum of 45 t/d necessary to allow for daily fluctuations in emission rates.

AEP approved Shell's request to reduce the incinerator stack top temperature from 538 to 330 degrees Celsius (°C) in August 1995. This reduction in temperature resulted in some energy cost savings to Shell, as well as reducing NO_x and CO₂ emissions from the stack. Shell noted that, prior to receiving approval from AEP, it was required to show that it could stay within the AEP limits for total reduced sulphur (TRS) in the stack, and operate without exceeding ambient air quality guidelines. Shell said that it conducted a performance test operating at 330°C which confirmed that it could meet TRS requirements at the increased throughput, and shared these results with the public. Shell said that AEP's decision to approve the temperature reduction was appealed to the Environmental Appeal Board by members of the public but that the appeal was withdrawn after the appellants agreed to conditions requiring Shell to carry out further testing.

Shell installed a measurement system which continuously monitors TRS levels inside the incinerator stack. Furthermore, Shell said that it increases the incinerator stack top temperature before TRS levels exceed 150 parts per million (ppm). This company policy is twice as stringent as the 300 ppm required under AEP guidelines.

On the basis of the information provided from Shell's air monitoring network, the company stated that there had been a reduction in regional SO₂ emissions since the plant start-up in 1993 that has resulted in improved regional air quality.

Views of the Interveners

The Coalition submitted that the application should not be viewed in the light of past approvals which used modelling and predictions made in the 1989 application. Approvals which were issued before the plant had begun operating were based on predictions and estimates. The Coalition believed that its members were experiencing adverse effects from the existing level of emissions in the Caroline-Sundre area, including emissions from facilities owned by operators other than Shell.

The Coalition was concerned that the increased emissions from the Caroline plant incinerator stack, combined with the recently-approved reduction in stack top temperature, would result in decreased plume size and less dispersion of SO₂.

The Coalition believed that the application should be denied because an increase in emissions would occur and would adversely affect the air quality in the area.

Views of the Board

The Board notes that the proposed increase in throughput would result in a modest increase in SO₂ emissions from the plant. However, the annual daily average emission would be 12.7 t/d, well below the currently-approved daily maximum limit of 45 t/d set in conformance to provincial guidelines and approved by AEP. In addition, the Board notes that Shell was adjusting the incinerator stack temperature through the use of a system which continuously monitors TRS levels in the stack, and that the level which would trigger an adjustment was set at half of AEP's guideline. Furthermore Shell's air monitoring network has shown that regional air quality with respect to SO₂ has actually improved since plant start-up. Having regard for these considerations, the Board believes that SO₂ emissions would be well within approved limits and that the guideline for maximum ground level concentration of SO₂ would be met.

The Board notes some confusion exists on the relationship between various emission limits set for this plant. The Board will try to use the interrogatory process to help clarify the relationship of these values and to address any questions on the subject.

3.1.2 Flaring

Views of Shell

Shell stated that the combustion efficiency of its flare was in the order of 95 per cent based on the engineering design. Shell said it was satisfied that it had achieved good combustion of material sent to its flare.

Shell stated that the proposed project would have no impact on flaring duration or frequency. However, given the increased throughput, the volume of flaring under certain instances could be more than it would have been without the proposed increase. In Shell's view, flaring is related to operational upsets, not throughput.

Shell noted that its operation had improved each year since the start-up in 1993, as was evident by the steady decline in the annual number of one-hour incinerator stack contraventions. In a September 1995 turnaround, Shell was able to make further modifications to the plant which focussed on solving corrosion problems. Shell stated that a more stable plant operation occurred once these modifications were in place. Shell acknowledged that the plant did not consistently reach stable operating conditions until after the turnaround in September 1995.

Shell said that it had worked hard to reduce flaring and would continue to do so, although it could not eliminate flaring. Furthermore, Shell believed that all reasonable steps were being taken to minimize flaring. It said that it had consistently flared less than 0.1 per cent of the inlet, although the approval for the plant allows flaring up to 0.5 per cent.

Views of the Interveners

The Johnstons noted that the Caroline plant was visible from their residence and that plumes from flares routinely come towards them. The Johnstons believed that pollutants in the plumes were adversely affecting their health. The interveners generally contended that there were harmful emissions from the Caroline plant flare and the flares at the compressors. Furthermore, they believed that extensive studies must be conducted to determine the exact types and concentrations of chemicals being emitted before the Board grants an approval for increased throughput.

Views of the Board

The Board believes that the primary purpose of an emergency flare stack is to protect plant personnel, the public, and plant equipment during upset conditions by safely burning hydrocarbons and sulphur components. The flare is not a continuous emission source and is used intermittently. Even so, the Board acknowledges significant community concerns related to emissions from flaring exist.

The Board notes that most of the Coalition's concerns are focused on Shell's past and existing operations and lack of confidence in the company's ability to operate the plant within standards acceptable to the Coalition. In some respects, the concerns of the community appear to be well founded given the two and a half years it took the plant to reach consistent stable operations. The Board believes some of these effects could have been mitigated with a more dedicated consultation program and greater commitment by Shell to resolve concerns about emissions such as the persistent odour problem at Rangeland. While the Board considers Shell to be largely responsible for the situation, it recognizes that good communication requires a measure of commitment by both sides to address problems.

The Board notes Shell's evidence that increased throughput would not affect flaring duration or frequency. However, the Board believes it is possible that flaring duration and frequency could increase if throughput were increased, especially in the initial period. It holds this view because the increase could cause equipment to operate at levels nearer capacity, and there would be less operational flexibility available.

Having considered the effects, the Board believes the majority of the concerns relates principally to the existing operation. While the Board acknowledges the serious concerns of the community and the need to resolve them, it does not agree that the increase in throughput would have a material impact on those concerns. The incidents of significant flaring should decline as the plant operation is further stabilized. Shell has operated within the flare limits imposed in the Board approval and the Board is confident that Shell will continue to meet these limits.

The Board accepts that flaring at the plant can continue to stay well within the limit of 0.5 per cent of the raw gas inlet. (However, this represents a substantial quantity of gas because the approved and applied-for inlet rate is substantial.) Shell's current approval states that "the operator shall operate the plant so that a minimum of gaseous hydrocarbons and other gases are flared". Consequently, if the request for increased throughput is granted, the Board would expect Shell to take steps to implement operating practices to ensure that flaring duration and frequency remains extremely low and avoid recurring problems.

The Board notes the Johnstons' comments that numerous flares and plumes are visible from their yard. The Board acknowledges that flaring is a regional concern that can be attributed to a number of operators. The Board believes that the visibility of flares and plumes increases the public's apprehension about them. For that reason, and because of concerns about emissions, the Board believes that each company must operate its facilities with due diligence and avoid unnecessary upsets. The Board intends to raise this issue with all operators in the Caroline area during the interrogatory process.

The Board also notes that provincial flaring policies are currently under review through the Clean Air Strategic Alliance (CASA³). In addition, the Board is currently conducting a policy review of solution gas flaring in Alberta and Board staff released a preliminary draft in March 1997. The Board will rely on the outcome of these two studies to determine additional steps to be taken to address the flaring issue in the province, including the Caroline-Sundre area. The Board expects some conclusions of the CASA study to be available by the end of 1997.

3.1.3 Fugitive Emissions

Views of Shell

Shell said that the equipment (plant, compressor stations and condensate storage facility) and processes which currently exist as part of the Caroline Complex, were adequate to safely handle the approved incremental increase in throughput and emissions. In addition, Shell said that it had created a team to deal specifically with the problem of fugitive emissions. The team's mandate is to identify the source of odours and then design and implement engineering controls to reduce odour problems.

Shell was aware that various sources within the complex have resulted in fugitive emissions. These sources include the sulphur pit, sulphur storage tank, condensate storage tank, compressor station water storage tanks, incinerator stack, and flare stack. As a result, Shell had taken the following steps to address fugitive emissions:

³ Clean Air Strategic Alliance (a multi-stakeholder partnership for air quality planning and evaluation in Alberta)

- Shell installed new seals in the sulphur storage pit and added a catalyst to facilitate removal of H₂S from the product in the pit. Recent successes in reducing the H₂S levels from sulphur in the pit should result in a significant decrease in odours from sulphur storage tanks.
- Shell conducted monitoring around the storage tanks at the plant and had not detected any significant odours. This was supported by its operating staff who were frequently in that area. Shell noted that the condensate tank at the plant served a different purpose than the one at the Rangeland terminal which had been prone to odours over the past few years. The condensate tank at the plant is a flow-through system, in which the condensate flows into and out of the tank on a continuous basis resulting in little fluctuation of the floating roof. Notwithstanding past findings and the different system at the plant, Shell said it was committed to ongoing monitoring for fugitive emissions and addressing any problems that arise.
- Shell had also experienced odour problems from the water storage tanks at its compressor stations. Shell had already addressed the potential for fugitive emissions at the south compressor station and planned to address it at two other compressor stations by the end of 1996 by implementing a closed system to replace the floating roof tanks with pressure vessels. These vessels would not vent to a flare.
- Although Shell was not convinced that the incinerator stack was the source of odours, it increases the stack top temperature to improve dispersion under certain meteorological conditions. An alarm system was installed to alert plant personnel when the wind direction is from the north (± 20 degrees) and the wind speed is greater than 10 kilometres per hour (km/hr). Under such conditions plant staff increase the incinerator stack top temperature up to 450°C. Shell stated that this was a precautionary measure to address odour complaints received from the Pagets who live directly south of the plant.

Views of the Interveners

Many of the interveners were concerned about the ability of the Caroline Complex storage equipment to handle increased volumes of sour product. Specifically, the Coalition was concerned that mitigative measures which Shell had in place for the condensate storage tanks, both at the plant and at the Rangeland terminal, might not be adequate.

The Pagets stated that there could be as many as 10 incidents per month when they had notified Shell of odours on their property. The Pagets said that the source of the odours could be the incinerator stack. Mr. Paget indicated that since the stack top temperature reduction was approved, Shell's response to an odour complaint is to increase the stack temperature and to ask him to call back if there is no improvement.

The Pagets had noticed odours while checking their cows in the vicinity of the plant, described as the smell of sulphur or electrical wires burning. On occasion, they have had difficulty breathing due to what they believed were emissions from the condensate and sulphur storage tanks. In addition to the odours, they had seen a yellow mist on the outside of the tanks.

The Pagets and Kelleys also described layers or pockets of odours around their residences. They said that they could step into the odour and walk out of it in a few steps. Mr. Paget said the odours appeared to hang alongside their buildings.

Views of the Board

The Board notes Shell's evidence that the equipment and processes at the complex are adequate to handle the increased throughput from the point of view of controlling fugitive emissions. The Board also recognizes the steps Shell has already taken with respect to fugitive emissions, but the community reaction suggests that Shell has not been fully responsive in dealing with some complaints.

The Board believes that, as with flaring, increased throughput has the potential to cause an increase in fugitive emissions, especially during the initial period of operation. Consequently, if the application were approved, the Board would require Shell to conduct a thorough review of the potential for increases in fugitive emissions from all sources, monitor the performance in those areas, and report back to the Board after three months of operation at the higher level.

The Board believes that the situation with the condensate storage tank at the Rangeland terminal, for example, has taken too long to resolve, and even at this stage, some additional experience and ongoing monitoring with the new system is required to determine its effectiveness. The Board will raise this issue during the interrogatory process. Given the nature of overall industry activity in the area, the Board does not attribute all sources of fugitive emissions to Shell.

The Board recognizes that a complex as large and complicated as the Caroline Complex will have flaring episodes and fugitive emissions from time to time. However, the Board believes that steps must be taken by Shell to ensure that such problems are infrequent, are responded to immediately, and are followed-up to prevent reoccurrences. The Board expects Shell to set up a formal program to monitor and respond to public complaints and report these findings to the Board within three months from the date of the decision. The Board will require Shell to report on this program on a quarterly basis. Reporting will continue until the Board is satisfied that incidents have been minimized, and an acceptable response procedure has been implemented.

3.1.4 Monitoring and Reporting

Views of Shell

Shell stated that it had implemented an ambient air quality monitoring program for the Caroline Complex that exceeds AEP's requirements. The AEP approval requires one compliance trailer capable of monitoring H₂S, SO₂, NO_x, ozone, total hydrocarbons (THC), non-methane hydrocarbons, plus two other compliance trailers capable of monitoring H₂S and SO₂. Shell also noted that AEP guidelines specify the need for only one trailer continuously monitoring emissions for a plant with this level of SO₂ emissions.

In addition to AEP approval requirements, Shell added another trailer at the Paget residence in an attempt to address their concerns about emissions. This additional trailer (initially equipped to monitor for H₂S, SO₂, NO_x, CO, and THC) was now monitoring for SO₂, H₂S, and TRS. Given that the THC and CO readings were highest when the winds were not coming from the direction of the plant and given that the NO_x levels did not appear to be dependent on wind direction, the decision to remove the monitors for THC, CO, and NO_x was made in January 1996.

Shell stationed one of the monitoring trailers according to AEP instructions and the other two in consultation with the community. Shell noted that the siting of the trailers could be discussed through the Air, Water, and Soils Committee (established as a result of the original hearing), which had a public membership and was an open committee. Shell believed that the current siting of the trailers was appropriate.

Shell noted that there were some limitations in locating the trailer in specific areas on the Paget's property; recognizing the availability of power, proximity to diesel-fuelled farm equipment, and the size of the trailer. However, given the concern at the hearing, Shell committed to work with the Pagets to determine if there was a more appropriate location for the trailer on their property.

Shell said it had also installed more than the normally required number of exposure stations for the detection of H₂S and total sulphation. It had installed 42 exposure stations versus the 20 normally required for a plant with similar levels of SO₂ emissions.

Shell stated that it had been open with the data and results of its air quality monitoring program. The monitoring information collected is reviewed by an independent expert who compiles an annual report for review by the Air, Water, and Soils Committee. Shell said that it was prepared to supply this information and to discuss the results with any interested individuals or groups. Shell also indicated that it was also open to suggestions as to how that reporting might be improved.

Shell stated that the calculation and reporting of hourly emission averages is done in accordance with its AEP approval and that the hourly averages are compared to the AEP ambient air quality guidelines. Air monitoring equipment samples and measures the air on a continuous basis (every

second) with hourly averages calculated from the recordings. Analysis of the one-second instantaneous peak levels showed that they were typically greater than the one-hour average values by a factor of about two. These one-second measurements exceeded the allowable hourly guideline level of 170 ppb only four times in the first year of operation and not once since then. From this data, Shell concluded that there is not a problem with peak emissions.

In addition, Shell stated that continuous monitors are wired into the control room so that, if the instantaneous one-second samples exceed the maximum hourly ambient quality requirement, an alarm will sound and appropriate action will be taken in the control room.

Shell also stated that the Caroline air monitoring network was audited by an independent consultant in January 1993 who concluded that the air monitoring program exceeded the air monitoring directive requirements for compliance monitoring.

Views of the Interveners

The Coalition believed that Shell's monitoring network was ineffective and was not obtaining data representative of emissions in the area. Members were concerned that the monitoring trailers were not in the best locations and that they were not analyzing for all appropriate parameters.

Mr. L. Paget had a monitoring trailer on his property which Shell placed there voluntarily. However, Mr. Paget was concerned that the trailer was not obtaining representative data because he had noticed odours at various locations on his property, although nothing had been recorded by the monitoring unit. Further concerns stemmed from the fact that, although Shell was originally monitoring for five or six parameters, it was currently measuring for H₂S and SO₂. Mr. Paget said that he would like to receive the data on a more consistent basis and would like someone to help him understand it better.

The Coalition's expert witness, Dr. Roth, also raised concerns about monitoring. He questioned the accuracy of using dispersion modelling for the placement of monitors and the ability of monitoring to obtain a true profile of the air quality in specific regions. From his perspective as a health professional he also questioned the data being averaged, believing that it minimized and masked the peak readings.

The Coalition said that, prior to making a decision on the application, the Board should impose a requirement that Shell engage an independent consultant to conduct a thorough review of its monitoring program.

Views of the Board

The Board notes that Shell's existing and proposed monitoring exceed the provincial standards, and in Shell's view, monitoring trailers are located appropriately. It notes that one trailer was sited according to AEP requirements and that the other two were sited in consultation with the community. The Board also notes the concerns by the Coalition that monitoring trailers are not located optimally and do not sample and analyze for certain constituents.

If the application were approved, the Board will require Shell to review the location of its monitoring trailers with AEP and the Air, Water, and Soils Committee and satisfy the Board that they are optimally located.

At this time, the Board is satisfied that the general monitoring and reporting procedures by Shell are sound. With respect to the specific concerns of Mr. Paget, the Board notes Shell's undertaking to work with the Pagets on a more satisfactory location for the monitoring trailer, and will require Shell to report to the Board on the resolution of that concern within three months from the date of the decision.

With respect to concerns about providing monitoring data and its interpretation to residents, the Board notes Shell's undertaking to discuss the results with any interested person or group and to receive suggestions about how to improve its reporting to the residents. The Board expects Shell to follow-up on this undertaking. The Board also expects individuals in the area who have concerns to take advantage of the process offered by the company to become familiar with the monitoring results and to work with Shell to address the issues.

With respect to the concern about averaging the data and masking peak readings, the Board notes that the equipment samples and analyzes air on a continuous basis (every second), and that hourly averages are calculated from these continuous data. It also notes that the one-second measurements did not exceed the hourly guideline level of 170 ppb after the first year of operation in any event. Considering the number of times that even a one-second level exceeds the AEP one-hour guidelines, the Board does not believe that peak SO₂ emissions are a concern at this plant.

3.1.5 Sulphur Recovery

Views of Shell

Shell stated that this application contained no changes to the required minimum sulphur recovery efficiency. Furthermore, Shell stated that its plant would continue to have the highest sulphur recovery level in Canada.

Shell further committed to maintain emissions below those given in its current AEP approval, resulting in a sulphur recovery efficiency on an annual basis of 99.83 per cent (currently approved for 99.8) and 99.59 per cent on a quarterly basis (currently approved for 99.5) when operating at the proposed, higher throughput levels.

Shell did not believe that a further increase in sulphur recovery level was warranted because the sulphur recovery guidelines took into account the possibility of periodic operational problems. Furthermore, Shell stated that it did not believe it was technically possible to run at the higher recovery rates suggested by the Coalition on a daily basis.

Views of the Interveners

The Coalition believed that the current AEP standards for sulphur dioxide emissions are too low. It proposed an increase in sulphur recovery efficiency to 99.9 per cent on an annual basis and 99.8 per cent on a quarterly basis.

The Coalition noted that the performance tests of the plant showed it could achieve sulphur recovery levels between 99.88 to 99.9 per cent and believed that the sulphur recovery levels should be increased to help minimize emissions.

The Coalition stated that its proposed quarterly and annual sulphur recovery efficiencies allowed for some operational flexibility. The Coalition said that what it was proposing increased sulphur recovery levels on a quarterly and annual basis and was not something Shell would have to meet on a daily basis.

Views of the Board

The Board notes that the Shell plant is more than meeting minimum sulphur recovery standards prescribed in the approval. It notes that these approved levels were set in accordance with the Sulphur Recovery Guidelines for Sour Gas Plants in Alberta (IL 88-13) and it is the most efficient plant of its type in Alberta.

Although the performance tests on the plant resulted in sulphur recovery levels in the range of 99.88 to 99.9 per cent, the Board believes that it would be unreasonable to expect that those levels could be sustained on a continuous basis. The Board considers the currently-approved levels of 99.5 per cent on a quarterly basis and 99.8 per cent on an annual basis would continue to be appropriate for the higher throughput level. Notwithstanding, the Board expects that, if the application were approved, Shell must operate within the prescribed limits and strive to achieve the highest levels possible with the equipment in place.

3.2 Soils

Views of Shell

Shell indicated that it ran the applied-for volumes through the sulphate deposition model which was used in its original 1989 EIA. This model predicted deposition from all regional sources. The model predicted maximum sulphate deposition levels would increase from 14 to 15 kilograms per hectare per annum (kg/ha/a) with the proposed throughput increase. This result was considerably lower than the 20 kg/ha/a that was predicted in the original environmental impact assessment (EIA). Furthermore, Shell noted that an even lower deposition rate of 11 kg/ha/a was predicted when it used the most recent AEP recommended model using site specific meteorological data.

Shell stated that, generally, the soils in the area were not acidic. It also stated that it had

knowledge about soils in the area as a result of information gathered for the 1989 EIA and from its soil monitoring programs taken since that time. Shell suggested that the issue of impacts on soils might be further addressed in the interrogatory process.

Views of the Interveners

The Coalition noted that local ranchers spread lime in certain areas in the region of the plant where the soil acidity is quite high. Mr. Macklin commented that there was currently a lot of land being ploughed up because it was not producing even though farmers were using the same amounts of fertilizers. He stated that he had been told by an agronomist that he needs to lime his land.

Mr. Macklin said that some of his land needs to be limed, crops rotated or straw ploughed into it because the pH was quite low. He said that liming was costing him approximately \$25 per ton. His application rates are supposed to be between 2 200 and 2 700 pounds per acre which should last about four years. Given this condition and the associated costs, he believed that Shell should not be increasing its emissions.

Views of the Board

The Board notes that there is a question regarding soil acidity, which requires liming at added expense. The Board also notes that sulphate deposition rates would be within levels predicted in the original EIA if throughput were increased.

Given the level of emissions and the length of time the plant has been operating, it is difficult to rationalize that the emissions have had an effect on soil acidity. However, the Board remains concerned about the comments made by some of the interveners about their soils. Since the Board has no information respecting the historic levels of soil acidity or whether or not soil acidity levels have changed over time, the Board is unable to draw any conclusions about whether or not area SO₂ emissions are having an impact on soils. The Board agrees that this is a matter which may be addressed in the interrogatory process.

3.3 Noise

Views of Shell

Shell acknowledged that the Caroline area is noise saturated. It stated that the only additional source of noise associated with the application would be from the additional cooling equipment. Since Shell was committed to no net increase in noise, it would implement mitigation measures to offset any noise increase when cooling equipment is installed. These measures would consist of

putting a noise barrier around the turbo-expander unit and installing more effective intake

silencers on two combustion air blowers in the sulphur recovery unit. Shell stated that the noise mitigation would be in place when the additional cooling equipment is installed.

Shell further committed to fence line noise monitoring after the modifications and it would compare results to monitoring done previously to ensure there is no net gain in noise levels.

Views of the Interveners

Mr. Brown stated that he would like to see Board staff involved with noise monitoring to help with the interpretation of results.

Views of the Board

The Board accepts that cooling equipment additions would be the only additional source of noise from the proposed increase in throughput. The Board notes that Shell is committed to no net increase in noise and would ensure this with follow-up monitoring. Therefore, the Board expects that additional noise impact would be mitigated and the increased throughput would not be a noise problem.

The Board notes Mr. Brown's desire to have Board staff involved with follow-up noise monitoring and be available to assist with the interpretation of results. If it would be of assistance, the Board is prepared to make staff available, but has confidence that Shell and other members of the Caroline Noise Committee can help address Mr. Brown's concerns.

3.4 Shell's Condensate Storage at the Rangeland Terminal

Views of Shell

Shell acknowledged that the odour problem at the Rangeland terminal deteriorated when Shell started shipping condensate through the terminal from the Caroline plant. Shell also acknowledged that it took a long time to fix the odour problem although it noted that it had taken steps which it believed would address the problem only to later learn that these steps did not remedy the concern.

The current system at the Rangeland terminal, implemented in July 1996, works by capturing and incinerating vapours coming off the floating roof tank. In order to capture the vapours, air (sweep gas) is drawn through the tank above the floating roof. This sweep gas is then sent to the incinerator. Instrumentation on the incinerator stack signals an alarm to the operator if there are problems with the temperature and a backup system for the sweep gas is available in the event that the blower shuts down.

Shell said that existing equipment is now very effective at controlling odours at its condensate tank and noted that it had not received any odour complaints since the new equipment was

installed. Shell believed that the applied-for increase could be easily handled by the existing tankage and odour control system.

Shell stated that it could not guarantee that there would be no odours in the area of the Rangeland terminal given the number of operators in the vicinity, but it would do its best to ensure that the tank utilized for Shell condensate would no longer be a source of odour problems. Although Shell does not operate the Rangeland terminal, it has worked closely with the operator to ensure the odour problem associated with the Caroline condensate was addressed.

Shell also stated that the applied-for increase in condensate production would not reduce the effectiveness of the new odour control system. It argued that the same volume of sweep gas would go through the tank and to the incinerator regardless of the volume of condensate entering the tank.

Views of the Interveners

Mr. Kelley indicated that, while the installation of the incinerator at the condensate tank had not eliminated all odours, it had helped a great deal.

Ms. Dahlman lives approximately 2.5 km west of the Rangeland terminal. She said that although she never smelled odours at her residence, she smelled odours almost every time she drove by this facility before the incinerator was installed. After the incinerator was installed she had detected odours in the vicinity of the facility while driving along Highway 22 in late September 1996, which was the first time she had smelled odours in a while.

The Coalition believed that approval should be deferred for one year to allow for continued monitoring at the Rangeland terminal to ensure the effectiveness of the new incinerator.

Views of the Board

The Board acknowledges that fugitive odours from the Rangeland tank farm had been a persistent concern to residents from March 1993 to July 1996. The Board also accepts that there would not be additional impacts from this facility as a result of an increase in throughput at the Caroline plant.

While the Board is very concerned about the significant amount of time required to address the condensate odour problem at the Rangeland terminal, it now appears that Shell has found an approach which is effective in minimizing odours and alleviating a long-standing concern. The Board is aware that the Caroline condensate is particularly odorous, a characteristic which has made the problem more severe than it otherwise might have been. The Board expects that Shell and other operators will be extremely vigilant in the follow-up to this problem to ensure that the current system remains effective in controlling odours. The Board will also invite other operators involved with the Rangeland terminal to participate in the general review of issues during the interrogatory process.

4 HEALTH EFFECTS

Views of Shell

Shell stated that, as a general rule, it does not proceed with any projects which it believes would harm the environment or human health. Shell stated that it takes the protection of the health and safety of its neighbours very seriously. Shell accepted that the onus was on it to demonstrate that this project would not affect the environment or human health and believed that it had done this.

Shell noted that standards for emissions were set to protect human health and the environment, and it would continue to operate its facilities within standards set for the oil and gas industry by regulatory bodies in Alberta.

Shell said it knew a lot about the components that make up the vast majority of its emissions and believed it is at the forefront of understanding the science involved in environmental effects. Given that knowledge, Shell stated that it did not believe that any increase in unidentified or unknown substances as a result of the increase in throughput would cause any harm to human health or the environment. It noted that the Caroline gas plant had the highest sulphur recovery level of any facility of its type in Canada and had many features to minimize emissions and flaring.

In its cross examination of Dr. Roth, Shell implied that the Alberta ambient standards for SO₂ were much more stringent than those referenced by Dr. Roth with respect to the U. S. Occupational Safety and Health Administration (OSHA) and the U. S. National Institute of Occupational Safety and Health (NIOSH). Shell's ambient monitoring data showed that since the start-up of the plant there had been no SO₂ readings at any of its compliance trailers which exceeded the one-hour ambient SO₂ guideline of 170 ppb.

Shell also noted that the Kanawha County, West Virginia study referenced by Dr. Bates is not comparable to the area around the Shell plant. The Kanawha area is one of the largest chemical manufacturing areas in the United States with 11 petrochemical facilities in a narrow valley between 1 and 2.5 km wide and 120 metres deep. Shell implied in its cross examination of Dr. Bates that the chemicals in this valley were not remotely like those in the Caroline area and that it was irresponsible to make such a comparison.

Shell believed that the Caroline Complex could handle the proposed increase in throughput without harming health, safety, or the environment. The emission, noise, and safety standards which it applies are based on the best evidence available. Shell stated that it would continue to monitor developments regarding emissions, is committed to being involved in ongoing initiatives, and will act in a responsible manner based on findings of new scientific information.

Views of the Interveners

Many of the interveners described symptoms of health effects, including coughs, headaches,

aching muscles, asthma, allergies, shortness of breath, and loss of memory, which they attributed to emissions in the area.

For example, Mr. Johnston stated that at times he has had a very heavy chest, gets emotional, and suffers from headaches, aching muscles, and a low energy level. He stated these symptoms came on after the Shell pipeline break in January 1994 and occurred when there was flaring or odours in the area. In the six months prior to the hearing, he experienced incidents where his health was affected typically once every two weeks. He said that he did not feel better until there was a strong west wind for about a week. Mr. Johnston said that he could see approximately 17 flares from his yard, at least four of which were Shell's.

Mr. Kelley lives beside the Rangeland terminal approximately 13 km from the Shell plant. He stated that shortly after the plant began operation his family began to feel the effects from the Shell tank at the Rangeland terminal. His three-year-old son developed allergies, Mr. Kelley had been diagnosed with asthma, and his wife began suffering from severe headaches. Mr. Kelley also stated that a neighbour who had developed similar symptoms to his wife's had the symptoms disappear when she moved away. Mr. Kelley stated that he was concerned that, instead of the previous odours, he would be exposed to emissions from the incinerator.

Ms. McMurtry stated that she had symptoms of chemical sensitivity including loss of voice, tiredness, headaches, and loss of memory. Her husband experienced similar symptoms, but was able to get rid of them if he went on a pack trip in the hills where there was no oil and gas activity. After a couple of days at home his symptoms would recur.

Dr. Roth indicated it was difficult to determine what individuals were being exposed to because one could never know precise concentrations of emissions. Ideally one would have to have a roving monitor. He said that measuring the effect of contaminants on individuals would require measuring concentrations in a number of areas where the individual was working or living. A monitoring location which was 0.5 km away would not give results for the person's specific location. Dr. Bates also commented on the difficulties in doing a health study that would give valid statistical results where there were so few people.

Dr. Roth believed that AEP's SO₂ ambient guidelines were based on preventing damage to vegetation not health. He also said that OSHA's eight-hour exposure level for SO₂ of 5 000 ppb might be too high for patients with "hyperreactive" airways. Furthermore, he stated that NIOSH had recommended an SO₂ exposure limit of 500 ppb for 10 hours. Dr. Roth said that he was not aware of the AEP SO₂ ambient level guideline of 170 ppb for this project.

Dr. Roth also stated that there was some concern with the Alberta Occupational Health and Safety (OH&S) standard of 10 000 ppb for H₂S (8-hour occupational exposure limit). He referred to research that had shown some effects on laboratory rats at the 10 000 ppb level. He further suggested that 1 000 ppb had shown some effect in a model for a hypersensitive population. Although Shell noted that 12 ppb was the highest level recorded at the Paget residence (closest to the plant), Dr. Roth stated that he would not know whether 12 ppb would or would not have an effect as he had not considered that level.

Dr. Bates questioned Shell's position that it did not "believe that any increase in exposure to unknown or unidentified substances that may arise as a result of the increase in throughput would cause any harm to human health or the environment". He maintained no proper conclusion could be drawn until proper studies were done to determine the cause and effect related to any symptoms.

Dr. Bates commented that, on the basis of his discussions in a Red Deer workshop with two farmers living downwind from a flare and the similarity between their symptoms and the ones described by the Johnstons, he was convinced the symptoms were actually occurring. These symptoms included fatigue, chest tightness, and headaches. Although he could not say with certainty that these symptoms were associated with downwind exposure, he believed that they probably were but that this would need to be confirmed with a proper study.

Given the symptoms he had heard and emission levels Shell had presented, Dr. Bates believed people's complaints are related to more than just emissions of H₂S and SO₂. He stated that, while H₂S could cause nausea and SO₂ is a hazard to asthmatics (although not a cause of it), it appears that the odour which was being complained about by residents was more than that of solely H₂S or SO₂.

Dr. Bates referred to a study conducted in Kanawha County, West Virginia. This study was conducted on a population of over 8 000 children who lived in a valley which contained one of the largest chemical manufacturing centres in the United States. As such, these children were exposed to a whole range of volatile organic chemicals. The study concluded that the survey of respiratory symptoms provided evidence that exposure to a mixture of volatile organic compounds had adversely affected the health of some of the children. While this study identified compounds that would not likely be present in Caroline, Dr. Bates believed some petroleum-related compounds such as "toluene, xylene, benzene, and n-decane, ... might be part of some release or fugitive emission" from this facility. While Dr. Bates acknowledged that an analysis of the chemicals in the U.S. study would not be similar to those in the Caroline area, he did suggest that a study should be done to measure volatile organic hydrocarbons (VOCs) downwind of the plant. Dr. Bates was unaware of what, if any, follow-up was taken as a result of the Kanawha study.

Dr. Bates also said that he presumed that the increased throughput would result in more frequent emissions (both fugitive and controlled). As a result, he believed it would be imprudent to approve the increased throughput until the character of the downwind exposures had been more precisely defined. He believed that conformance to SO₂ and H₂S emission standards was not enough to protect public health.

Views of the Board

The Board notes that provincial emission guidelines are set to prevent undue impact on health and the environment. Maximum ambient guidelines are typically much higher than actual conditions because the plant operates at lower levels of emissions once the operation is stabilized.

The Board notes that the ambient standards applied in Alberta for SO₂ are among the strictest in the world. The Shell Caroline plant has a higher sulphur recovery efficiency than any other plant of its type in the country. It is also one of the only plants in Alberta to monitor TRS levels on a continuous basis. This plant has monitoring in place that exceeds what would normally be required for a plant with these emissions. The guidelines under which Shell operates are those to which all gas plants in the province are subject. In fact, emission monitoring and requirements are more stringent at this plant than at other gas processing plants in the province.

Given the extensive health studies related to gas plants done to date the Board cannot reconcile the health concerns in the community with the Caroline Complex. While the Board does not doubt that the interveners are experiencing the symptoms described, it cannot conclude from any available evidence that these symptoms are necessarily related to emissions from the flares or the incinerator stack from the Caroline Complex. Notwithstanding that view, the Board believes that medical research currently in progress in Ft. McMurray should assist in reconciling some of these issues in the future.

The Board accepts the evidence given by Dr. Roth which shows some effect of H₂S on hypersensitive populations at concentrations that are 100 times greater than that of Alberta's ambient guidelines. However, it is difficult to draw any meaningful conclusions from this observation. While the Board can accept that high emission levels show the effects identified by Dr. Roth, it is reassured that provincial standards prevent emissions at such levels. The margin of safety adopted for Alberta's ambient H₂S guidelines would suggest provincial standards are adequate for the applied-for level of increased throughput at the Caroline Complex.

The Board cannot accept Dr. Bates' conclusions based on the information he provided at the hearing. The Board is puzzled that Dr. Bates could draw any meaningful conclusion about the Caroline Complex given the symptoms he has heard from "two farmers in a Red Deer workshop" who live downwind from some type of flare and similar symptoms described by the Johnstons. The Board questions the suggestion that the symptoms are probably caused by downwind exposure from this plant. While the Board accepts that public health concerns should be addressed with meaningful research, the Board does not draw any inferences from Dr. Bates testimony.

With respect to the Kanawha County study of "one of the largest chemical manufacturing centres in the United States", the Board sees little value in this information given the nature of the emissions and the extensive industrial development in that area compared to the situation at Caroline.

5 SAFETY

5.1 Shell Caroline Emergency Response

Views of Shell

Shell maintained that it has a complete emergency response plan (ERP) to handle all eventualities from the plant. This plan includes a 4 km emergency planning zone and a larger emergency awareness zone (see Figure 1).

Shell stated that there are approximately 1 800 households catalogued for its emergency awareness zone for the Caroline facility. In 1992, company representatives visited all the households twice to build a database for the ERP. This database includes a complete list of people (and their contacts if they are away) who live within 8 km of Shell's facilities.

Since 1992, Shell has continued to visit residents and has highlighted the emergency response plans at open houses. Shell said that it visits everyone in the emergency awareness zone and tries to send out simple, clear messages to those living within this area to assure them of the response. As a precaution, if people smell something of unknown origin, they were left with the message to go into their house, close the doors and windows, and telephone a 1-800 number to receive more information. This 1-800 number allows people to report a problem for the entire region regardless of who owns or operates the facility. Shell acts as coordinator for inquiries about non-Shell facilities to ensure that the company whose facilities are the likely source of the complaint are promptly notified. The 1-800 number is staffed on a 24-hour basis.

Shell stated that when it receives a call on its 1-800 number, it initiates the Mutual Aid-Call-Down System which identifies the relevant operators in the area based on the location of the complaint. In cases in which the incident was likely caused by another company in the area, Shell directs the concern to that operator for follow-up.

In any event, operators in the area of impact are dispatched to investigate the problem. Once the problem has been investigated, there is a follow-up call made to identify the source of the complaint and information is logged. In almost all cases, the person who reports the problem is called back. The complaints, cause, and follow-up are reviewed each morning by the operators and management.

Shell stated that when an odour complaint is received regarding its facility, it dispatches personnel immediately to the area. In the event that evacuation would be necessary, Shell would try to telephone people and would also send its people to check the area of impact so that they would not have to rely on just one method of communication.

While Shell does not distribute its emergency response plan to people, it does provide a sheet that highlights key messages that would be useful and relevant to residents in an emergency. When a visit is made, the information on this sheet is reviewed with residents. Shell refined the ERP further as a result of experience gained in previous incidents. Following a January 1994 pipeline leak, Shell reviewed its ERP and developed an enhanced communication zone involving at least the 4 kilometre emergency planning zone or further depending on the size of the incident. In response to a concern by one resident in 1994 Shell stated that no information had been left to confirm a visit to the residence. It now leaves a door-tag notice to indicate that company responders had been at a household in relation to a problem.

Shell stated that it conducts one major mock exercise each year and a "table-top" exercise six times per year in which it goes through the ERP in response to various types of emergencies. Although Shell believed that there is always room for improvement, it believed that part of the purpose of the mock exercises was to find ways to test and improve its ERP.

Views of the Interveners

Mrs. Johnston expressed concern with Shell's complaint response. She indicated that Shell's response to odours had been slow and that, on most occasions, the odour was gone by the time someone arrived. In the case of the January 1994 pipeline break, Mr. Johnston indicated that they evacuated themselves and were never contacted by Shell's emergency response team with respect to the incident.

A number of residents in the area expressed concerns about Shell's state of readiness in case of an emergency. Some interveners expressed concern that they might not be contacted in an emergency given that they did not reside within the emergency planning zone, but were often working on land which was in this area. Other interveners said that they were not clear as to whether or not they were in the emergency planning zone.

One intervener also expressed concern that he did not believe that the ERP would be able to handle simultaneous emergencies. Furthermore, he suggested that the mock exercises were planned and not a true test of the company's ability to respond to an emergency. He suggested that the community should be totally involved with the ERP even to the extent of being able to have the community trigger an emergency and take part in evaluating the applicant's response.

Views of the Board

The Board believes sour gas plants must be operated with the utmost regard for public and worker safety. The Board accepts that at times it is difficult to reconcile public complaints in that an odour may not be present by the time that the company or Board staff reach the location. The Board believes the company is in the best position to isolate a problem and take the necessary action. To that extent, the Mutual-Aid-Call-Down System is a superior process for responding to emergencies and complaints. The Board expects the company to dispatch staff as quickly as possible to investigate complaints, determine the cause of odours or other problems so that they may be addressed, and then take steps to prevent recurrences. Affected parties must be advised of corrective action taken.

The Board notes that a number of concerns raised about Shell's ability to respond to emergencies related to communication between the parties. With respect to Mr. Johnston's concern that he was never contacted by Shell's emergency response team at the time of the January 1994 pipeline leak, the Board believes Shell improved its approach by revising its emergency response plan to provide for communication with residents in a larger radius.

In addition, the Board believes that Shell's decision to leave some form of written advice when no one is home is an improvement. In that way, returning residents can follow-up with the company and have the confidence that the notification process applied to them.

The ERP, and the ability of the company to respond to emergencies according to the plan, are critical elements in operating a sour facility. While concerns have been expressed about Shell's ability to respond, the Board continues to have confidence in the company's emergency response capabilities. The Board notes the concern of some of the interveners who do not live within the emergency response plan area, but who own and work on land within it may not be contacted in an emergency. The Board recognizes that this is a significant problem for all sour gas area emergency response plans because it is difficult for an operator to know if people are in the area temporarily unless they advise the operator. While it is Shell's responsibility to have an up-to-date plan, the company depends on the effort made by residents to keep Shell informed of their movements. The Board believes individuals affected by the plan should be aware of measures in the plan and responses proposed in various circumstances.

With respect to the concern of some interveners as to whether or not their residences are within the emergency planning zone, the Board believes they should contact Shell and ask about their status.

With respect to the ability of the operator to handle simultaneous emergencies, the Board does not believe it is reasonable or necessary to require an operator to provide for such a case, given the small risk that such events would occur. While some shortcomings in the ERP were identified due to incidents at the plant since the start-up, they were generally related to problems in communication. These problem areas have since improved. The Board agrees that the community should be involved in the plan to understand its role as well as to evaluate the company's response.

The Board also believes that mock exercises are sufficiently representative to test the company's true ability to respond to emergencies. The Board considers such exercises useful and essential for proper planning, training of personnel, and detection of shortcomings which may exist in plans. However, the Board does not believe it would be appropriate to have control of decisions to initiate a mock exercise rest with the community because of the importance, complexity, and costs. Nevertheless, the Board endorses the idea that the community can have a significant role to play in the exercise.

It is critical that the company and all residents affected by the ERP are familiar with the process. This requires a measure of commitment and good will by all participants. The Board is confident that with that commitment, the plant can be operated without unacceptable risk to the public.

5.2 Budget Reductions

Views of Shell

Since start-up, Shell had been able to increase its operating efficiency and improve the profitability of its complex. Shell acknowledged that when plant operations started in 1993 there were approximately 200 employees at the plant which has since been reduced to 110 staff. Shell did not believe the reduction in staff compromised the safety of its operation. A further, modest decline in the work force could be expected in 1997. Shell maintained that the increased throughput would not put increased demands on staff operating the complex. Furthermore, Shell submitted that operating procedures at the plant with respect to safety and environmental performance had not been changed over the last couple of years. Shell said any reductions in staff and budget at the plant have not been and would not be at the expense of safety or environmental performance.

Views of the Interveners

Many of the interveners believed that the economic benefits of this project would accrue to Shell only. With the continued reduction in Shell's operating budget, the effect on the community would be less money invested in the community and fewer jobs.

The Coalition was concerned that a reduced operating budget would result in a greater risk to public safety and the environment.

Views of the Board

The Board believes that the practice by Shell to streamline its operation is typical of measures adopted by the industry in general. The Board accepts that as an operator gains experience with certain facilities there may be opportunities to reduce the workforce and streamline operations. The Board accepts that companies should be permitted to implement such measures. However, the Board cannot accept that doing so would compromise public safety or environment protection. In particular, the operator must provide adequately trained staff at all times. The Board has no reason to believe that Shell's operation is inadequately staffed or that the staff do not have sufficient training. In addition, the Board accepts that an increase in throughput would not require additional staff.

The Board does not agree that the economic benefits of the project would be to Shell only. It may be true that decreases in the operating budget would result in less money being invested in the community and fewer jobs. However, such decreases do not detract from the ongoing economic benefits of the remaining employment, local expenditures, taxes, and royalties that are part of the overall public interest to the province.

6 PUBLIC OPPOSITION AND CONSULTATION

Views of Shell

In preparation for the plant application, Shell conducted a number of meetings with groups and individuals in the area during December 1995, January 1996, and February 1996. In total, Shell met with approximately 16 groups. Shell also held an open house in February 1996 attended by 226 residents. In addition, Shell mailed out a newsletter describing the proposal to approximately 2 000 residents in the area.

Despite this consultation process, Shell was unable to satisfy all individual concerns about its existing operation. The company accepted that this might have affected the confidence these individuals have in the company's ability to operate the complex in a safe manner. Shell acknowledged that the pipeline break in 1994 and the persistent odours at the Rangeland terminal had perhaps affected the level of confidence of some members in the community in Shell's operation.

Nevertheless, Shell believed that the interveners that raised concerns about the proposed expansion represented a very small portion of the total community within the emergency awareness zone. In total, only about three per cent of households were represented by the interveners. Shell was confident that the small number of interveners opposing the application represented a large degree of support in the community or lack of opposition. Shell stated that there was a larger community support for this application than there was in the original application in 1989.

Shell acknowledged there was some room for improvement in its consultation process and that it was committed to looking at other ways to improve and address public concerns. It would also look at the range of Shell people it gets involved in the consultation process. Shell also believed that the interrogatory process might be a way to improve the consultation process.

Views of the Intervenors

Mr. McLeod believed that Shell's public consultation program had changed over the past three or four years. He indicated that his family used to meet with Shell and generally could work out their differences. He believes that Shell is now less responsive to individual issues.

He stated that, although he did not think there was anyone in the community that wanted the plant to shut down, he believed that the consultation process needed to be improved. Mr. McLeod also indicated that consultation needed to be more than a one-on-one process because it was difficult for any one individual to ask all the questions.

While the 43 Coalition members believed they represented a segment of the community that was conservative by nature and rooted in their community, they also believed their objections to this application were based on good reasons. The Coalition could not accept that 97 per cent of local

people supported Shell's application. They maintained that many who did not support this application were not at the hearing because they were frustrated and disillusioned.

Views of the Board

It appears to the Board that, although Shell conducted a significant amount of public consultation and involvement relative to the subject application, the company needs to improve ongoing consultation with area residents about operations, problems, issues, and complaints.

Given the level of community support at the time of the original application, the Board is quite concerned with the number of interveners who opposed this increased throughput project and the apparent breakdown in communication between Shell and the community. Figure 1 shows the extensive distribution of lands owned or operated by Coalition members within the planning zone. Typically the Board has seen opposition to new plants when a project is initially proposed. The Board rarely sees significant concerns raised about increased throughput projects of this scale (approximately 15 per cent) once facilities are operating and dialogue within the community has been established. As a rule, the Board has found that the impact for a large-scale facility is less than initially expected by residents in the area.

The Board is concerned about comments made by residents about the apparent reluctance of Shell to talk about their concerns and work out solutions. It appears that Shell's response to some complaints have not been acted on with the diligence nor promptness the Board expects.

While the Board believes that Shell has done a good job of communicating the effects of the proposed increased throughput application, it is concerned with Shell's general handling of its operation and the apparent erosion of public confidence. The Board also notes that some public concerns relate to facilities other than Shell's. The Board believes that the interrogatory process is an opportunity to initiate improved communication between Shell and area residents and better address concerns raised by these residents.

7 DECISION

Having regard for the evidence which the Board received and considered, the Board believes that approval of the application to increase throughput at the plant as indicated in Attachment 1 would be in the public interest. Therefore, the Board is prepared to approve the application subject to the following conditions:

1. Shell is to conduct a thorough review of the potential for increases in fugitive emissions from all sources.
2. Shell is to notify the Board, on a quarterly basis, of all public complaints it receives through its 1-800 telephone number and the follow-up action that is taken.
3. Shell is to review the location of its monitoring trailers with AEP and the Air, Water, and Soils Committee and satisfy the Board that they are optimally located.
4. Shell is to work with the Pagets on an appropriate location for the Paget trailer and report back to the Board within three months.

DATED at Calgary, Alberta on 9 April 1997.

ALBERTA ENERGY AND UTILITIES BOARD

F. J. Mink, P.Eng.
Presiding Member

Gordon J. Miller
Board Member

J. D. Dilay, P.Eng.
Board Member

ATTACHMENT 1

SHELL CAROLINE GAS PLANT RATES

Operating Parameter	Current Approval	Requested Rate
1. Raw feed inlet rate (10 ³ m ³ /d)*	9 435	10 850
2. Sulphur inlet rate (t/d)**	4 513	5 450
3. Sales gas rate (10 ³ m ³ /d)	2 709	3 580
4. Pentanes plus production (m ³ /d)***	3 050	4 235
5. C ₂ + mix (natural gas liquids (m ³ /d))	4 896	5 460
6. Molten sulphur (t/d)	4 501	5 445
7. Minimum annual sulphur recovery (%)	99.8	No Change
8. Minimum quarterly sulphur recovery (%)	99.5	No Change
9. AEP approved maximum daily SO ₂ emission rate (t/d)	45	No Change
10. AEP approved max. one-hour SO ₂ emission rate (t/d)	2.63	No Change
11. Actual average daily SO ₂ emission rate in 1995 and Shell's projected emission (t/d)	10.2	12.7

* thousand cubic metres per day

** tonnes per day

*** cubic metres per day