IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF a Notice of Review of resource consent CRC930289 **ASHBURTON MEAT PROCESSORS LIMITED** under s 128 of the Resource Management Act 1991

DECISION OF COMMISSIONERS C E ROBINSON AND DR S SELVARAJAH

Introduction

1. In 1993 Environment Canterbury ("the Council") issued a resource consent to Ashburton Meat Processors Limited ("AMPL") to discharge screened meat works effluent via spray irrigation, onto 24.6 hectares of land, at or about map reference L37:121-008 at Bridge Street, Netherby. The resource consent was granted for a period of 35 years subject to conditions including the following:

> Condition 9
>
> *"The Canterbury Regional Council may annually, on or about the last working day of March each year, serve notice of its intention to review the conditions of this consent for the purposes of:*
>
> *(i) Dealing with any adverse effect on the environment which may arise from the exercise of the consent;*
>
> *(ii) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment;*
>
> *(iii) Complying with the requirements of a regional plan;*
>
> *(iv) Altering the frequency of sampling required in condition 8; or*
>
> *(v) Reviewing the methods used to sample and analyse determinants specified in condition 8."*

2. On 31 March 2004 the Council gave notice of its intention to review the resource consent conditions in accordance with s 128(1) of the Act and with Condition 9 of the resource consent.

3. The Notice of Intention to Review indicated that all of the conditions (1 to 10 inclusive) were subject to the review and noted that it may be necessary to add new conditions to the consent to address adverse effects.

4. The reasons for review were given as follows:

> *"Nitrate nitrogen concentrations in ground water down-gradient of the Ashburton Meat Processors Limited discharge area have increased beyond those anticipated when the consent was granted. Ground water in this area is abstracted for domestic drinking water, and concentrations have frequently exceeded the Maximum Acceptable Value for nitrate set out in Drinking-Water Standards for New Zealand 2000 (Ministry of Health, August 2000). Ground water sampling from August 2000 onwards has shown a plume of nitrate contamination approximately half a kilometre wide, extending about 2 kilometres south east from the Ashburton Meat Processors Limited discharge area."*

5. In accordance with s 129(1)(d) the Council invited the consent holder to propose new conditions within 20 working days of serving the notice.

6. AMPL took that opportunity and presented conditions to the Council.

7. In making its decision to review the consent the Council took into account:

   7.1 Environment Canterbury draft report "Nitrate contamination of ground water in the Ashburton – Rakaia" written in February 2004 by S A Heywood and C R Hansen;

   7.2 Ground water quality and consent monitoring data collected by Environment Canterbury since 1992; and

   7.3 Information presented to residents of the North East Ashburton area and newsletters and public meetings from October 2000 onwards.

8. The Council then issued a notice of hearing commencing on 28 September 2004 and duly appointed independent Commissioners to hear and determine the review of the resource consent conditions.

9. As Commissioners we were appointed by the Council to consider and decide the review of the resource consent conditions of resource consent application CRC930289 by AMPL with the full powers of the Council as consent authority in respect of this matter.

10. At the commencement of the hearing it was agreed by all parties that the procedure to be followed in relation to an application for review hearing would be as follows:

    10.1 It was for the Council as the proponent of the review to outline the basis upon which it initiated the review of resource consent conditions and to speak to various reports prepared under s 42A of the Resource Management Act.

    10.2 AMPL represented by legal counsel, Mr K Smith with evidence from Mr D Graham, Operations Manager for A Verkerk Limited, the shareholder of AMPL, Mr Cliff Tipler from URS Limited in respect of waste water disposal and Mr Chris Evans from URS Limited, a ground water scientist.

    10.3 Submitters in opposition were invited to present their submissions in the following order:

10.3.1 Mrs H A Mulligan, a resident;

10.3.2 Mr John McKenzie on behalf of Ashburton District Council;

10.3.3 Mrs Judith Williamson on behalf of Community and Public Health;

10.3.4 Mr K J McKinstry, Chairman of the North East Ashburton Residents Action Group;

10.4 Council officers were then invited to offer any further comment in response to the matters they had heard;

10.5 Mr K Smith then presented a right of reply on behalf of AMPL.

11. The hearing was then adjourned. The Commissioners undertook a site visit and formally closed the hearing on October 15 2004.

The case for the Council

12. Ms Jackie Todd, a Consents Investigating Officer employed by the Council noted that prior to the review of consent conditions being notified the consent holder had entered into discussions with Council officers regarding appropriate resource consent conditions. She acknowledged that there was a willingness from AMPL to entertain discussions regarding resource consent conditions in light of the issues that had arisen and noted that in general, council officers support the intention of what was proposed by AMPL. Ms Todd then addressed the areas where there remained differences between the views of Council officers and those of AMPL.

In particular, the review dealt with existing resource consent condition 3 which provided that

> *"the rate at which the abattoir effluent is applied shall not exceed 200 kilograms of nitrogen per hectare per year on to grazed pasture, or an equivalent effluent application and land management system, that matches the annual nitrogen application with annual plant uptake."*

It was acknowledged that in recent times AMPL had altered its land management practices to adopt a cut and carry approach which provided a more reliable method of calculating nitrogen uptake than the condition previously stated.

13. AMPL had proposed that the condition be amended as follows:

> *"The aerial nitrogen loading rate of the discharge of screened meat works waste water shall not exceed 400 kilograms N per hectare per year for the area of land to which the waste water is applied."*

14. Council officers, Mr Reijnen and Mr Hansen considered that further information needed to be provided before it could be determined whether 400 kilograms per hectare was an appropriate limit. It was also noted that the method of calculating the nitrogen loading rate needed to be specified.

The Council officers recommended that the average of the five daily composite samples taken in accordance with proposed condition 12 be used to calculate the nitrogen loading for the following two months. Council officers recommended that the wording of the condition be amended as follows:

"The aerial nitrogen loading rate of the discharge of screened meat works waste water on to any part of the disposal area shall not exceed X kilograms of nitrogen per hectare over any consecutive 12 month period. The aerial nitrogen shall be calculated using the most recent sample taken in the previous two monthly sample in condition 12."

15. Another area of difference was proposed condition 5. AMPL suggested that the condition should provide that the

> *"two year rolling average of the difference between the mass of nitrogen applied to the total irrigation area and the total nitrogen and herbage 'cut and carried' from the same area, taken over consecutive years, shall not be greater than 150 kilograms of nitrogen per hectare".*

Council officers in their reports considered that further information needed to be provided before it can be determined whether a net loading rate of 150 kilograms per hectare was an appropriate limit. The method for calculating the amount of nitrogen removed by the cut and carry method should be detailed in the management plan.

16. Council officers recommended the following wording:

> *"The two year rolling average of the difference between the mass of nitrogen applied to any part of the disposal area and the total nitrogen and herbage 'cut and carry' from the same area, taken over consecutive years, shall not be greater than X kilograms of nitrogen per hectare per year."*

17. Council officers were not able to confirm that they accepted that the loading rate of 150 kilograms per hectare was necessarily appropriate but did not offer an alternate figure.

18. A further issue related to the number of bores required to provide monitoring data. AMPL proposed new condition 13 which provided an up-gradient ground water monitoring well will be established at bore L37:1368, and two down-gradient ground water monitoring wells will be established at bore L37:1206, and at or about Map Reference Sheet NZMS260 L37:1193-0060. There was some debate during the course of the hearing as to the appropriate number of bores. Council officers considered that three monitoring bores was insufficient and suggested that there should be four wells, one upstream of the site and three down-gradient. Council officers acknowledged that while it would be desirable to have bores outside the property boundary of the consent holder, there was some uncertainty attributed to the results of wells outside the control of the consent holder and also there may be issues regarding access to those wells. In the end we understood Council officers to concede that provided there were four bores, one up and three down-gradient this would meet the satisfaction of Council officers.

19. Monitoring frequency was also an issue for Council officers in relation to proposed condition 14 relating to the sampling of ground water from the monitoring wells, Council officers considered that monthly sampling of ground water would be preferred to gain an adequate understanding of the effects of the discharge of ground water. This was disputed by the consent holder and we will address their reasons for opposition below.

20. The final issue related to the necessity or desirability of undertaking a full one-off intensive soil investigation. AMPL had offered a condition that provided as follows:

> *"At least two representative soil sampling sites shall be established within the waste water discharge area. At each location soil composite samples to a depth of 0.075 metres shall be taken annually in October and analysed for the following:*

(i) Total nitrogen;

(ii) Available nitrogen determined by the anaerobic incubation method;

(iii) Olsen P;

(iv) Available phosphorous;

(v) Base saturation;

(vi) CEC;

(vii) pH;

(viii) Bulk density;

(ix) Organic matter."

21. Council officers considered that this may be an appropriate condition for ongoing soil monitoring. However, they have suggested to the consent holder that a more intensive soil investigation should be carried out prior to the hearing. The Council officers believe that there was insufficient time for this but that they have indicated a willingness to undertake such an investigation and this could be discussed further at the hearing. Council officers were hopeful that the Commissioners might request that information from AMPL before reaching a decision in relation to the review. We note at this stage that AMPL disputed the need or indeed the usefulness of such detailed soil investigation as a result of this review process.

Case for AMPL

22. Mr Smith on behalf of AMPL, outlined the legislative framework upon which resource consent conditions can be reviewed under the Resource Management Act. He noted that the Council gave its notice to review in reliance upon s 128(1)(a). He submitted that the conditions of resource consent allowed for reviews and complies with s 128(1)(a)(iii) and therefore it must follow that the statutory power being exercised by the Council is the one contained in 128(1)(a)(iii) and no other.

23. Mr Smith noted that the only statutory power being exercised is a right to seek a review for any purpose specified in the consent and that the Council's reason for stating a review appears under the heading in the letter of 31 March 2004 relating to nitrogen concentrations in ground water down-gradient of AMPL's discharge area that have increased beyond those anticipated when the consent was granted.

24. Mr Smith then referred us to s 131 of the Act which sets out the matters that the consent authority is to have regard to when considering an application for review of consent conditions. As Commissioners appointed by the Council he said we are to have regard to the matters contained in s 104 of the Act and to whether the activity allowed by the consent will continue to be viable after the change and we may have regard to the manner in which the consent has been used.

25. Mr Smith emphasised the importance of the issue of viability. He submitted that the word "viable" in this context must mean the activity is both practically and financially feasible after any change to the consent conditions have been made. Mr Smith acknowledged that the Council officers appeared to accept that an important consideration was the future viability of

the company and that they did not wish to see conditions imposed which would be unduly restrictive of the company in that regard.

26. Mr Smith submitted that in relation to s 132 of the Act, that there was some significance in the words used by Parliament that a condition can be changed "if and only if" one or more of the circumstances specified in s 128 apply and in this case that the content of the notice of review on 31 March has to be proved to an adequate degree and that the consent remains viable.

27. Mr Smith emphasised that there was an onus on the Council that must be discharged before any decision under s 128 can be made. There must be cause and effect. Mr Smith also referred to numerous cases where the Environment Court and High Court have held that while there is no formal burden of proof under the Resource Management Act the standard of proof is the balance of probabilities although in some case which refer to the balance of probabilities having regard to the gravity of the question. He noted that a party asserting a set of circumstances or a statement of fact, is required to present cogent evidence on which the statement could be based.

Mr Smith submitted that given the Council is seeking a review of what it has previously done it is not unreasonable to expect the Council must have to discharge an onus demonstrating that this step is appropriate. After all, the corollary is the possibility that the Council could allow a substantial investment to be made following the granting of resource consent only to undo that work later.

28. We, however, understood that the company had accepted to some degree that their activities were contributing to the plume effect which had been identified by Council officers. However, the extent of that contribution was uncertain owing to a lack of understanding of the effects of upstream users and also the number of septic tanks within the plume area which may also be having an effect on the elevated nitrogen levels measured in surrounding bores.

Mr Smith was critical of the approach taken by Council officers to their assessment criteria. He noted that the theme running through that report is that s 131 opens up an assessment under part II of the Resource Management Act. He is also critical of the fact that the report dwells on the RPS and proposed Canterbury Natural Resources Regional Plan (NRRP). Mr Smith initially suggested that we should read down the reference to part II matters. However, we understood him to accept that we can have regard to both the planning documents and part II insofar as they relate to the issues under review and that it was not open to us to enter into a wide ranging reassessment of the grant of resource consent subject to those matters.

29. Finally, Mr Smith addressed issues raised by submitters noting that some submitters were seeking matters which were outside the scope of this review process including a reduction in the duration of a resource consent which is expressly excluded by the relevant statutory requirements. Clearly also the resource consent cannot be cancelled in terms of this review. He also made a comment in relation to a submitter's request that a condition be imposed requiring the applicant to provide an alternative potable water supply. Mr Smith submitted that this was not practicable and referred to evidence to be given by Mr Tipler, particularly in relation to the difficulties with establishing causation for the high nitrate levels in surrounding domestic water wells.

30. We then heard from Mr D Graham on behalf of the major shareholder in AMPL. He explained the activities of AMPL, the company and its endeavours in recent years to improve environmental practices including the fact that it now operates under an approved risk management programme under the New Zealand Food Safety Authority performance based verification system. He outlined the steps taken to consult with the Council relating to the

company's effluent and waste management practices and he appended a draft copy of the company's updated management plan which following the review of resource consent conditions is to be incorporated into the company's risk management programme and then audited by the New Zealand Food Safety Authority. Mr Graham confirmed that the company accepted the recommendations of Mr Cliff Tipler in relation to the amended conditions. He noted that the company was already putting into place improved management practices in accordance with the draft management plan and in the first year, March 2003 to February 2004 the company had been able to achieve a residual nitrogen loading of 112 kilograms per hectare and was fully compliant with its resource consent.

31. Cliff Tipler, an Environmental Engineer and principal of URS New Zealand Limited gave evidence that the land management practices proposed by the company would result in a harvesting operation where the recovered nitrogen may well exceed the nitrogen applied by waste water applications. He acknowledged that there would be some loss to ground water of nitrate nitrogen and gave an estimate of this loss.

32. Mr Tipler supported the new proposed condition 3 which sets the maximum application rate of 400 kilograms N per hectare per year. He said that the rate was consistent with the data collected for the 2003/ 2004 years as he believed that at that rate the leaching of nitrate to ground water could be effectively controlled by land management practices that he had proposed.

33. In relation to proposed condition 5 and the appropriateness of the net nitrogen loading rate proposed of 150 kilograms N per hectare per year he stated that this represented a 50 kilogram N per hectare per year reduction over the previously consented limit. He noted that Environment Canterbury had for many years accepted that a net nitrogen loading rate of 200 kgn per hectare per year was acceptable.

34. In relation to the issue of the number and location of ground water monitoring wells proposed by condition 13 he considered that the three wells proposed by the company, one up-gradient and two down-gradient were sufficient to show the environmental effects of the consent holder's activity. Mr Tipler was reluctant to accept any suggestion of a bore outside the property boundary. He noted that one bore measured by the Council known as the Mareeba Gardens well L37/ 0918 was measured and it returned the highest concentration 37.8 per cent higher than the average of the five nearby wells and he noted literature Di and Cameron (2002) which recorded market gardens as the land use system having the highest potential for causing nitrate leaching.

35. In relation to proposed condition 14 he did not support monthly sampling of the ground water monitoring wells. He believed there was no evidence to support a monthly sampling regime and he considered a two monthly monitoring as sufficient frequency to assess the impact of the activities.

36. Mr Tipler resisted any suggestion of the need for a detailed soil sampling programme to be carried out. He did not believe that there was any evidence to suggest that it was warranted and he noted that the newly sown pasture in 2003/ 2004 grass types were able to fix over 300 kilograms N per hectare per year and that the sampling of soils undertaken from the Verkerks and Abattoir blocks showed good Olsen P values and SAR values which further supported his proposition.

37. Finally, for the applicant company, Mr Chris Evans, a ground water scientist, employed by URS Limited gave evidence as to the site soils' geology and hydrology. He discussed nitrate contamination issues and assessed the effects of waste water disposal on ground water nitrate

concentration. He concluded that the hydrological characteristics of the site under the proposed cut and carry regime the waste water discharges would only have a minor effect on down-gradient drinking water wells during the winter months and any increase in nitrate nitrogen concentration in ground water resulting from AMPL's discharge should not result in the maximum acceptable value exceeding 11.3 grams per cubic metre. Mr Evans, however, acknowledged that there may be other factors in the environment which might cumulatively result in the maximum acceptable value exceeding the 11.3 figure.

38. Mr Evans accepted that there was a plume in existence. However, he noted that there were more wells within the plume area which were at shallower depth than in the wider Ashburton area and he thought that this might provide some explanation for the existence of the plume. He suspected, based on his knowledge, that if there were more shallower wells in other locations around Ashburton, that other plumes may be in existence. He did, however, generally accept that there was a contribution to the plume from the activities of the company. He drew our attention to the fact that the report from Heywood and Hansen upon which the Council had relied on promulgating this review followed a period of the highest rainfall ever recorded in Ashburton which had followed one of the driest winter periods on record. He considered that this would also explain the elevated levels of Nitrate Nitrogen.

Submissions

39. In response to public notification the Council received 11 submissions. Four submitters requested to be heard in support of their submissions. Submissions came from Ashburton District Council, Community and Public Health, the Committee of North East Ashburton Residents Group ("NEARAG") and eight people living in an area concerned about the impact on water quality.

40. Submitters requested a range of conditions including:

- Improved treatment for effluent prior to discharge on to land to ensure that the quality of drinking water in the area complies with health standards;
- Conditions that reduce the nitrate concentration in ground water to below MAV for drinking water;
- A limited on the gross application rate of nitrogen applied in the effluent (backed by information that demonstrates that the net residual loading of N as appropriate given soil type, water holding capacity, climatic conditions and annual rainfall);
- Increased monitoring of the effects of the discharge;
- A limit on effluent application when soil temperatures drop below 6 degrees centigrade or when soil water holding capacity is met;
- Continue to monitor existing sampling wells given the value of historical data obtained from these wells;
- A requirement for AMPL to supply alternate sources of potable water down-gradient residents an affected plume if the nitrate concentration in their well exceeds the MAV for drinking water;
- A management plan which limits the amount of nitrate being leached to ground water;

- A more comprehensive soil sampling programme with standards set for all parameters sampled; and

- A requirement for AMPL to take action when the soil water holding capacity is reached.

41. During the course of hearing submissions, it was accepted by all that under this review the consent duration cannot be changed and the consent cannot be cancelled and that the scope of the Commissioner's jurisdiction is limited to those matters in s 128(1)(a) of the Act as set out in the Notice of Review. Submitters, Mrs Mulligan and the NEARAG spoke strongly of the importance to good clean drinking water in their area and their concern about the elevated nitrate levels measured within the plume area. The residents group acknowledged the importance of the meat processing plant to the economy of Ashburton, however, emphasised their concerns about the unacceptable water quality. The submitters spoke of their concern that they had already met significant capital costs in putting down wells and in some cases had been assured of the water quality in the area. The submitters expressed a reluctance to be forced to move to a reticulated water supply system as a matter of principle and as a matter of cost given the outlay in establishing wells in the area. The residents group asked that a restriction be placed on the company so that drinking water met a higher standard than that advocated by the guidelines. The residents sought 8 mg N per litre rather than the 11.3 advocated in water quality guidelines. This was on the basis that that was the level of nitrate measured in wells outside the plume area.

42. Community and Public Health ("CPH") were concerned that the review gave no assurance that the change or the proposed changes to conditions would in fact make a difference and that there would be a long period of time before the results were known. CPH gave evidence as to the effect of high nitrate levels on public health. In particular, a condition known as Methaemoglobinaemia, a description given to high levels of methaemoglobin in the blood which results in oxygen deprivation throughout the body. This condition is also known as "blue baby syndrome". It appears that infants are both in the womb and until the age of three months are susceptible to the effects of nitrate.

43. CPH explained the MAV (maximum acceptable value) for nitrate which is set out in the drinking water standards for New Zealand 2000 (DWS 2000). The submitter explained that ground water monitoring in mid Canterbury over the last few years has shown that elevation of nitrate levels is widespread in the region, with some levels approaching or exceeding the MAV. CPH are not surprised by this finding given the region's intensive agriculture and horticultural history and the shallow and unconfined nature of much of the region's ground water.

44. CPH also raised the issue of the risk of contamination by pathogenic micro organisms including campylobacter, salmonella, giardia and cryptosporidium. In relation to this issue counsel for the applicant company disputed whether such issues were within the scope of this review.

45. Both the residents and CPH urged the Commissioners to consider imposing a condition which required the supply of an alternative potable water supply within the plume area, particularly for those persons in the higher risk area being pregnant women and infant children.

46. Finally, Mr John McKenzie for Ashburton District Council spoke generally in support of the activity of AMPL noting its important contribution to the economy of Ashburton but also highlighting the concern about the increasing nitrate problem within the area and urged the Commissioners to impose conditions only to the extent to which they related to the effect on ground water that the discharge causes rather than simply controlling the rate of application of

waste. Ashburton District Council sought an increased monitoring regime and improved consultation mechanisms should contamination occur in the ground water.

Council Officer Reply

47. Jackie Todd confirmed that the Council officers still remained concerned about the justification for the proposed 400 kilogram N per hectare per kilogram limit application rate and did not have an alternate calculation available at the hearing but offered to do should the Commissioners so request.

48. Council officers also remained concerned about proposed condition 12 and the nitrogen loading. Their concern was the multiplication of average results and the uncertainties that that might result in.

49. They urged us to require the gross loading rates to be calculated on a per run basis. Council officers recommended that there should be four monitoring bores, one up-gradient and three down-gradient. They accepted the uncertainty that may arise in relation to monitoring bores outside the land within the applicant's control.

50. In terms of the request by submitters about an alternative potable water supply the Council officers believed that that was a reasonable request although they accepted that it would be incredibly difficult in this case to ascertain what the cause of elevated nitrate levels might be. They noted the number of septic tanks within the area and considered there was more work to be done by the Council to eliminate other sources if such a remedy was to be made available.

51. Council staff confirmed that they still supported the need for an intensive soil sampling regime and had requested that prior to the hearing. They believed that the water holding capacity of the soil varied considerably over the site and that there were potential long terms effects including mineralization.

AMPL Reply

52. Mr Smith emphasised that this was a review of an existing resource consent and that the onus was on the consent authority initiating the review to prove an evidential basis for changes it advanced. He believed that this was not a full inquiry and therefore s 41 of the Resource Management Act did not apply and that AMPL could not be asked to do something that was beyond the scope of the review. He submitted that the intensive soil samples requested by Environment Canterbury were not raised on a proper basis within the scope of this review or in evidence. He also submitted that concerns raised by Community and Public Health about "bugs" were a tangential issue and that this review was solely justified on the basis of the elevated nitrate levels claimed by Environment Canterbury and that it was not an opportunity for a wide ranging inquiry into the conditions of this resource consent.

53. Mr Smith also raised concerns about the way in which reference had been made throughout the hearing about compliance by the company. He believed care needed to be taken when referred to the words "non-compliance" and noted that in the last round of compliance monitoring from 6 November 2003, 5 March and 8 April and June this year AMPL were fully complying. He believed that the reference to non-compliance had the necessary implication that there had been a breach of resource consent and he submitted that if that were the case then he would have expected enforcement action to have been taken by the Council.

54. Finally, Mr Smith submitted that he believed that the consent holder had offered a robust set of draft conditions which were supported by Environmental Engineer, Mr Cliff Tipler. He noted

that the Council had accepted in large part most of the conditions but there were one or two areas where the Council felt more information was needed. However, he was critical of the fact that the Council had not supplied that information. Mr Smith submitted that this left Commissioners in a vacuum and a gap that we cannot fill based on the information. We needed to look at the proposal based on the evidence which had been supplied in the context of this hearing.

Decision

55. The decision of the Commissioners is structured in two parts. Firstly, it deals with the legal issues that have been raised in opening by AMPL and as has been raised in submissions. The second part of the decision will deal with the amended conditions.

Legal Issues

56. We accept that the jurisdiction for a review of resource consent conditions is limited to the matters raised in the Notice of Intention to Review served on the consent holder on 31 March 2004.

57. The scope of our review is necessarily limited to the circumstances which justify the review, i.e. the reasons for review which is the effect of the elevated nitrate nitrogen concentration in ground water down-gradient of the AMPL discharge area.

58. When considering the merits of the review we are guided by ss 130 and 131 of the Act. Although s 130(1) provides that ss 96 to 102, with all necessary modifications, applies in respect of the review as if the Notice of Review were a resource consent and the consent holder were the applicant, we note that the those sections relate to the procedural aspects of making a submission and arranging a hearing rather than this consideration of the substantive issues.

59. S 131 sets out the matters to be considered by us in considering the substantive issues. It provides:

    59.1 Shall have regard to the matters in s 104 and to whether the activity allowed by the consent will continue to be viable after the change;

    59.2 May have regard to the manner in which the consent has been used.

60. Subsection 2 deals with conditions when it is proposed to include a condition requiring the consent holder to adopt the best practicable option.

61. On the basis of the case put to us by the Council and as responded to by AMPL, we did not understand that we were being asked to consider a condition requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment.

62. In our view that when we are having regard to the matters in s 104 we do so to the extent to which the matters in s 104 are relevant to the issues raised in the Notice of Intention to Review. Subject to part II of the Act the matters we consider relevant are:

    62.1 Any actual or potential effects on the environment as a result of the activity;

    62.2 The provisions of the Regional Policy Statement and the recently notified proposed natural resources regional plan ("NRRP") to the extent those documents address issues relating to nitrogen contamination of ground water;

62.3 Any other matters relevant and reasonably necessary in determining this application.

63. Part II of the Act guides our approach to those matters listed in s 104.

64. In effect we need to strike a balance between the social and economic needs of the community and avoiding, remedying and mitigating adverse effects of the activity on the environment to the extent these effects are the subject of this review.

65. In the context of the s 128 review this is not the end of the matter. We are required to consider whether the activity will continue to be viable after the change to conditions.

66. In this case AMPL has offered a number of conditions and these have generally been accepted by the Council and we are able to conclude that the proffered conditions will allow AMPL to remain viable if they were to be imposed.

67. To the extent that the Council or submitters seek more stringent controls (and there is evidence to support them) we would need to be satisfied that those conditions would, if imposed, allow the company to continue to be viable.

Conclusion on proposed conditions

68. In the following section we will address specifically the evidence in relation to conditions where there is some dispute or disagreement between the Council, AMPL and submitters as to the appropriate standard.

69. We have not specifically commented on all conditions but note that to the extent that there has been agreement between Council officers, AMPL and no specific issue raised by submitters, we have been able to conclude, based on the evidence presented to us that those conditions are indeed appropriate and we will require amendment of the same.

Nitrogen Loading Rate

70. AMPL proposed the following condition:

> *"the areal nitrogen loading rate of the discharge of screened meat works waste water shall not exceed 400 kg N per hectare per year for the area of land to which the waste water is applied.*

71. As discussed above, Council officers were not satisfied that 400 kgs per hectare was an appropriate limit. They also noted that the method of calculating the nitrogen loading rate needs to be specified. Council staff believe that the average of the five daily composite samples taken in accordance with proposed condition 12 should be used to calculate the nitrogen loading rate for the following two months.

72. Council staff recommend the following amended wording;

> *"the areal nitrogen loading rate of the discharge of screened meat works waste water onto any part of the disposal area shall not exceed X kilograms of nitrogen per hectare over the consecutive 12 month period using the most recent sample results taken in the previous two monthly sample in condition 12."*

73. The pasture uptake of N is important to reduce nitrate leaching and N accumulation in soil. The amount of N removed from the site therefore depends on the amount of pasture removed from the site and its N content. In the absence of information from the council staff we could only consider the information provided by the consent holder and Mr Tipler.

74. Mr Tipler stated that the N content of the pasture removed ranged from 2.3 to 3.7% and the amount of pasture removed was 287,390 kg per season. We presume that the amount of pasture removed had been calculated on a dry matter basis, therefore the amount of pasture removed was 11683 kg/ ha/ season based on total irrigable area being 24.6 ha. In our opinion if the effluent irrigation is properly managed the pasture removal could be increased up to 16,000 to 18,000 kg dry matter/ ha/ year. This is possible if the consent holder manages the soils conditions to enhance nutrient uptake by pasture which includes avoidance of saturated or dry soil conditions. Under saturated and dry conditions nutrient uptake by pasture will be low.

75. As for the N content of the pasture using the range provided by Mr Tipler we estimate that on average the N content of the pasture will be 3%. This is an acceptable figure for N content in the presence of little or no clover at the site because presence of clover could increase the N content of the pasture. Therefore based on 11683 kg/ha/year dry matter production and 3% of N content the N removal could be estimated as 350 kg/ ha/ year. We compared this with Mr Tipler's more accurate N removal estimate of 305 kg/ ha/ year based on the N content range (i.e. 2.3 – 3.7%). Using Mr Tipler's figure of 305 kg N/ ha/ year as N removal because we believe it is a conservative estimate (i.e. at the lower scale of N removal) and that more N could be removed as a result of good soil management practices by the consent holder. It should also be noted that as noted by Mr Tipler, Council staff used a figure of 364-405 kg N/ha/year under normal conditions.

76. It is now a question of what happens to the balance of the N applied being 95 kg N/ha/year.

77. Effluent-N applied to soil not taken up by pasture could be lost from soil either through gaseous loss processes such as volatilisation (as ammonia gas) and denitrification (as nitrogen and nitrous oxide gases) or leaching (mainly as nitrate). Ammonia volatilisation occurs during and following effluent application from effluent itself and soil and plant surfaces. Ammonia loss is greater during high temperature conditions. Since there is no nitrate present in the effluent there will not be any instantaneous denitrification losses from effluent-N, however, the high dissolved organic content of effluent could denitrify any nitrate present in soil following effluent irrigation. We conclude that given the prevailing conditions, gaseous losses through ammonia volatilisation and denitrification will be relatively low.

78. Apart from gaseous N losses, N could be lost from the root zone by irrigated effluent flushing out nitrate present in soil. Nitrate in soil is generated from ammoniacal-N under unsaturated conditions through a process called nitrification. Most of the ammoniacal-N present in soil is either directly or indirectly derived from the effluent. Ammoniacal-N present in effluent could be either adsorbed to soil clay particles which is available for plant uptake or nitrification or absorbed and synthesised by soil bacteria, a process known as immobilisation. When soil bacteria die and decay the ammoniacal-N is released back to soil and this process is referred to as mineralization. The equilibrium between immobilisation and mineralization is controlled by the quality and ratio of soil carbon and nitrogen. Since the effluent is rich in potentially available organic carbon the equilibrium shift be towards immobilisation rather than mineralization. Since both immobilisation and mineralization processes coexist in soil, from hereon we refer to immobilisation as 'net immobilisation' because immobilisation > mineralization. Therefore under the given conditions and based on Mr Tipler's evidence we conclude that plant uptake, nitrate leaching and net immobilisation of nitrogen could be the most predominant N processes compared to the gaseous losses outlined in the above.

79. Since nitrate leaching is the process under focus due to the potential to contaminate ground water, in the absence of onsite nitrate leaching information, N budget for an effluent irrigation system could be used to predict the amount of nitrate leaching. Mr Tipler made a comparison

of N budgets between several effluent research trials and existing meat works land treatment systems. In the absence of actual nitrate leaching information for the site this is generally an accepted practice. However, there are numerous variations between such trials and land treatment systems. Therefore such comparisons should be viewed cautiously. A cautious approach to N budget requires little or no dependency on one dominant N process unless any such dominant process has been proven scientifically to be dominant consistently. Mr Tipler concluded that based on his collation of information on N budget there may be an N deficit in the proposed system. This means that the 'removal' of applied-N is more than that of applied effluent-N. We believe that such a deficit is caused by the use of a high 'immobilisation' figure such as 150 kg N/ ha/ year based on the information from Di and Cameron (2000) and that an annual 'immobilisation' rate of 150 kg N/ ha/ year is excessive. Even if we accept such a figure, we must consider any long term implications to potential nitrate leaching because if the immobilisation-mineralization equilibrium shifts towards mineralization (i.e. net mineralization) in future the potential for nitrate leaching is high. Therefore if we accept a high 'immobilisation' of N predicted by Mr Tipler, on the one hand we place most of the weight on 'immobilisation' process to minimise N leaching and on the other hand we leave considerable doubts in terms of long term sustainability of the AMPL effluent irrigation system. Therefore we have decided to not to use a figure of 150 kg N/ ha/ year as net annual immobilisation rate. We emphasise that net annual immobilisation rates should be obtained from long term trials or historical meat works land treatment systems rather than from short-term trials.

80. We are fortunate that at least the plant uptake for the site is known and it is a matter of ascertaining that of the remainder of N not taken by pasture which proportion will leach as nitrate Mr Tipler predicted a figure of 50 kg N/ ha/ year as nitrate leaching. This is nearly 50% of the N not taken up by pasture. The remainder of 45 kg N/ ha/ year not taken up by pasture will sustain gaseous losses (ammonia, nitrous oxide and nitrogen) and net immobilisation. Bearing in mind this is only (approximately) 10% of the applied-N the combined gaseous N losses and net immobilisation is at the lower end of the scale hence in reality this figure could be greater but may not be as great as Mr Tipler predicted (i.e. 179 kg N/ ha/ year for combined gaseous N losses and immobilisation). Therefore if we accept the N leaching loss of 50 kg N/ ha/ year there may be N deficit in the system. Since the objective of the effluent irrigation is to dispose effluent to land whilst minimising nitrate leaching, any such N deficit will reduce nitrate leaching and hence should be viewed as beneficial. Alternatively, since the combined gaseous N losses and net immobilisation could be >45 kg N/ ha/ year, we consider 50 kg N/ ha of annual nitrate leaching could be at the higher end of the scale hence from a conservative viewpoint we accept the use of this figure by Mr Evans to predict ground water quality.

81. We accept 305 kg N/ha/year being plant uptake, 50 kg N/ha/year being leaching of nitrate and other 'losses' (i.e. net immobilisation and gaseous losses) being >45 kg N/ha/year and conclude that the proposed effluent-N loading rate of 400 kg N/ha/year is acceptable.

Net Nitrogen Loading Rate

> "*The two year rolling average of the difference between the mass of nitrogen applied to the total irrigation area and the total nitrogen and the herbage 'cut and carried' from the same area, taken over consecutive years, shall not be greater than 150 kgn of nitrogen per hectare.*"

82. Council staff, Mr Reijnens and Mr Hansen, consider that further information needs to be provided before it can be determined whether a net loading rate of 150 kgns per hectare is an appropriate limit. Council staff also consider the method of calculating the amount of nitrogen removed by cut and carry should be detailed in the management plan.

83. Council staff recommend the wording should be as follows:

> *"the two year rolling average of the difference between the mass of nitrogen applied to any part of the disposal area and the total nitrogen and herbage 'cut and carried' from the same area, taken over consecutive years, shall not be greater than X kilograms of nitrogen per hectare per year."*

84. As we discussed before the N removal by cut and carry system was estimated as 305 kg N/ ha/ year. If effluent is irrigated at the rate of 400 kg N/ ha/ year, the N not taken up by pasture will be 95 kg N/ ha/ year. The consent holder proposes that the average N not taken up plant not to exceed 150 kg N/ha/year for two consecutive years. We believe that this allowance is excessive bearing mind the potential N deficit the system may sustain. Mr Tipler also predicted a deficit in his evidence. Moreover, if properly managed the pasture uptake of N could be more than the estimated 305 kg N/ ha/ year. If saturated soil conditions are minimised and supplementary moisture is provided during dry periods and other major soil nutrients are managed properly the pasture N uptake could be much greater. For example Mr Reijnen from the Council reported that under normal conditions a harvesting of 364-405 kg N/ ha/ year should occur.

85. We believe that by allowing lower margin between N harvested and N applied there is an incentive for the AMPL to provide conducive soil conditions to enable greater N uptake by pasture. However, we believe that any such margin set should be realistic and compliable. Having carefully considered Mr Tipler's and council staff reports and evidence we conclude that a margin or difference of 100 kg N/ ha/ year between N harvested and N applied is easily and realistically achievable by the consent holder and promotes better soil management conditions to minimise long term N accumulation in soil. Therefore we propose 150 kg N/ha/year in proposed condition 5 be replaced with 100 kg N/ha/year.

86. The general wording in condition 5 proposed by AMPL and council staff is slightly different and 'area' specific. Because of the natural spatial variation of soil conditions and characteristics within the disposal area we believe it is unrealistic to expect little or no variation between paddocks in terms pasture performance or N uptake. Some paddocks may have greater pasture N uptake than the others. This was evident from Mr Tipler's evidence that the %N in harvested pasture was 2.3 to 3.7 at the AMPL site. Therefore it is unrealistic to expect a consistent difference of 100 kg N/ ha/ year between applied effluent-N and harvested N from all paddocks. In the circumstances we believe that the most appropriate approach would be to use an average values for the whole of the disposal area. Whilst realistic and practical, this approach will still result in the same environmental outcomes anticipated by the general wording of condition 5 by both parties. Therefore we alter condition 5to read as follows: "The two year rolling average of the difference between the mass of nitrogen applied and the total nitrogen and herbage "cut and carried" in the disposal area, taken over consecutive years, shall not be greater than 100 kilograms of nitrogen per hectare per year". We must, however, emphasise that paddock specific information on effluent loading and pasture performance obtained by AMPL are still valuable to manage effluent irrigation and pasture performance effectively but overall the outcome expected is net removal of effluent-N applied in the disposal area.

Supplementary irrigation

> "*Supplementary irrigation of pasture with bore water will result in a maximum combined waste water and irrigation application of less than or equal to 50 mm with a minimum return period between applications of 17 days."*

87. Council staff had noted that an additional deeper bore has been drilled at the AMPL site recently for the primary purpose of abstracting water for plant processing. However, water from this bore could also be used for irrigation of the disposal area during dry periods. Council staff accepted during the hearing that the 50mm was an appropriate limit.

Management Plan

> *"A comprehensive waste management plan shall be submitted for approval of the compliance and enforcement section of Canterbury Regional Council no more than one month after the commencement of this condition. Approval of the waste management plan shall not be unreasonably withheld. A copy shall be held by the consent holder along with a copy of this consent."*

88. Council staff noted and several submitters suggested that it would be useful to have the management plan available during the review process. It had been suggested that the consent holder should circulate a draft management plan prior to the hearing. This was not possible given that the management plan is based on conditions that have yet to be determined.

89. A draft management plan was appended to the evidence of Mr Graham on behalf of AMPL at the hearing. We have reviewed the management plan and consider that subject to amendment incorporating the conditions imposed as a result of this review, its contents are generally appropriate and address appropriate background management and contingency responses.

90. We are generally not comfortable with the content of the management plan being subject to the "approval" of Environment Canterbury and would prefer that it is clear that the Council's approval was limited to ensuring that the management plan is updated to reflect the conditions imposed as a result of the review and contains the minimum requirements proposed in condition 10. Accordingly, we would suggest condition 9 be amended as follows:

> *"The discharge of contaminants to land shall be carried out in accordance with a waste management plan which shall be prepared and submitted to the consent authority no more than one month after the commencement of this condition."*

And in conjunction with this

> *"The waste management plan shall be in a form generally in accordance with the draft document presented in evidence of Mr D Graham, headed 'Ashburton Meat Processors' 19.0 Waste Disposal Effluent Control Management Plan pages 1 to 17 and shall set out the practices and procedures to be adopted in order to achieve compliance with the conditions and shall as a minimum address the following:*
>
> *(i) Definition of waste streams;*
>
> *(ii) Land treatment and disposal area;*
>
> *(iii) Land Management Plan;*
>
> *(iv) Operational rules*
>
> *(v) Nitrogen budget;*
>
> *(vi) Monitoring and reporting;*
>
> *(vii) Complaints procedure;*
>
> *(viii) Self-compliance assessment;*
>
> *(ix) Remedial measures;*

(x) Emergency response;

(xi) Responsibilities".

The plan may be amended at any time provided that any such amendment is for the purpose of improving the efficiency and/or quality of the operation. Any amended plan shall be submitted to Canterbury Regional Council but at all times shall comply with the minimum requirements of this condition."

91. We consider that the proposed amended wording of the condition reflects the intent of management plans. They are not of themselves mechanisms for setting environmental standards or compliance standards, rather they explain the how and the why a condition is imposed and will be complied with. It is a tool upon which the Council and submitters can utilise to understand and improve the way in which the conditions of resource consents are complied with.

Monitoring bores

92. AMPL suggested that three bores be provided, one up-gradient at bore L37:1368 and two down-gradient at L37:1206 and at or about map reference sheet NZMS260L37:1193-0060. The Council officers considered that three bores are insufficient and consider that a fourth bore should also be included down-gradient of the activity.

93. We are satisfied that four bores are appropriate and require the condition to be amended to include reference to one further bore down-gradient of the discharge.

Water samples

"During the months of January, March, May, July, September and November, a ground water sample shall be taken from the up-gradient and three down-gradient monitoring wells identified in condition 13. Each sample shall be analysed for the following:

93.1 Total Kjeldahl nitrogen;

93.2 Total oxidised nitrogen;

93.3 Dissolved reactive phosphorous;

93.4 Chloride;

93.5 pH;

93.6 Conductivity;

93.7 Escherichia Coli."

94. We question whether or not it is appropriate to use Kjeldahl nitrogen and believed that the appropriate measure is ammoniacal nitrogen. Kjeldahl nitrogen method measures ammoniacal-N and organic-N. It is highly unlikely that organic-N could leach from soils and enter aquifers. Leaching of ammoniacal-N from soil is also not a common occurrence. However, under extremely anoxic and cation saturation conditions ammoniacal-N could leach from soils occasionally. Moreover, measuring ammoniacal-N directly is more accurate rather than

measuring ammoniacal-N by using Kjeldahl method. Therefore monitoring of ammoniacal-N is more appropriate than monitoring for Kjeldahl nitrogen.

95. Council officers believed that monthly sampling of ground water is preferable to gain an adequate understanding of the effects of the discharge of ground water. Mr Tipler considered that monthly ground water sampling was not warranted in this situation.

96. We believe that the frequency of ground water monitoring depends mainly on aquifer characteristics and to a lesser extent on weather conditions and effluent irrigation management. Of the aquifer characteristics the key factor determining the frequency of sampling will be the ground water velocity. Aquifers with high ground water velocity may require more frequent sampling. Mr Evans estimated an average flow velocity of 5.5 metres/ day. During winter months when water table is high the flow velocity may be greater.

97. Nitrate in soil is generated from ammoniacal-N under aerobic or unsaturated conditions and usually the rate of nitrification is high during spring and summer periods. When nitrate is available in excess of pasture uptake either a high hydraulic loading of effluent or rainfall could leach or flush nitrate below the root zone. Generally recharge of aquifers occurs during or just after winter. Therefore typically in shallow and unconfined aquifers when recharge of ground water occurs nitrate level increases. With the limited information provided in the Council report by Hayward and Hanson (2004) the time series graphs illustrate such a pattern, i.e. the ground water table and nitrate levels are high during June/July at the AMPL site.

98. The main rationale behind ground water quality monitoring is to identify whether any critical contaminant levels such as nitrate had exceeded the drinking water standard level. We believe that the two monthly sampling proposed by the consent holder is acceptable for a major part of the annual or seasonal sampling cycle given the aquifer flow velocity is 5.5 metres/ day. However, during winter more frequent sampling is required. This is because (a) as Mr Evans pointed out the aquifer flow velocity is high when the water table is high and (b) nitrate levels appear to peak during winter at the AMPL site. Therefore we propose an additional monthly sampling during winter in addition to the sampling frequency proposed by the consent holder.

99. AMPL had proposed ground water sampling during January, March, May, July, September and November. In order to accommodate the three winter months, i.e. June, July and August we alter their proposed sampling months to the following: February, April, June, July, August, October and December. In order to undertake the sampling on a rigid time series basis we also propose the sampling to be performed as much as practicable in the middle of a month (or end or beginning) rather than any time during the month.

100. We emphasise that the hydraulic loading and/ or rainfall is one of the critical factors that increases nitrate leaching. We mentioned at the hearing that it is critical to control effluent application during wet periods to reduce nitrate leaching and reduce the frequency of saturated conditions. We asked Mr Tipler whether effluent could be stored during wet periods to avoid causing saturated conditions. Mr Tipler argued that since the waste water is not pre-treated any such storage would produce odours which could be a nuisance. We accept Mr Tipler's explanation. However, we are still concerned that not only effluent is irrigated during wet periods but site storm water is also discharged with the effluent. As we emphasised before it is important to reduce hydraulic loading as much as possible during wet periods to reduce nitrate leaching and saturated conditions. Saturated soils conditions affect pasture performance substantially.

101. We propose that storm water should not be applied to pasture during wet periods and but should be diverted to storm water drains. When questioned by us Mr Graham of AMPL

mentioned that sometimes the storm water is diverted to a trench. Therefore we propose to introduce a new condition i.e.

> *"All site storm water shall be either diverted to appropriate storm water drains or trenches and shall not be applied with effluent during wet periods or saturated soil conditions"*

Soil samples

102. AMPL proposed two representative soil samples to be established within the discharge area to test annually for a number of parameters. The wording proposed is as follows:

> *102.1 At least two representative soil samples site shall be established within the waste water discharge area. At each location soil composite samples to a depth of 0.075 metres shall be taken annually in October and analysed for the following:*
>
> *(i) Total nitrogen;*
>
> *(ii) Available nitrogen determined by the anaerobic incubation method;*
>
> *(iii) Olsen P;*
>
> *(iv) Available phosphorous;*
>
> *(v) Base saturation;*
>
> *(vi) CEC;*
>
> *(vii) pH;*
>
> *(viii) Bulk density;*
>
> *(ix) Organic matter.*

103. Council officers considered that this may be an appropriate condition for ongoing soil monitoring, however they suggested to the consent holder that a more intensive soil investigation should be carried out prior to the hearing.

Soil survey

104. Council staff have suggested that AMPL might wish to undertake a comprehensive soil survey and this was resisted by AMPL.

105. In our view, an effective cut and carry system should maximise pasture uptake of nitrogen. The greater the uptake, then there is less potential for N accumulation in soils and nitrate leaching. The N uptake by pasture is affected by several key factors of which soil conditions is the most important factor. Understanding soil conditions requires collection of information on key soil bio, physical and chemical characteristics. It appears to us that there are considerable benefits to AMPL in performing a one-off detailed soil conditions assessment and an ongoing monitoring of selected soil characteristics. Since most soil characteristics do not change significantly with time the ongoing monitoring could be performed on an annual basis. Therefore we have accepted the annual soil sampling programme proposed by the consent holder in the draft Management Plan. We also believe that a one-off detailed soil investigation should be completed within six months of this review which should include but not restricted to the soil characteristics in the annual soil monitoring programme in the draft Management Plan. Any such detailed soil investigation should provide supportive information to manage effluent and pasture to maximise N uptake by pasture.

106. Therefore we propose the following additional condition:

> *"A detailed soil investigation shall be carried out within 6 months of this review to understand soil conditions to manage pasture and effluent irrigation effectively to reduce nitrate leaching. The investigation should include the soil characteristics monitored in condition 18 but not limited to these characteristics. A report on the investigation shall be provided to the consent authority within one year of this review."*

Reference to Environment Canterbury managers or employees within consent conditions

107. An issue was raised by AMPL as to the appropriateness of requiring various information required in the resource consent conditions to be supplied to named office holders within Environment Canterbury. Their concern was that if there was any restructuring of the Council and those office positions were amended or removed altogether then this may bring about technical non-compliance with the conditions.

108. In the circumstances we think that it is simply appropriate to refer to Canterbury Regional Council (or consent authority) as the body to receive information and that no specific benefit is gained by identifying particular office holders.

Potable water

109. In terms of the request by submitters that AMPL provide an alternative water supply we find that there is insufficient evidence in this case for us to determine what the trigger level for such a requirement might be (and therefore unable to assess the impact on AMPL). Submitters suggested a trigger level of 8 g/m^3 could not be used, but we cannot agree because as Mr Tipler argued the 11.3 g/m^3 level has already been set with safety factors. Furthermore, Mr Evans of URS argued that the upstream aquifer water quality could reach 8 g/m^3 following heavy rainfalls hence such a level could not be used as a downstream trigger level. We heard evidence from Ashburton District Council and from Council staff of the significant number of septic tanks within the plume area and that Council considered more work needed to be done to eliminate these sources as a contributing factor to the elevated nitrate levels measured within the plume area. If the New Zealand Drinking Water Standard of 113g/m^3 was exceeded on a regular basis it is understandable that residents might expect the company to contribute to an alternate supply. However, we are not satisfied that it has been proved to sufficient degree that AMPL ought to be solely responsible for such a step.

110. We believe that Mr Evans of URS has provided a good assessment of the relative contribution of AMPL's effluent disposal to elevated nitrate levels in the plume area. Mr Evans predicted that a nitrate-N level increase of 3.5 g/m^3 is possible due to AMPL's discharge. He argued that under normal conditions such an increase would not cause nitrate-N levels to be elevated above 11.3 g/m^3, however heavy rainfalls may cause greater elevated nitrate-N levels than that are sustained under normal conditions. Such an assessment illustrates the difficulty faced by the AMPL who is surrounded by intensive land uses that contribute to elevated upstream nitrate-N levels on which the consent holder does not have any controls. If we accept Mr Evans assessment of AMPL's discharge resulting in an in situ nitrate-N level of 3.5 g/m^3 (in contrast to the upstream level of 5.4 g/m^3), cumulatively it could result in a downstream water quality of 8.9 g/m^3 or more than this under heavy rainfall conditions. We are concerned that even if the AMPL manages the effluent discharge carefully to minimise nitrate leaching as required by the council, any further nitrate-N level increase due to increasing upstream land use intensity could result in a plume whose nitrate-N levels could be exceeding the NZ Drinking Water Standard more frequently than it had occurred in the past. We asked several questions from the council

staff about any future reviews that are likely due to increasing nitrate-N level downstream as a result of increasing upstream land use intensity and we did not receive any satisfactory answers. It seems to us important that the Council must consider the relative contribution of nitrate-N by AMPL in comparison to upstream contributions before contemplating any future reviews.

111. It is our conclusion that resource consent conditions must be both certain and enforceable and relate to a relevant resource management matter raised by the matters within our jurisdiction. We do not think that, as this time, based on the evidence before us that we can conclude that there is sufficient justification for such a condition to be imposed. Or even if it were, that it could be necessarily enforced until such time as the Council has done more work on isolating other potential causes of the contamination.

Conclusion

112. In accordance with the discussion above and having regard to the matters outlined in section 131 of the Act we find that it is appropriate to require the amendment of resource consent conditions as set out in Appendix 1 attached, to address adverse effects on the environment which have increased beyond those anticipated when the consent was granted.

113. We are satisfied on the evidence presented that the activities of AMPL will continue to be viable after the change and that the over-riding purpose of the Act is achieved.

Dated this day of November 2004

_____

C E Robinson

Chairperson

APPENDIX 1

Amended conditions as a result of review

1. The volume of screened Meat Works' waste water discharge via spray irrigation shall not exceed 520 m^3 per day, with a maximum rate of 13 litres per second.

2. There shall be no discharge of Meat Works' waste water:

   (i) Within 20 metres of any water race, river, stream, creek, lake, wetland, or other sub-surface water; and

   (ii) Within 30 metres in any direction of any well used for drinking water supply; and

   (iii) In such a manner that waste water is likely to run off or percolate into sub-surface water or on to neighbouring properties.

3. The areal nitrogen loading rate of the discharge of screened Meat Works' waste water on to any part of the disposal area shall not exceed 400 kgs N/ ha/ yr over any consecutive 12 month period. The N shall be calculated using the most recent sample results taken in the previous two monthly samples in condition 12

4. The depth of application shall not exceed 25 millilitres per day with a minimum between applications of 17 days.

5. There shall be no ponding of effluent on the ground.

6. The two year rolling average of the difference between the mass of nitrogen applied and the total nitrogen and herbage "cut and carried" in the disposal area, taken over consecutive years, shall not be greater than 100 kilograms of nitrogen per hectare per year.

7. All mechanically harvested herbage from the disposal area shall be exported and shall not be used for feeding any stock on the disposal area.

8. Where effluent is applied simultaneously with irrigation water, the depth of effluent and water combined, shall not exceed 50 millimetres.

9. All site storm water shall either be diverted to an appropriate storm water drain or trenches and shall not be applied with effluent during wet periods or saturated soil conditions.

10. The discharge of contaminants to land shall be carried out in accordance with a waste management plan which shall be prepared and submitted to the Consent Authority no more than one month after the commencement of this condition.

11. The waste management plan shall be in a form generally in accordance with the draft document presented in evidence of Mr D Graham, headed "Ashburton Meat Processors" 19.0 Waste disposal effluent control management plan, pages 1 to 17 and shall set out the practices and procedures to be adopted in order to achieve compliance with the conditions and shall as a minimum address the following:

   (i) Definition of waste streams;

(ii) Land treatment and disposal area;

(iii) Land Management Plan;

(iv) Operational rules;

(v) Nitrogen budget;

(vi) Monitoring and reporting;

(vii) Complaints procedure;

(viii) Self-compliance assessment;

(ix) Remedial measures;

(x) Emergency response;

(xi) Responsibilities.

The management plan may be amended at any time provided that any such amendment is for the purpose of improving the efficiency and/ or quality of operation. Any amended plan for the improvement of waste management shall be submitted to the consent authority but at all times shall comply with the minimum requirements of this condition.

12. All analyses, other than field measurements, required by the conditions of this permit shall be undertaken by an independent laboratory accredited to a standard equivalent of IANZ.

(a) The consent holder shall take five one day composite samples of the waste water from the outflow to the land disposal area as follows;

(b) The samples shall be taken at least once every two months and analysed for the following parameters:

(i) pH;

(ii) total oxidised nitrogen (nitrate nitrogen plus nitrite – nitrogen);

(iii) ammoniacal nitrogen;

(iv) total kjeldahl nitrogen;

(c) Samples shall be taken at least once every six months and analysed for the following parameters:

(i) chloride;

(ii) total phosphorous;

(iii) sodium;

(iv) calcium;

(v) magnesium

(d) Samples shall be taken at least once every 12 months and analysed for the following parameters:

(i) filtered 5 day bio-chemical oxygen demand;

(ii) total suspended solids;

(iii) fats, oils and greases.

13. An up-gradient ground water monitoring well will be established at Bore L37:1368, and 3 down-gradient monitoring wells will be established at L37:1206 and at or about map reference sheet NZ MS260L37:1193-0060.

14. During the month of February, April, June, July, August, October and December, a ground water sample shall be taken from the up-gradient and 3 down-gradient monitoring wells identified in condition 13. Each sample shall be analysed for the following:

(i) Total ammoniacal nitrogen;

(ii) Total oxidised nitrogen;

(iii) Dissolved reactive phosphorous;

(iv) Chloride;

(v) pH;

(vi) Conductivity;

(vii) Escherichia coli;

15. To ensure that ground water samples are representative, before sampling any bore, shall be purged by pumping at a low rate until the conductivity of purged water stabilises, or by other suitable methods.

16. When samples are taken in accordance with condition 14, the permit holder shall measure and record the date, time and water level (before purging the bore) in each of the monitoring bores identified in condition 14. The water level shall be measured from the top of the casing, and shall be recorded to the nearest 0.01 metres.

17. Any on-site ground water bores identified in condition 13 shall be maintained at all times in good working order, to ensure the ground water quality monitoring can be carried out by the Consent Authority.

18. (a) At least two representative soil sampling sites shall be established within the waste water discharge area. At each location, soil composite samples to a depth of 0.075 metres shall be taken annually in October and analysed for the following:

(i) Total nitrogen;

(ii) Available nitrogen determined by anaerobic incubation method;

(iii) Olsen P;

(iv) Available phosphorous;

(v) Base saturation;

(vi) CEC;

(vii) pH;

(viii) Bulk density;

(ix) Organic matter;

(b) A detailed soil investigation within 6 months of this review to understand soil conditions to manage pasture and effluent irrigation or reduce nitrate leaching. The investigation shall include the soil characteristics monitored in condition 18(a) but not limited to these characteristics. A report on the investigation shall be provided to the consent authority within one year of this review.

19. The permit holder shall maintain a detailed record of waste water disposal, including the following:

(i) Daily volume of screened Meat Works' waste water discharge;

(ii) Date, time and location of each application of waste water and screenings;

(iii) The depth of each application of waste water;

(iv) The total nitrogen applied during each application of waste water and screenings based on the nitrogen concentrations obtained from condition 12;

(v) The total nitrogen applied to the irrigated areas annually based on the nitrogen concentrations obtained from condition 12;

(vi) Any incidents or equipment malfunctions that resulted in, or could have resulted in environmental adverse effects, and details of any corrective action taken. The incidents and malfunctions shall be reported to the consent authority as soon as practicable;

20. For the areas that are cropped, records shall be kept of:

(i) The area cropped;

(ii) The location of the area cropped;

(iii) The date(s) of cropping for each area;

(iv) The weight of dry matter removed from each area;

(v) The nitrogen content of the dry matter;

21. The permit holder shall log all environmental complaints received. The log shall include the date, and time, and nature and location of the complaint, the complainant's details, whether information, details of key operating parameters at the time of the complaint and the remedial

action taken to prevent further incidents. Complaints shall be reported to the consent authority as soon as practicable and the log of complaints shall be made available to the consent authority on request (subject to privacy requirements).

22. The consent holder shall provide the consent authority by the last day of April and October of each year for the duration of this permit, or at any other time that may be requested by the consent authority, a report containing monitoring records, results in accordance with the conditions of this discharge permit since the previous report was prepared.

23. The consent holder shall provide by the last working day of March each year an annual monitoring report to the consent authority. The report shall cover the preceding period from the first day of March to the last day of February, and shall include but not be limited to the following matters:

    (i) A summary of analyses and records collected in accordance with the conditions of this permit;

    (ii) An interpretation of the analyses and records;

    (iii) A comment on the extent that each consent condition has been complied with.

24. The Consent Authority may annually, on or about the last five working days of April each year, serve notice of its intention to review the conditions of this consent for the purposes of:

    (i) Dealing with any adverse effects on the environment which may arise from the exercise of this consent;

    (ii) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment;

    (iii) Complying with the requirements of a regional plan;

    (iv) Altering the frequency of sampling required in conditions 12, 14 or 18;

    (v) Reviewing the methods used to sample and analyse the determinants specified in conditions 12, 14 or 18(a).

25. A copy of this resource consent shall be given to all persons undertaking activities authorised by this consent prior to any discharge occurring.