

**BOARD OF INQUIRY
TE MIHI GEOTHERMAL POWER STATION PROPOSAL**

In the Matter of the Resource Management Act 1991

And

In the matter of resource consent applications by Contact Energy Limited
in respect of the Te Mihi Geothermal Power Station Proposal

OPENING SUBMISSIONS FOR CONTACT ENERGY LIMITED

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Introduction

1. The purpose of these submissions is to outline the case that will be presented in support of the applications by Contact Energy Limited (“Contact”) for resource consents related to its proposed Te Mihi Power Station.
2. Contact’s consent applications were called in by the Minister for the Environment because:
 - (a) They were relevant to New Zealand’s international obligations related to greenhouse gas emissions (the Kyoto Protocol) and the related New Zealand Energy Strategy target for a significant increase in electricity generation from renewable energy sources by 2025; and
 - (b) The proposal represented a significant use of the limited number of geothermal systems available for development in New Zealand.
3. Although these applications have been identified as nationally significant, the matters in contention before the Board of Inquiry are of a relatively narrow compass. A number of issues have been able to be resolved, with the result that a number of submitters have either withdrawn their requests to be heard or indicated their lack of opposition to the applications based on the conditions now proffered by the applicant.
4. The evidence before the Board of Inquiry filed by submitters is similarly narrow in scope.
5. Against that background, I propose in these submissions to:
 - (a) Outline the key aspects of the project and the applications related to it;
 - (b) Outline the consenting framework that the applications before the Board of Inquiry fits into;
 - (c) Discuss relatively briefly the policy and planning context for the applications;
 - (d) Discuss the issues identified by the parties as being in contention, initially briefly to separate out matters believed to have been resolved or which can be addressed in short order, from those still genuinely in contention and requiring a more detailed discussion;
 - (e) Address certain issues arising from the updated section 42A report;

- (f) Summarise the case for grant of consent in terms of Part II of the Act;
- (g) Finally, outline the evidence which has been circulated by the applicant.

Overview of Te Mihi Project and Consent Applications

6. The key element of the project is a new geothermal power station proposed to be located on the Wairakei-Tauhara Geothermal System in the Te Mihi area. It is proposed to be built in stages with the first stage incorporating two steam turbines due for completion by early 2011, and the second stage incorporating one further steam turbine projected to be installed and commissioned by 2016. The applications were premised on three approximately 78 MW turbines producing at least 220 MW net. It now appears likely that those output figures are conservative and that an increased output is possible.
7. A Binary Plant option originally part of the applications is no longer being pursued.
8. The new power station is intended to replace the Wairakei Power Station over time. The staging of the proposed power station produces corresponding reductions in output at the Wairakei Power Station.
9. The Wairakei Power Station was commissioned in 1958. It has given sterling service now for 50 years but the proposed Te Mihi Power Station offers the prospect of more efficient modern technology as well as providing an opportunity to address adverse environmental issues inherent in the Wairakei Power Station's original design.
10. More efficient technology and resource use translates into at least 60 MW more generation output from the new station as soon as the first stage is complete (2011), for no increase in the volume of geothermal fluid extracted above currently consented levels. As a result, Contact is not seeking an additional extraction consent.
11. The environmental issues arise principally from the fact that Wairakei Power Station uses a cooling system which involves the mixing of approximately 35,000 tonnes per day of geothermal condensate with Waikato River water. The resulting mixture of contaminants including heat, hydrogen sulphide and mercury is then discharged into the Waikato River.
12. The cooling process proposed to be utilised at the Te Mihi Power Station will result in the discharge of approximately 20,000 tonnes per day of condensate

to the atmosphere in the form of water vapour, and the production of approximately 10,000 tonnes per day of condensate for disposal either by reinjection within the System boundaries or by irrigation of pastoral land, or by a combination of the two. As the output from the Wairakei Power Station reduces, the discharge of contaminated cooling water to the Waikato River will reduce significantly. Accordingly, Contact is seeking a consent for additional reinjection (WRC 116786) and a consent to irrigate condensate (WRC 116787).

13. In addition, currently some 60,000 tonnes per day of separated geothermal water is discharged to the Wairakei Stream and from there into the Waikato River. Separated geothermal water is both hot and contains a range of chemical contaminants, including arsenic. That poses obvious contamination issues for the Waikato River. Counterbalancing that, a significant proportion of the separated geothermal water is used at the Netcor Wairakei Terraces facility, to recreate the Te Kiriohineki Stream (a natural geothermal stream of considerable significance to Ngati Rauhoto that dried up following commencement of Wairakei Power Station operations) and at the Wairakei Prawn Farm (as a heat source). While the applicant has not made a decision as to how these conflicting issues should be addressed in the balance of discharge methods used by it, reinjection consent application 116786 provides it with the flexibility to reinject all of the condensate and the separated geothermal water currently discharged to the Waikato River.
14. In fact, because the reinjection application 116786 was framed at the point when Contact was still considering the possibility of using binary cycle technology at Te Mihi the application is now oversized for the volume of geothermal fluid potentially available for reinjection. Use of steam turbine and mechanical draught cooling tower technology means that the condensate evaporated into the atmosphere during the cooling process will not be available for reinjection. The extra reinjection capacity provided is still valuable because it provides additional flexibility in relation to the location of infield reinjection, compared to Wairakei consent 104718.
15. Application 116786 provides operational flexibility in other ways. One of the criticisms made of Contact's 2001 resource consent applications was that the permitted area for reinjection was too limited. Contact's view was that such criticisms were a classic example of being wise in hindsight, but it has taken this opportunity to spread the net wide and to seek a very large consent area.

16. The second application (116787), for irrigation of condensate, is also designed to provide Contact with additional flexibility. The condensate produced from the Te Mihi Power Station will be of reasonably high quality and suitable for irrigation of pastoral land. At around 35°C, it is much cooler (70°C cooler) than the separated geothermal water so its reinjection results in marginal cooling of the geothermal resource. In an area where irrigation quality water is the subject of competing demands from numerous users, this presents an opportunity for a win/win outcome, provided the condensate is not required to be reinjected to meet the objectives of the Discharge Strategy for the System¹.
17. I emphasise that the ultimate choice as to how much condensate and separated geothermal water is reinjected as opposed to being discharged to ground or to the Waikato River is not one for Contact alone. As will be discussed shortly in the context of my review of the existing consent position, the Discharge Strategy employed by Contact is reviewed by the Peer Review Panel established under Contact's existing consents, and must be approved by Waikato Regional Council in the light of a series of specified objectives and other criteria.
18. The production of new air discharges and a new location has necessitated application 116789 for discharges to air from the proposed power station. As the evidence of Dr Craig Stevenson on air quality will make clear, however, the proposed Te Mihi Power Station is in a much more favourable location for dispersion of air discharges than the Wairakei Power Station. The shift from Wairakei to Te Mihi will result in a significant improvement in air quality on the Wairakei-Tauhara Geothermal System, considering Contact's operations alone. The position is complicated because of the extension to the Rotokawa Power Station currently under construction by the Rotokawa Joint Venture. For reasons that will be discussed by Dr Stevenson, the Rotokawa air discharges are likely to become the dominant influence on air quality on the Wairakei Field in the future.
19. The necessity to undertake a complete assessment of all air discharge sources in the area to support application 116789 provided Contact with the basis on which to make applications to renew air discharge consents held for other parts of its operation. Specifically, the existing air discharge consent for the Poihipi Power Station expires on 31 December 2011. Contact is seeking to renew that consent for a further term (commencing 1 January 2012) as part of this process (WRC 116790).

¹ These matters are discussed in the rebuttal evidence of Mr B S Carey, paragraphs 27-29.

20. The existing air discharge consent for the Wairakei Power Station combines discharges from both the steamfields and from the power station. As discussed in the evidence of Dr Stevenson, steamfield discharges make a negligible contribution to air quality in the area.
21. Given the fact that the Wairakei Power Station air discharges will reduce proportionally with its staged decommissioning, Contact has taken the opportunity to apply for a new air discharge consent for the steamfields on a stand alone basis (WRC 116791).
22. Lastly, Contact has sought in its application 116788 for consent to discharge septic tank waste, principally required for its construction work force.
23. The power station complex has a number of substantial buildings and associated plant that require land use consents. The power produced by the station has to be fed into a switchyard and then conveyed to the adjacent national grid transmission line running between Wairakei and Whakamaru. There is already a transmission line across the site connecting the Poihipi Power Station to the national grid line. It is proposed that that line will be altered, firstly to connect it to the switchyard adjacent to the proposed Te Mihi Power Station, and from there to the Wairakei-Whakamaru line.
24. Separate resource consents have been made for each element of the project:
- (a) Power station (RM 070304);
 - (b) Switchyard (RM 070305);
 - (c) Alteration of existing line and construction of new 220kV grid connection (RM 070299).
25. As discussed in the section 42A report, separation of these three elements is largely a matter of administrative convenience, intended to facilitate ultimate transfer of the transmission consents to Transpower New Zealand Limited, but clearly all elements of the project should be considered as an integrated whole.
26. Overall, the project represents a substantial investment by Contact in the future generation of geothermal energy from the Wairakei-Tauhara Geothermal System. The estimated project cost for Stage 1 is in the order of \$300-400 million². The economic evidence for the applicant, provided by Mr David Hunt of Concept Consulting, is that the project would directly inject approximately

² Mr Kilty's evidence in chief at paragraph 17.

\$50 million into the local economy with a total flow on beneficial regional impact of approximately \$90 million.

27. Mr Hunt has also quantified the benefits of the project in electricity production and greenhouse gas terms as being production of an additional 574GWh/year (the amount of electricity consumed by 70,000 homes annually) and reduction of greenhouse gas emissions of approximately 330,000 tonnes of carbon dioxide emissions per annum. The latter estimate is subject to possible reduction, should the proposed restriction on baseload thermal plant currently before Parliament be implemented. In addition, as will be discussed further in the evidence called by the Ministry of Economic Development and the Energy Efficiency and Conservation Authority, the proposed Te Mihi Power Station will also make an important contribution to the Government's policy drive for greater levels of renewable electricity generation.

Consent Background

28. Contact's Te Mihi resource consent applications do not come before the Board as a complete suite of stand alone consents. The Te Mihi Power Station project is not in that sense, a *greenfields* project.

29. This is manifested in a number of ways. First, the Te Mihi Power Station site sits on the Wairakei-Tauhara Geothermal System. That System has been the subject of large scale development for 50 years with significant effects on the natural and physical environment.

30. Thus there are already a number of very substantial investments in electricity generation plant on the System. There is of course the Wairakei Power Station itself, commissioned in 1958. Steamfields and pipework servicing the Wairakei Power Station have been a feature of the Taupo landscape for many years. In recent years, there has been a progressive increase in steamfield plant in the Te Mihi area as that area of the field has supplied an increasing proportion of the steam supplied to the Wairakei Power Station and it now also supplies a significant volume of steam to the Poihipi Power Station.

31. Contact's long term development plans for the Wairakei Field envisage further expansion of the Te Mihi Steamfield in the vicinity of the proposed power station. This is in fact one of the key benefits of the proposed site. Its proximity to the principal source of steam on the field reduces energy losses and increases efficiency.

32. The Poihipi Power Station is another feature of the local landscape. Built in the mid 1990s, it was purchased by Contact in early 2000.
33. More recently again, Contact has constructed a binary plant adjacent to the Wairakei Power Station. It is proposed that the Wairakei Binary Plant will continue to operate after decommissioning of the Wairakei Power Station.
34. On the Tauhara Field, which is linked to the Wairakei Field at depth to make one integrated geothermal system, Contact has consents to build a small power station and it has recently announced its intention to proceed with construction of that power station.
35. In the landscape evidence of Mr Coombs, he draws attention to the fact that these existing power station developments sit in a broader landscape context of which the Mokai, Rotokawa and Ohaaki Power Stations form a part.
36. Finally, Geotherm Group (In Receivership) Ltd (“Geotherm Group”) has consents to construct a power station on the corner of the Poihipi and Tukoirangi Roads. That project is currently in abeyance as the Geotherm Group receivers pursue a sale process. I will have more to say about whether it forms part of the existing environment and is therefore relevant for the purposes of consideration of Contact’s resource consent applications shortly.
37. The existing power station developments on the Wairakei-Tauhara Geothermal System operate pursuant to a number of separate resource consents. The most significant resource consents required for operation of the Wairakei Power Station were the subject of a comprehensive suite of applications filed by Contact in March 2001. Those applications also covered the ongoing geothermal extraction and reinjection/injection requirements of the Poihipi Power Station. Given that three of the members of the Board were involved in various capacities in Contact’s 2001 Wairakei application process, it is probably sufficient to say that that process was somewhat eventful, before consents were finally confirmed by the Environment Court in August 2007.
38. Importantly, Contact’s existing Waikato River discharges of mixed cooling water/condensate and separated geothermal water were the subject of considerable scrutiny through the consenting process, with a range of contaminant reduction requirements imposed. As will be discussed in the evidence of Mr James Kilty, Contact’s Project Director-Generation, there was an escalation in capital cost in achieving the required reduction of hydrogen sulphide in the cooling water discharge from approximately \$8 million at the

date of application to approximately \$24 million. This was a key driver to the development of the Te Mihi Power Station project concept in parallel with the latter stages of the Wairakei 2001 consent process.

39. Another important element of the Wairakei consent process was a significant focus on subsidence issues. Subsidence has been measured within the Wairakei-Tauhara Geothermal System for a number of years. It is believed to be the result of the pressure drawdown within the geothermal reservoir caused in the initial years of the Wairakei development. That drawdown causes dewatering of underground formations which are then compressed by the weight of the formations above them. The subsurface compression of those formations manifests itself at the ground surface as slow subsidence. Some geological features are more susceptible to compression than others and so the pattern of subsidence is not uniform. The exact mechanisms involved at different locations were the subject of considerable contention in the context of Contact's Wairakei consent applications, as were the extent to which subsidence has caused any material surface damage to date and the extent to which it might cause damage in the future.
40. The Environment Court's interim decision on Contact's applications³ contains an extensive discussion of all these issues. For present purposes, the significant point is that the Environment Court put in place a system of adaptive management, which hinged on the preparation and progressive revision of a Discharge Strategy. The conditions approved by the Court put the Discharge Strategy in a broader context of overall system management. Importantly, the Court directed that while the Discharge Strategy would serve a number of relevant objectives, its primary objective was to address the adverse effects of subsidence.
41. Because this is such a critical point in the current context I will set out the relevant General Condition governing the content of the Discharge Strategy as follows:

“3.3 The initial Discharge Strategy and any reviewed Discharge Strategy shall have as their primary objective, the need to address the adverse effects of subsidence, with the following additional secondary objectives subsidiary to that primary objective:

³ *Rotokawa Joint Venture Limited and Mighty River Power Limited & Ors v Waikato Regional Council A41/2007*

Secondary objectives (not in any order of priority):

- (a) Facilitating further extraction of energy from the Wairakei/Tauhara Geothermal System;*
- (b) Remediating or mitigating adverse effects on significant geothermal features including maintenance of geothermal features at Karapiti as long as practicable;*
- (c) Avoiding, remediating or mitigating contamination of surface and groundwater bodies;*
- (d) Integrating takes, uses (including cascade users), reinjection/injection, and other discharge methods;*

while having regard to:

- (i) The benefits, costs and adverse effects of alternative disposal options,*
- (ii) Existing investment and infrastructure, including investment by cascade users;*
- (iii) Ongoing monitoring of changes to the system and any adverse effects on its values.*

42. The Environment Court's decision recognises that management of a Development Geothermal System like the Wairakei-Tauhara Geothermal System is a complex matrix of competing considerations and that every discharge option available has both advantages and disadvantages in terms of potential effects. Thus, for instance, while a greater level of reinjection and consequent increases in reservoir pressure should in principle assist in minimising subsidence, there are risks, explained by Dr Arnold Watson for Waikato Regional Council in this process, that it might have the opposite effect.

43. Hence the emphasis on adaptive management against a hierarchy of objectives.

44. That management needs to be based on good quality information and analysis. Thus, another important element of the Environment Court's decision is its emphasis on the need for research into subsidence issues to inform future revisions of the Discharge Strategy.
45. Mr C J Bromley, a geothermal scientist at GNS based in Wairakei, will give evidence on the research programme which Contact has put in place to respond to the direction of the Environment Court. The first well in a comprehensive programme of well drilling and analysis is now under way on Centennial Drive, on the outskirts of Taupo, and it is anticipated that the programme will take much of the balance of this year, continuing into 2009. Mr Kilty's evidence is that the budget for the programme is in excess of \$10 million.
46. Mr Bromley discusses the way in which the Te Mihi reinjection application before you fits into this process, providing additional options, including in particular the potential for targeted reinjection near the subsidence bowls on the outskirts of Taupo township when that was felt to be desirable in order to best achieve the objectives of the Discharge Strategy.
47. Mr Stephen Daysh, a Principal Planner from Environmental Management Services, will present evidence for Contact on proposed conditions to govern the consents sought. The conditions that Mr Daysh proposes for the reinjection consent are deliberately designed to pull the Te Mihi reinjection consent directly into the management framework that the Environment Court has put in place for reinjection under the existing Wairakei reinjection consent (104718).
48. It follows that one of the principal issues Contact has with the varied conditions proposed by Mr Richard Matthews, giving evidence for Geotherm Group, is that they would put in place a quite different regulatory regime governing the proposed Te Mihi reinjection consent to that governing the Wairakei reinjection consent, notwithstanding the very substantial overlap in consent areas. As I will discuss, Contact's view is that such differences are not conducive to integrated management of the Geothermal System, which is a key policy of the geothermal chapter of the Waikato Regional Policy Statement.

Policy and Planning

49. I do not understand there to be any dispute between the planners who have circulated evidence (Mr MB Chrisp for Contact, Ms G Platts on land use consent applications for Taupo District Council, and Mr Burton in his section 42A report) that all of Contact's Te Mihi consent applications fall to be considered as unrestricted discretionary activities. Any differences between the planners appear to be limited to identification of the exact performance standards of the Taupo District Plan that the project fails to meet. Given, however, that the core elements of the applications are clearly not permitted activities and they need to be considered on a bundled basis with the most restrictive status classification (that is, discretionary) I do not believe it is necessary to take the Board of Inquiry through the respective plans that produce that conclusion.
50. In her response to the section 42A report, Ms Platts also raised an issue as to the extent to which pipelines are within the scope of the applications and, if they are not within the applications, whether they might need consents.
51. The relevant application included all structures and facilities associated with a geothermal power station, including ancillary equipment. The application documents define an area covered by the application within which such ancillary equipment might be located. At section 2.3.1, the Assessment of Environmental Effects describes the process by which steam and geothermal brine need to be piped from geothermal wells located principally in the Te Mihi borefield to the Power Station. The exact location of the pipework of course depends on the location of the wells.
52. To the extent that such pipes are within the application area, they are clearly within the application. It appears that Ms Platt's concern is that pipework might be located in close proximity to Oruanui Road or to neighbouring landowners. There are no wells in those areas currently.
53. In the unlikely event⁴ that wells are drilled in future in those areas, pipework connecting them would be part of the ongoing development of the steamfield rather than part of the Power Station development. As such, the need for consents would have to be assessed at that time. It is not a matter that need concern the Board of Inquiry.

⁴ Unlikely because it is hard to conceive how such wells could meet reasonable noise standards at nearby dwellings.

54. In the context of unrestricted discretionary activities the policy framework in the relevant regional and district plans is obviously of relevance.
55. The content of the relevant policy statements and plans at regional level is discussed both in the evidence of Mr Chrisp and the section 42A report of Mr Burton. The relevant provisions of the Waikato Regional Policy Statement and Proposed Waikato Regional Plan governing discharges onto and into the ground, and to surface waters from Development Geothermal Systems have relatively recently been the subject of extensive consideration by the Environment Court, in the context of Change 1 to the Waikato Regional Policy Statement and Variation 2 to the Proposed Waikato Regional Plan. Policy Three of section 3.7.2.1 of the Waikato Regional Policy Statement, a copy of which is exhibit "MBC2" to Mr Chrisp's evidence, is a key provision. It emphasises that for large takes of geothermal energy and water in Development Geothermal Systems, such as those undertaken by Contact on the Wairakei-Tauhara Geothermal System, the geothermal water remaining after use is to be reinjected/injected in accordance with the Discharge Strategy, itself forming part of a System Management Plan. For this purpose, reinjection refers to returning geothermal water into the system from which it was extracted. Injection, in this context, is the discharge of geothermal water into the ground beyond the boundaries of a geothermal system.
56. It is submitted that Contact's Te Mihi applications are entirely in accord with this policy. If granted, they will facilitate a substantial reduction and potential elimination of geothermal water discharges to surface water bodies, which is clearly a less preferred option in regional policy terms than reinjection. The relatively small proposed irrigation discharge of condensate is not inconsistent with the policy framework because, if it occurs, it will occur pursuant to a Discharge Strategy reflecting both the policy background in the original Policy Statement and the more specific objectives in the existing Wairakei General Conditions.
57. Mr Chrisp also draws attention to Policy Two of section 3.7.2.1 which requires management of each Development Geothermal System in an integrated manner through a System Management Plan. Contact submitted a draft System Management Plan with its Te Mihi applications (Part C) which sought to meet the policy requirement for integrated management.

58. Mr Chrisp will discuss other relevant regional policies governing air discharges. His opinion is that the proposed discharges are consistent with the regional policy framework.

59. In a land use setting, the power station site sits astride the boundary of the Rural and Industrial Environments in the Taupo District Plan. Mr Chrisp's view is that the proposed development is consistent with the objectives and policies of both Environments. Mr Burton concurs in his section 42A report. To the extent that Ms Platts expressed some concerns regarding consistency with the Taupo District Plan provisions related to traffic management, these have been resolved with agreement on suitable traffic management conditions.

60. In relation to the transmission applications the National Policy Statement on Electricity Transmission is also a key document supporting the grant of consents.

Issues in Contention

61. As a result of the direction of the Board of Inquiry, counsel for Contact filed a memorandum listing all issues which Contact understood to be in contention as at 30 June, based on the evidence which had been circulated by submitters. The issues listed were as follows:

- 1) Whether the Geotherm project is part of the existing environment for the purpose of assessing Contact's Te Mihi applications:

Subsidiary Issues:

- (a) Potential adverse effects of Contact reinjection on Geotherm project;
- (b) Suggested conditions for avoiding, remedying mitigating adverse effects of Contact reinjection on Geotherm project;
- (c) Cumulative effects of Contact air discharges as potential constraint on Geotherm project;
- (d) Cumulative effects of Contact noise emissions as potential constraint on Geotherm project;
- (e) Potential for Te Mihi project to constrain Geotherm output as a result of constraints on the Wairakei transmission ring.

- 2) Reinjection Issues – potential issues arising from increased reservoir pressures.
- 3) Air discharges – proposed emission limits.
- 4) Air discharges – extent of ambient air quality modelling.
- 5) Noise emissions – adequacy of conditions to limit noise to levels assessed.
- 6) Traffic issues:
 - (a) Adequacy/robustness of assessment of potential effects;
 - (b) Suggested conditions to avoid, remedy, mitigate adverse effects.
- 7) Poihipi Air Discharges – extent of adverse effects.
- 8) Contact outfield reinjection under existing consents.
- 9) Contact well drilling and extraction under existing consents.
- 10) Contact land access rights.
- 11) Potential constraints on output of other consented renewable energy projects (other than Geotherm project) arising from transmission system constraints.
- 12) Technical condition issues regarding:
 - a) Cross references to Wairakei General Conditions;
 - b) Noise measurement;
 - c) Wording of landscape conditions;
 - d) Construction management;
 - e) Hazardous substance management;
 - f) Wording of protocol on cultural issues.

62. Counsel for Geotherm Group and for Transit New Zealand confirmed agreement with the list filed by Contact. Mr Brockelsby for the Waikato Regional Council and Ms Feary for ECCA similarly confirmed their agreement.

Counsel for the McLachlan interests filed a memorandum identifying one additional issue:

13) The extent and definition of the activity areas that are to be used in connection with the Poihipi Power Station.

63. Counsel for Taupo District Council filed a memorandum listing the issues on land use resource consents which the District Council regarded as still in contention. Deleting the common issues, the only additional matters identified in Counsel for Taupo District Council's memorandum were:

14) Consent condition review timeframes; and

15) Advice notes as specified in draft consent conditions.

64. In the light of the directions of the Board of Inquiry, as communicated to Contact in the Board's letter of 25 June 2008, Contact is proceeding on the basis that unless and until the Board grants leave to any party to add to the list of issues as set out above (that is, items 1-15 inclusive), there are no other contested issues requiring discussion.

65. Working down the list of contested issues. The Geotherm Group related issues (Item 1) remain in contention. I will address each point in detail below.

66. The point regarding potential issues arising from increased reservoir pressures (Item 2) arises from Dr Arnold Watson's evidence for Waikato Regional Council. As already noted, Dr Watson has expressed concern that if pressures rise too quickly in response to increased reinjection, there is potential for a range of adverse effects which require management. In rebuttal evidence, Mr Bromley agrees that Dr Watson has a valid concern, but points out that the principal risk would be with targeted reinjection for the purpose of subsidence mitigation which might lead to the collapse of small steam zones in the vicinity and consequent adverse effects. In practice, as Mr Bromley notes, targeted reinjection will not be possible until the East Taupo Arterial highway bridge is complete, not expected until 2012, and by then the subsidence investigation project being undertaken by Contact will be complete and will enable a better assessment of the risks identified by Dr Watson. Mr Brockelsby's suggestion was that this matter might appropriately be dealt with through revisions to the Discharge Strategy. Mr Bromley concurs.

67. My submission is that this is the appropriate mechanism to deal with the issue.
68. In relation to proposed emission limits on air discharges (Item 3), this matter has been put in issue both by Mr Matthews for Geotherm Group and Mr McLachlan, for himself and the interests associated with him. Neither has produced technical evidence. The evidence of Dr Stevenson, that the effects of air discharges at the proposed emission limits are no more than minor, stands uncontradicted. The only other qualified technical witness on air discharge matters, Dr Graham for Waikato Regional Council, has no issues with the proposed air discharge limits.
69. In my submission, unless cross examination of Dr Stevenson causes the Board to doubt the conclusions that he has reached, there is no basis on the evidence for any different view.
70. In relation to the extent of ambient air quality modelling (Item 4), this is no longer in contention. In Mr Daysh's rebuttal evidence, he accepts Mr Brockelsby's point and has amended the draft conditions attached to his evidence accordingly.
71. In relation to the adequacy of conditions to limit noise to levels assessed (Item 5), this remains a point of material disagreement linked to other issues raised by Geotherm Group. I will return to it below.
72. All traffic issues (Item 6) have been resolved by agreement on the basis of revised conditions (refer the joint memorandum of counsel for Contact, Transit and Taupo District Council dated 18 July 2008). Clearly, the technical witnesses for the parties (Mr Harries for Contact and Mr Swears for Transit) disagree on the extent of any adverse effect the construction workforce of the project might have on the State Highway network, specifically at the intersections of Norman Smith Street and State Highway 1 and Poihipi Road and State Highway 1. In effect, Transit and Contact have agreed to disagree on that point but, more importantly, have agreed on the appropriate condition mechanisms to address any traffic effects, as has Taupo District Council which also has an interest in traffic management. Unless the Board of Inquiry indicates some concern with the agreed conditions, the parties would propose to leave the position on that basis, and in particular not to cross examine the technical witnesses. The parties would naturally be grateful for an indication from the Board of Inquiry as to whether that approach causes it any concern.

73. In relation to the extent of adverse effects from Poihipi air discharges (Item 7), this is a point raised by Mr McLachlan in his evidence, without the benefit of any technical input. Mr McLachlan refers to apparently contradictory information emanating from the former Information Centre on State Highway 1. As Mr Carey observes in his rebuttal evidence, that Information Centre was sold by Contact to Netcor around the same time that Contact was set up (February 1996) and that Contact only purchased the Poihipi Power Station in early 2000. It is submitted that whatever information might have been circulated at the Information Centre either in the mid 1990s when under the ownership of Contact and its predecessors, or subsequently by Netcor, the evidence of Dr Stevenson is to be preferred, particularly given that it stands uncontradicted.
74. In relation to Contact's outfield injection (Item 8), Mr McLachlan raises a point in his evidence regarding outfield injection of geothermal fluid used at the Poihipi Power Station. He argues that fluid should be returned back to its source at Te Mihi and reinjected there. As Mr Daysh observes in his rebuttal evidence, the injection at Poihipi is currently occurring pursuant to Contact's existing consent granted in August 2007 (104718). The exercise of that consent is not a matter before the Board and is not something that can be addressed in this proceeding.
75. Contact's well drilling and extraction (Item 9) is a point raised in Mr McLachlan's evidence. He refers to well 607, which Contact has recently drilled adjacent to the existing Poihipi wells WK604, 605 and 606. Mr McLachlan states in his evidence that the purpose of this well is unclear and seeks conditions to constrain drilling of similar wells. Although Mr McLachlan does not say so specifically, it appears that his concern is with the proximity of this well to Geotherm Group's consented site. The point was addressed in the evidence in chief of Mr BS Carey⁵. Well 607 is a proposed steam extraction well. Contact struck problems in the drilling process. The target depth for the well was within the shallow steam zone accessed by the other Poihipi extraction wells. As Mr Carey observes, the conditions on the Geotherm Group consents preclude it from accessing that steam zone. All Geotherm Group wells are required to be cased to below the steam zone. There is therefore no basis for any possible effect on Geotherm Group production should it proceed. Last but not least, well 607 is an extraction well. Contact is not seeking

⁵ Mr Carey evidence in chief, paragraphs 43-48.

consents for additional extraction as part of this consent process. Mr McLachlan's point is simply misconceived.

76. The point regarding Contact's land access rights (Item 10) was intended to capture a comment made by Mr McLachlan in his evidence taking issue with Contact's ability to access land the subject of consent applications 116786 (Te Mihi reinjection) and 116790 (Poihipi Road Power Station air discharge). As such, this appears to be the same point as that identified in Mr Lang's memorandum of 3 July 2008 (Item 13) albeit that the latter probably better captured the point that Mr McLachlan was seeking to make.
77. As is clear from Mr Kilty's evidence in chief, Contact's property rights in relation to the Poihipi Road Power Station have been the subject of considerable litigation which, at last count, involved three substantive decisions by the High Court, two by the Court of Appeal and one by the Privy Council, with yet another High Court fixture scheduled for this coming October.
78. Mr Kilty sets out his understanding of the legal position in his evidence in chief. Among other things, he draws attention to the clear finding of both the High Court⁶ and the Court of Appeal⁷ that additional land can be added to the Power Station site at any time on the initiative of the receivers of Mercury Geotherm Limited if that land is required for operation of the Poihipi Road Power Station.
79. Clearly, therefore, Mr McLachlan has a different view of the effect of those decisions. Be that as it may, it is submitted that for present purposes, the important point is that resource consents do not convey rights to access property in private ownership. The absence of access to a particular block of land is not therefore a ground to decline a resource consent application. If a consent application is granted and the consent holder is unable to access the land in question, the consent cannot in practice be utilised. Contact's 2001 Wairakei applications were granted on exactly this basis and cover significant areas of land Contact does not currently own or have legal rights to access.
80. Again, it is submitted that Mr McLachlan's point is misconceived.
81. In relation to the point regarding constraints on other consented renewable energy projects (other than the Geotherm Group Project) arising from transmission system constraints (Item 11), this was intended to capture the

⁶ *Mercury Geotherm Limited (In Receivership) and Ors v AS and AM McLachlan and Ors* M129-IM00, Judgment of Potter J 14 June 2002

⁷ *AS and AM McLachlan & Ors v Mercury Geotherm Limited (In Receivership)* CA142/02, Judgment of the Court of 28 August 2003

submission of Wind Farm Developments (Australia) Limited (“Wind Farm Developments”). That company has an interest in a wind farm in Hawkes Bay that was granted resource consents recently but which has not proceeded to date. The submitter has since advised the Board of Inquiry it does not seek to be heard. Its letter to this effect referred to the decision of the Environment Court in *Contact Energy Limited v Clutha District Council*⁸. In that case, Contact appealed a consent granted for a wind farm development by TrustPower in Otago based on similar grounds to those in the Wind Farm Developments’ submission (although the condition sought was framed somewhat differently). Contact’s appeal was dismissed on the grounds, inter alia, that it raised only trade competition issues. Wind Farm Developments also referred to the evidence of Mr Greg Sise called for Contact analysing the transmission issues in the Central North Island and finding there is in fact no risk of transmission constraints constraining the Hawkes Bay wind farm development, as justifying its change of position. Given that situation, and the uncontested evidence of Mr David Hunt that the condition sought in the Wind Farm Developments’ submission is not workable under the current electricity governance rules anyway, in my submission the Board of Inquiry need not consider the matter further.

82. In relation to the technical condition issues (Item 12), and the further matters raised in Mr Hickman’s memorandum for the Taupo District Council (Items 14 and 15), these were all matters raised by Taupo District Council which has now confirmed that revisions Mr Daysh had made to his suggested conditions, as attached to his rebuttal evidence, have resolved the Council’s concerns.
83. In summary therefore, of all of the “*contested issues*” raised by the parties in memoranda circulated pursuant to the directions of the Board of Inquiry, the only substantive issues requiring a detailed response are those raised by Geotherm Group. Most of those issues turn, one way or another on the potential for exercise of the consent sought to adversely affect the exercise of the Geotherm Group consents. The exception is the point raised by Mr Matthews regarding the need for and form of conditions governing operational noise from the proposed Te Mihi Power Station (Item 5 above).

⁸ CP73/08

Geotherm Group Issues

84. The starting point for determining the series of issues raised in the Geotherm Group evidence is to determine whether the Geotherm Group project is part of the existing environment for the purposes of Contact's Te Mihi applications.
85. The consents in question were granted in late March 2007. The key consents are 104980 (authorising a production take of up to 70,000 tonnes per day of geothermal fluid) and 104781/82 (consent for reinjection of up to 65,000 tonnes per day of geothermal fluid. Neither consent has been exercised.
86. What has occurred on the Geotherm production site is that one exploratory well has been drilled (GGL1) and tested. As noted in the evidence of Mr BS Carey the well was sub-commercial⁹.
87. The leading authority on determining whether existing but unimplemented consents form part of the existing environment is the decision of the Court of Appeal in *Queenstown Lakes District Council v Hawthorn Estate Limited*¹⁰. The case involved a subdivision in the Wakatipu Basin. The question for determination was whether consented but undeveloped subdivisions in the immediate area should be considered as part of the existing environment for the purposes of determining the effects of the proposed subdivision. The uncontested evidence before the Environment Court had been that it was practically certain that approved building sites in the Wakatipu Basin would be built on.
88. The way the Court of Appeal approached the issue was to start from the premise that the existing environment was the environment that one could actually see around the landscape on the day of hearing. In the case before it, that did not include a development of the consented but unimplemented subdivisions. In the case of Geotherm Group there is no power station development yet in existence.
89. The question, in each case, is the extent to which it is appropriate to have regard to future changes to the environment, overlaid on what one sees around you.

⁹ Refer paragraph 35 of Mr Carey's evidence in chief and his exhibit BSC5, a report to the receivers of Geotherm Group from the engineering consultancy SKM

¹⁰ CA45/05, Judgment 12 June 2006

90. The Court of Appeal considered an argument that trying to identify future states of the environment would be unworkable. The Court of Appeal's response to that argument is set out at paragraphs 75 and 76 of its judgment:

"It was not necessary to cast the net so widely in the present case. The Environment Court took into account the fact that there were numerous resource consents that had been granted in and near the triangle [the area of the Wakatipu Basin in which the proposed subdivision application was located]. It accepted Mr Goldsmith's evidence that those consents were likely to be implemented. There was ample justification for the Court to conclude that the future environment would be altered by the implementation of those consents and the erection of dwellings in the surrounding area.

Limited in this way, the approach taken to ascertain the future state of the environment is not so uncertain as to be unworkable or unduly speculative, as Mr Wylie contended."

91. Application of the *Hawthorn* decision is assisted by consideration of the Environment Court's decision in *Unison Networks Limited and Ors v Hastings District Council*¹¹. That case involved consideration of two sets of wind farm applications on neighbouring properties. In an earlier decision, the Court had determined that the Unison application had priority. There was evidence before the Court that whichever wind farm was considered to be first in time was important, because if wind turbines from one project were located too close to turbines in the other project, wind flow would be affected and hence output from both adversely affected, depending on wind direction.

92. In paragraph 10, the Court noted that it had found the *Hawthorn* decision of assistance:

"The decision makes it clear that what is to be considered... includes the environment as it might be modified by the implementation of resource consents which had been granted at the time a particular application is considered, where it appears likely that those resource consents will be implemented. (paragraph [84])

Here we have two consents, neither of which has been granted because appeals are still outstanding against the Council's decision. Therefore you should consider the application with first priority (i.e. Unison) as if the second application did not exist (as per *Fleetwing Farms*). If we decide to grant the Unison application we should then go on to consider the HBWF application

¹¹ W58/2006

and include, among the other relevant issues, the effects on the Unison development because it will have been, by that point, *granted* and is very likely to be implemented. In terms of the *Hawthorn Estate* decision, it is part of the environment.”

93. Based on this authority, it is submitted that it is clear that the test in this case is whether the Geotherm Group consents are likely to be exercised.

94. In this regard, it is submitted that there is a material distinction between a subdivision consent in the Wakatipu Basin and a wind farm consent on the one hand, and consent for a geothermal power station. In both of the former cases, once consent is granted, the only relevant issue is whether the consent holder has the financial wherewithal to implement the consents and intends to do so. In a geothermal power station development, by contrast, there is a significant element of exploration and proving of project concept. It is like a gas or oil field development in that regard. It may be, for instance, that the concept will be unable to be implemented no matter how much time and money is thrown at it.

95. The evidence for Contact on this point is that of Mr BS Carey and Professor MJ O’Sullivan. As will appear from Mr Carey’s evidence, he has an extensive career managing the Wairakei/Tauhara geothermal resource on behalf of Contact and its predecessors. Since June 2007 Mr Carey has been employed in a senior management position in GNS Science. As already noted, Mr Carey produces an SKM report to the receiver following completion of the GGL1 exploratory well. That report notes the need to revise the development concept, the subject of the project consents, from a steam turbine plant to a binary plant and recommends drilling of a further well to prove production temperatures and injectivity. The conclusion is carefully phrased on a conditional basis as follows:

”If these objectives [of the proposed second well] can be met in full, and can be supported by satisfactory results from the numerical modelling for acceptable long term reservoir pressure performance, then the prospects of developing a binary power plant of up to 60MWe capacity or better, are good.”
[Emphasis added]

96. As Mr Carey notes, however, no such second well has been drilled and thus at best, the Geotherm Group project must be regarded as unproven. Mr Carey’s evidence¹² is that he has always thought that the prospects of the Geotherm Group project encountering the combination of favourable reservoir conditions

¹² Mr Carey evidence in chief, paragraph 39

required for a viable project were low given its location on the outer margins of the geothermal system and small project area, and that the results of the GGL1 well have reinforced that view. It should be emphasised, therefore, that Mr Carey's opinion is not a view he has come to recently and in the context of this hearing.

97. Professor O'Sullivan will give reservoir modelling evidence for Contact, presenting a range of scenarios utilising the geothermal reservoir model that he has developed for the Wairakei-Tauhara Geothermal System over a number of years. He identifies¹³ the Geotherm Group project as having fundamental difficulties and, at the following paragraph, that the geothermal reservoir cannot deliver much fluid mass for Geotherm Group in anything other than the very short term.
98. Countering the Contact evidence on the point, one of the receivers, Mr Downey, robustly asserts that the receivers are satisfied that the project has a range of viable development options and that the resource consents granted to Geotherm Group will be exercised. Mr Downey does not identify what the advice he and his colleague have received actually says but notes that the receivers have attracted significant interest in purchasing the project.
99. In this regard I should note that Contact itself is participating as a potential bidder in that process. This has posed some difficulties for Contact given that it has received information from Geotherm Group as part of the bidding process subject to obligations of confidentiality. It was felt that receiving information on this basis would compromise the ability of Contact's expert witnesses to comply with the Environment Court Code of Conduct for Experts (having information they could not refer to or discuss) and thus Contact has put a Chinese wall in place. My instructions are that none of Contact's witnesses (or counsel) have had access to any confidential information supplied by Geotherm Group as part of the bidding process and that the latter is being handled by a completely separate team of people within Contact. My instructions are, however, that Contact is not participating in that process because it wishes to exercise the Geotherm Group consents itself.
100. Mr Richard Matthews, an experienced resource management practitioner, will give evidence for Geotherm Group that he is not aware of any reason why the consents would not be exercised. He also expresses himself unaware of any particular technical information that would suggest that they could not be

¹³ Paragraph 32.

exercised in full or in part and states that there is “*every reason*” to expect that the Geotherm Group resource consents will be exercised in the foreseeable future. In that regard, Mr Matthews’ evidence is strong on assertion and devoid of technical justification.

101. Mr Matthews repeats Mr Downey’s statement that the resource consents enable the development of the geothermal resource for a range of activities, including different types of power stations. Mr Matthews does not address a point made by Mr Carey in his evidence in chief that the land use consent granted for the Geotherm Group project is specific to a steam turbine layout. While, as Mr Carey observes in rebuttal, the relevant condition could presumably be the subject of a section 127 variation application to permit construction of a binary plant, that would require consideration of effects issues. The most obvious is the different noise profile a binary plant has compared to a steam turbine plant. Certainly though, if as the SKM report produced by Mr Carey indicates, a steam turbine plant is not viable, the current position at least is that the consents do not permit the range of development options referred to by Mr Matthews.

102. Mr Carey also observes in rebuttal that generalised references to different types of power stations overstate the position. If a steam turbine is not viable, then binary cycle technology is the only alternative, and the flexibility in practice is limited to the size of the plant.

103. Lastly Dr John Burnell will give evidence for the Geotherm Group on the results of his modelling analysis. Although Dr Burnell does not say so specifically in his evidence, it appears (from his Figure 23) that his model predicts that Geotherm Group is able to maintain a reasonable production level. As Professor O’Sullivan observes, however, Dr Burnell gives insufficient information to allow any assessment of how realistic the assumptions are within the model that underpin that prediction, or the extent to which they correspond with measured data (in particular of temperature and permeability) in GGL1.

104. Dr Watson is the only other technical witness with expertise to comment on the technical viability of the Geotherm Group project. His evidence states¹⁴:

“Geotherm’s proposed project strategy at the time of its application in terms of reservoir engineering is to reinject immediately below its production; it has no option with such a small land area available. Geotherm’s reservoir modelling as presented to the Environment Court hearing [sic] indicates that this is

feasible, but I am unconvinced that any modelling in this part of the reservoir is reliable.”

105. Professor O’Sullivan takes issue in his rebuttal with the basis for Dr Watson’s caution in accepting any modelling outputs. The fact remains, however, that, the only technical evidence Geotherm Group presents to indicate that its project is technically viable is modelling evidence not directly addressing the point, and Dr Watson does not accept that modelling evidence is particularly reliable anyway.
106. In summary, against clear case law requiring that the Geotherm Group consents must be likely to be exercised, it is submitted the most that can be said is that it is possible that they will be able to be exercised, but by no means likely.
107. Logically, if the Board of Inquiry accepts that position, that is the end of the matter. If the Geotherm Group consents are not part of the existing environment then adverse effects on the exercise of those consents are not relevant. Nevertheless, the evidence called by Contact will address the substance of the Geotherm Group position.

Potential Adverse Effects on the Geotherm Project from Contact Reinjection

108. Professor O’Sullivan undertakes the principal assessment for Contact through modelling a realistic scenario with some reinjection located in the area around Karapiti, east of the Geotherm Group consent site. The effect predicted is a marginal benefit to Geotherm Group. Professor O’Sullivan also addresses in his evidence in chief the potential for variations to the modelling scenario to produce a different and adverse effect. His evidence will be that he could envisage different scenarios producing different results but the effect, whether positive or adverse on Geotherm Group, is likely to be marginal. Dr Burnell has produced modelled outputs showing variations to the Contact reinjection scenarios having varying results around an overall trend of cooling. As Professor O’Sullivan observes in his rebuttal evidence however¹⁵, the difference between the most adverse scenario modelled by Dr Burnell and the least adverse is only 4.5°C after 45 years of production. This is at the de minimis level.
109. Both Dr Burnell and Dr Watson draw attention to the potential for subsurface faults and fracturing to provide permeability paths between Contact

¹⁴ Dr Watson evidence in chief paragraph 15

re injection sites and Geotherm Group production areas. Professor O'Sullivan responds in his rebuttal evidence that the dominant influence on the movement of reinjection fluid around the field will be the very large pressure drawdown created by the Contact steamfields in the Te Mihi and Western Borefield area. By contrast, the close proximity of Geotherm Group production and reinjection is likely to produce little or no pressure draw down. Indeed, in the Geotherm Group consent process, that was the basis on which Geotherm Group asserted that the exercise of its consents would have no impact on subsidence on the Wairakei-Tauhara Geothermal System. Fluid reinjected to the north, east and south-east of the Geotherm Group consent area is therefore likely to flow away from that area, not toward it.

110. That same logic would suggest that Contact reinjection in the area due south of the Geotherm Group consent area might have an effect because fluid would be drawn past and possibly through the Geotherm Group consent area, flowing towards the Contact borefields and the lower pressures in that location. As Mr Carey observes in his rebuttal evidence, however, that area has Geotherm Group's own reinjection between it and the Geotherm Group production wells so that the dominant effect, if it is an effect, will be from Geotherm Group's reinjection.
111. In summary, it is submitted that while the potential for fracturing creates some uncertainty in the predictions, the evidence is that on the information currently available, Contact reinjection is likely to have a minimal effect on Geotherm production and it could well have a positive effect.
112. Dr Burnell proposes a buffer of 1.5 km within which Contact would not be able to reinject separated geothermal water and a 3km buffer for condensate. Mr Carey has mapped the effect of these buffers in his rebuttal evidence (Exhibit "BSC8"). The 3km buffer would take up over half the Wairakei field. As Mr Carey observes in his rebuttal evidence, if applied as suggested, these buffers would dominate management of a significant part of the south western area of the Wairakei field to protect an unproven project. It is submitted that this is an excessive response, especially given the apparent absence of any technical rationale in Dr Burnell's evidence for the buffer areas suggested.
113. Mr Carey produces a somewhat more modest suggested buffer area as his Exhibit "BSC9". Another feature of Exhibit "BSC9" is that it shows the

¹⁵ Paragraph 38.

boundary of the Wairakei 2001 consents coming right up to and in fact underlying part of the Geotherm consent area. Those consents include reinjection consent 104718. Therefore, the provision of any buffer in the Te Mihi reinjection consents, and certainly any substantial buffer, has the potential to provide an illusory level of protection for Geotherm Group.

114. Mr Matthews suggests in his evidence a series of additional conditions designed to provide enhanced protection for the Geotherm Group project. Mr Daysh provides a detailed commentary and critique of the suggested conditions in his rebuttal evidence. Mr Brockelsby similarly critiques Mr Matthews' evidence from a regulator's point of view pointing to the confusion the suggested conditions are likely to cause and their inherent unenforceability, given the ability to undertake the identical activity under a different consent not subject to the suggested restrictions.
115. Stepping back from the issues, it appears that Mr Matthews has failed to appreciate the extent to which Geotherm Group is already protected by the management regime which the Environment Court put in place for the Wairakei consents and which Mr Daysh suggests should equally apply to the Te Mihi reinjection consent. I have already quoted the objectives and other considerations which provide the reference point for the Discharge Strategy. The important thing to emphasise is that the Discharge Strategy forms part of a System Management Plan. The System Management Plan is a whole of System plan. It is not a plan to manage Contact's activities on the System and the draft System Management Plan filed with Contact's applications endeavoured to take the broad approach required.
116. Looking at discharges specifically, one objective specified in General Condition 3.3 quoted above is facilitating further extraction of energy from the Wairakei/Tauhara Geothermal System. This is extraction of energy by any party, whether by Geotherm Group, shallow bore users in Taupo, of which there are hundreds, or anyone else.
117. The Discharge Strategy has a further objective of integrating takes, uses (including cascade users), reinjection/injection, and other discharge methods. The integration objective is not limited to integrating Contact's take and reinjection/injection. The very fact that there is specific reference to third party cascade users makes that clear. It is an objective to integrate, among other things, Geotherm Group takes and Contact reinjection/injection.

118. Similarly, the preparation of the Discharge Strategy is required to have regard to existing investment and infrastructure, including cascade users. Once again, these provisions make it clear that the adaptive management regime is not Contact - centric.
119. Most importantly, all of these are secondary objectives with the primary objective being addressing the adverse effects of subsidence. In other words, production objectives, whether of Contact or Geotherm Group, or anyone else, give way to proper management of subsidence effects issues. As Dr Watson notes in his evidence, one consequence of needing to provide both for large buffer areas around the Geotherm Group consent area and for subsidence effects management is that Contact rapidly starts to run out of viable alternatives. At that point, something has to give. That is why the Environment Court identified a primary objective to which all others were subject – to avoid an impasse position.
120. Existing General Condition 3.10 provides an additional layer of protection for Geotherm Group. It empowers Waikato Regional Council, at any time, acting on the advice of the Peer Review Panel to require changes to the then current Discharge Strategy, inter alia, to better avoid adverse effects arising from reinjection/injection.
121. It is submitted that the thrust of Mr Matthews' evidence fundamentally fails to appreciate the force and effect of these provisions. He seeks to make avoidance of any effect on Geotherm Group's production activities effectively a new primary objective.
122. More generally, it is submitted that the condition regime proffered by Mr Matthews fails to appreciate the adaptive management regime put in place by the Environment Court and the need for any additional reinjection consent to fit into that regime.
123. In summary, the conditions proffered by Contact give Geotherm Group all the protection it needs, in a way which is consistent with the existing regime and does not produce the inconsistencies of administration and difficulties of enforcement identified by Mr Brockelsby in his rebuttal evidence.
124. Before leaving this point I should note that Doctors Watson and Burnell and Professor O'Sullivan have recently caucused on the technical issues. Counsel is conferring with Mr Kirkpatrick to ensure a record of that meeting can be tabled before the witnesses give evidence next week.

Cumulative Effects of Contact Air Discharges

125. In paragraph 4.14 Mr Matthews identifies some uncertainty (as he sees it) in Dr Stevenson's air modelling assessment regarding the cumulative effects of the Te Mihi proposal and the Geotherm Group project.
126. At paragraph 4.16, he identifies in particular that Mr Daysh's proposed conditions contain a higher hydrogen sulphide emission level than that which he identified as having been assessed by Dr Stevenson.
127. In his rebuttal evidence, Dr Stevenson provides clarification that his cumulative dispersion modelling explicitly included all relevant air discharge sources, including the proposed Geotherm Group Power Station. At paragraph 11 of his rebuttal evidence, Dr Stevenson identifies a section of his evidence which demonstrates that, in his view, effects at the proposed consent limits will not produce effects that are more than minor.
128. It is submitted that Mr Matthews has misread the technical evidence. Geotherm Group has presented no air quality evidence of its own. Dr Stevenson's evidence stands uncontradicted.

Cumulative Noise Effects

129. In paragraph 4.17, Mr Matthews asserts that the Contact assessment of environmental effects does not specifically address cumulative noise effects. He suggests a noise boundary should be defined and a noise standard specified. The proposed condition Mr Matthews suggests seeks to bind Contact to meet operational noise contours modelled by Mr Malcolm Hunt, the acoustic expert who is giving evidence for Contact on noise issues.
130. In rebuttal, Mr Hunt identifies the sections of his evidence in chief which discussed his view that cumulative noise effects associated with the Geotherm Group noise emissions are unlikely to occur. Mr Hunt explicitly disagrees with Mr Matthew's suggestion that a noise boundary should be specified. He has no difficulty, however, with the concept of a condition binding Contact to meet the District Plan noise standards at the notional boundary of any existing dwelling rather than an advice note to that effect.
131. In Mr Daysh's evidence in chief, he explained that the land use consents he proffered were derived from the consents recently granted by Taupo District Council to the Rotokawa Joint Venture for expansion of the Rotokawa Power Station complex (effectively the construction of a second power station). An

advice note regarding operational noise was the technique used with the Rotokawa applications. However, Mr Daysh also expresses himself to be comfortable converting the advice note he has proffered to a condition and suggests a specific form of words if the Board prefers that option.

132. Mr Hunt's view in conclusion in his rebuttal evidence is that operational noise that meets such a condition will not adversely affect people or the environment. Geotherm Group has called no expert noise evidence. That opinion stands uncontradicted.

Transmission Related Constraint Issues

133. In Mr McLachlan's evidence (paragraph 17), he expresses concern that the consented Geotherm Group project will be constrained by Contact putting electricity into the national grid without upgrading the capacity of that circuit. Mr McLachlan quotes the stance Contact took in relation to TrustPower's Mahinerangi wind farm as supporting his position – effectively a "*what's sauce for the goose is sauce for the gander*" type submission. This is a variation of the same point raised by Wind Farm Developments discussed above. As previously noted, Contact's appeal on the Mahinerangi wind farm was unsuccessful and Contact's appeal was categorised as raising only trade competition issues¹⁶. In addition, in the Otago situation it was accepted that the effect of additional electricity generation from the proposed wind farm would be to constrain Contact's renewable hydro generation from time to time as a result of the limits in capacity in the relevant transmission lines. But Mr Sise's uncontradicted evidence is precisely to the contrary in this case; there is no prospect of transmission constraints under normal operating conditions. It is submitted that the point being made by Mr McLachlan has no substance.

Points Arising in Section 42A Report

134. At pages 22-23, of his updated report, Mr Burton notes an issue raised at the May prehearing meeting by submitters regarding the potential for horses on the adjacent Price property to be spooked by sudden loud noises. Mr Burton records the steps Contact has taken to respond to this potential issue, routing the proposed access road further away from the Prices' property, putting in place a 100 metre buffer around the property and inserting specific reference

¹⁶ *Contact Energy Limited v Clutha District Council* C73/08

in the conditions relating to the Construction Management Plan requiring that potential disturbance to neighbours be addressed.

135. Notwithstanding the absence of any contrary evidence, Mr Burton queries whether the Board might feel the issue has not been adequately covered off. In my submission, Contact has properly addressed the issue and I would refer the Board also to the evidence in chief of Mr Malcolm Hunt. Mr Hunt addresses the point raised at paragraph 116, giving his opinion that construction and operation of the proposed power station will not cause any unreasonable noise levels at the Prices' dwelling.
136. Also at page 23, Mr Burton discusses claims in the submissions that there may be adverse effects on local property values. He notes that there is no evidence either from Contact or from the submitters on this point.
137. The reason Contact did not address the point in evidence is because case law indicates that property values, which are of course subject to a wide variety of competing and conflicting influences, are not directly relevant to a resource consent application. Thus in relation to another Contact power station application in the Taupo area, the Environment Court commented that:

“Claims of effects on tourism appeal... like claims of depreciation of property values, are derivative. If they are well founded, that is because of adverse effects on the environment, and it is the adverse effects themselves, rather than the supposed secondary results of them, that should be considered in the ultimate judgment. If they are not proved to be well founded, we hold that they should not influence the Court's decision.”¹⁷
138. Thus, if substantiated, adverse effects on property values might be a pointer to adverse environmental effects which the Board of Inquiry, in this case, should be considering. Here, however, there is no evidence either of any likely effect on property values, or any more direct effect, which could lead to such economic consequences.
139. At paragraph 4.1 of his updated report, Mr Burton draws attention to a point made in the evidence of the project engineer Mr Pummer, namely that as a result of a change of mind on the part of Transpower, the shape of the switchyard has changed slightly, extending into the consent area for the transmission line. Mr Burton does not specifically comment, but it is

¹⁷ *Contact Energy Limited v Waikato Regional Council* A04/2000 at paragraph 255.

submitted that this is a minor change and as such able to be accommodated within the scope of this process. There is no evidence before the Board of Inquiry raising any visual issues either generally or specifically related to the transmission aspects of the project. No party has given notice to cross examine Mr Coombs, Contact's expert on visual issues. The switchyard is entirely located on Contact freehold land. It is submitted that the change is not material.

140. At paragraph 43 of his updated report, Mr Burton queries whether proposed conditions restricting surface activities in the vicinity of identified cultural sites are sufficient, in particular, whether such a restriction should also apply to the irrigation and reinjection consents.
141. The difficulty with this suggestion is that reinjection in the vicinity of these areas is not constrained under existing consents. For this reason, the issue has been dealt with separately through a memorandum of agreement with the hapu in whose rohe the cultural sites fall, covering both surface and subsurface activities in the vicinity of these sites.
142. At page 47 of his updated report, Mr Burton queries the use of 6,000 tonnes per day as a trigger for potential application of the suggested buffer around the Geotherm Group site post the lapse date in 2013. Mr Burton's point is that Geotherm Group has the ability to exercise its consents at any level up to the maximum permitted. While theoretically true, Mr Burton fails to take account of the point made by Mr Carey in his rebuttal evidence, that the exercise of Geotherm Group's consents at levels below 6,000 tonnes per day would effectively provide only direct heat to some third party use. It is not sufficient to enable electricity generation.
143. As Mr Carey also observes, a direct heat supply at that level requires a large industrial activity. There is no such activity in the vicinity of the Geotherm Group consent site. On that basis, it is reasonable to have cut off requiring Geotherm Group to be operating at a reasonable level. The figure of 6,000 tonnes per day is one identified in the Waikato Regional Plan (Variation 2) as representing the difference between a medium and large use of geothermal water. It is also the point at which, under the Geotherm Group's consents, its operations are brought under the umbrella of the System Management Plan.
144. At page 47 of his updated report, Mr Burton suggests that the construction traffic management plan condition in the power station consent should be carried over into the switchyard consent, together with a brief condition

linking the two. Contact does not see that as necessary, but has no particular difficulties with that proposal.

145. On the following page (48) Mr Burton suggests, for similar reasons, a carry over of the construction management plan provisions in the power station consent conditions into switchyard consent. Again, Contact would have no difficulty with that suggestion.

Part II Issues

146. In any application under the RMA, consistency with Part II of the Act and in particular with the purpose of the Act is the ultimate litmus test as to whether a consent application should be granted or not.
147. In this case, it is submitted that the overwhelming balance falls in favour of granting consents on the terms sought. The proposal before the Board of Inquiry provides a number of tangible ways in which social and economic conditions of people and communities will be advantaged. A new power station replacing the now aging Wairakei Power Station and producing electricity more efficiently out into the future provides for the reasonably foreseeable needs of future generations. Providing a means to significantly reduce geothermal river discharges provides for the life supporting capacity of surface water ecosystems. Finally, all relevant effects will be appropriately avoided, remedied or mitigated by the conditions proffered with the evidence of Mr Daysh.
148. Mr Chrisp undertakes a detailed assessment of the effects of the proposal against the balance of the provisions of Part II in his evidence. Importantly, in relation to potential effects of reinjection on significant indigenous vegetation and/or significant habitats of indigenous fauna, this is addressed in the hierarchy of objectives for the Discharge Strategy, recognising that some objectives are potentially inconsistent.
149. In relation to those aspects of Part II incorporating cultural issues, specifically section 6(e), 7(a) and 8, Contact has entered into a memorandum of agreement with Ngati Rangiiita ki Oruanui, whose rohe encompasses the power station site and environs to address cultural issues.
150. Finally, the applications fall squarely within the subparagraphs of section 7 emphasising efficient use and development of natural and physical resources, the need to give particular regard to the effects of climate change and the benefits to be derived from the use and development of renewable

energy. All of these considerations point firmly in favour of granting of consent.

151. In his evidence, Mr Matthews, points to the fact that a number of the same Part II benefits that Contact relies on for the purposes of its application apply equally to the Geotherm Group project, and therefore that adverse effects on the latter are Part II issues.
152. While theoretically correct, this position of course assumes that the Geotherm Group project is viable and will proceed. As discussed already, this is by no means certain. By contrast, Contact seeks to utilise an existing proven resource area for its Te Mihi project. The benefits claimed by Contact in relation to Part II can therefore be relied on.
153. In any event, as discussed, the evidence is that the Geotherm Group project is not likely to be materially affected should it proceed and the conditions suggested by Mr Daysh appropriately protects its potential output.

Evidence

154. Contact circulated 16 briefs of evidence and a further 9 briefs of rebuttal evidence as follows:
 - (1) Mr James Kilty, Project Director – Generation employed by Contact, will provide a broad description of Contact and its activities. He will outline the commercial rationale for the project. He will provide a management perspective on the subsidence investigation programme being undertaken by Contact. Finally, he will respond to certain matters put in issue by the McLachlan interests;
 - (2) Mr Craig Stephenson, Contact’s Environment and Land Manager (Geothermal) based at Wairakei will give evidence on consultation as part of the application process, ongoing subsidence investigations at the surface and the progress of the East Taupo Arterial Road project;
 - (3) Mr Bernd Pummer, employed by Contact as Project Manager – Generation Development – Geothermal, will provide an engineering description of all aspects of the project. No party has given notice to cross examine Mr Pummer;
 - (4) Mr David Hunt, a Director of Concept Consulting Group will provide an economic assessment of the project, introducing the report of which he

was the principal author and which was a technical appendix to the Assessment of Environmental Effects. Mr Hunt will also respond to the relief sought by Wind Farm Developments. No party has given notice to cross examine Mr Hunt;

- (5) Mr Brad Coombs, an Associate and Senior Landscape Architect of Isthmus Group Limited based in Tauranga, will give evidence on his assessment of visual amenity issues related to the project. No party has given notice to cross examine Mr Coombs;
- (6) Mr Malcolm Hunt, an Acoustical Engineer and Principal of Malcolm Hunt Associates, will give evidence on his assessment of noise emissions from the proposed plant for which land use consent is sought;
- (7) Mr Brett Harries, a Chartered Professional Engineer and Managing Director of Traffic Design Group Limited, will give evidence on traffic issues associated with the project. Although notice to cross examine Mr Harries was given by Transit New Zealand Limited, it is understood that this has been overtaken by the agreement between the parties on traffic conditions;
- (8) Mr David Ray, an Environmental Engineer at the Hamilton office of Environmental Management Services Limited, will give evidence on management of the proposed sewage disposal systems, hazardous substances, stormwater and solid waste. No party has given notice to cross examine Mr Ray;
- (9) Mr Greg Sise, Managing Director of Energy Link Limited and an Engineer with considerable experience in transmission issues, will give evidence on the implications of the proposed Te Mihi Power Station for the transmission network in the vicinity of the plant. No party has given notice to cross examine Mr Sise;
- (10) Mr Brian Carey, an Engineer with extensive experience in geothermal reservoir management on the Wairakei-Tauhara Geothermal System and the Geothermal Section Manager for GNS Science, will introduce the Draft System Management Plan of which he was the principal technical author, update the draft plan submitted with the applications with more recent data, outline Contact's operations on the Tauhara field and discuss the Geotherm Group proposal;

- (11) Professor Michael O’Sullivan of the Auckland Engineering Science Department will present his reservoir modelling assessment of the proposed reinjection including a discussion of potential effects on the Geotherm Group project;
- (12) Mr Christopher Bromley, a Geothermal Scientist employed by GNS Science at Wairakei, will discuss the current knowledge of the shallow hydrothermal regime on the Wairakei-Tauhara Geothermal System. He will produce additional information on the understanding of subsidence mechanisms gained since the Wairakei Environment Court hearings in 2006, including an outline of the proposed subsidence investigation programme. Finally, he will discuss the potential effects of increased reinjection and its proposed management through the Discharge Strategy;
- (13) Dr Craig Stevenson, Director of Air and Environmental Sciences Limited and an expert in air and ground discharge effects, will set out his analysis of the effects of the proposed air discharges and of potential contaminant related effects from the proposed surface irrigation consent;
- (14) Mr Stewart Cameron, a Hydrogeologist employed by GNS Science based at Wairakei, will give evidence on the potential effects on groundwater levels, ground water flows and surface water flows from the proposed condensate irrigation. No party has given notice to cross examine Mr Cameron;
- (15) Mr Mark Chrisp, a Director and Principal Planner at the Hamilton Office of Environmental Management Services Limited, will give a planning assessment of the applications;
- (16) Mr Stephen Daysh, a Director and Principal Planner in the Napier Office of Environmental Management Services Limited will explain the rationale behind the suite of resource consents sought and his work developing and consulting with the other parties regarding the formulation of suggested consent conditions.

155. In rebuttal evidence:

- (1) Mr Pummer – will clarify certain issues raised in the preliminary section 42A report prepared by Mr Burton;

- (2) Mr Coombs – will introduce a revised planting plan that was the subject of comment by Mr Burton in his preliminary section 42A report;
- (3) Mr Malcolm Hunt – will address those aspects of Mr Matthews' evidence relating to noise effects;
- (4) Mr Harries – will address the technical traffic evidence of Mr Swears for Transit New Zealand and a memorandum produced by Ms Platts with her evidence;
- (5) Mr Carey – will respond to a number of points in the evidence of Mr Matthews and isolated points in the preliminary section 42A report, the evidence of Dr Watson and the evidence of Mr McLachlan;
- (6) Professor O'Sullivan – will respond to aspects of the evidence of Dr Watson and Dr Burnell;
- (7) Mr Bromley – will respond to an issue raised by Dr Watson regarding the potential adverse effects from rising reservoir pressures;
- (8) Dr Stevenson – will respond to the issues raised by Mr Burton and by Mr Matthews relating to hydrogen sulphide emission limits and also discuss a point made by Mr Brockelsby in relation to ambient air quality modelling;
- (9) Mr Daysh – will respond to a number of witnesses who addressed consent condition issues and produce a revised suggested set of draft conditions. His rebuttal also addresses a discrete issue raised by Mr McLachlan.

Dated this 21st day of July 2008.

TP Robinson
HR Dixon
DGA Allen
Counsel for Contact Energy Limited