



# Te Mihi Geothermal Power Station

Report On Consent Applications Under s42A Resource  
Management Act 1991 - Version 2 - Final

Prepared for the Board of Inquiry Appointed by the Minister for the Environment

09 July 2008

# Te Mihi Geothermal Power Station

Prepared for

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Prepared by

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# Preface

This report has been prepared under s42A of the Resource Management Act 1991 (RMA) at the instruction of the Board of Inquiry appointed by the Minister for the Environment to hear and determine applications for resource consent by Contact Energy Ltd to develop and operate a geothermal power station at Te Mihi near Taupo. The Board of Inquiry will commence hearing the applications at Taupo on 21 July 2008.

At the instructions of the Board of Inquiry this report makes no recommendations as to the outcome of the applications.

This version of the s42A report has been prepared following receipt of the evidence in chief of submitters, and rebuttal evidence of the applicant (Contact Energy Ltd), and thus supercedes the version prepared following receipt of the evidence in chief to be presented by the applicant.

A suite of suggested conditions to assist the Board in the event that their decision is to grant the applications has been included.

# 1.0 Background

The proposed Te Mihi Power Station site is located within the boundaries of the Wairakei geothermal field. This forms part of the wider Wairakei – Tauhara geothermal system with the two fields understood to be connected at depth.

The Wairakei – Tauhara geothermal system extends over a wide area on both sides of the Waikato River. On the Wairakei side (west), the field boundary (resistivity boundary) extends beyond Poihipi / Oruanui Road and State Highway 1. On the Tauhara side (east), the resistivity boundary extends beyond the Off Road Highway in the north, around the eastern side of Mt Tauhara and to the south of SH5 (Napier / Taupo Road). Most of that section of Taupo Town located on the east side of the Waikato River is within the boundaries of the Tauhara field.

The Wairakei - Tauhara geothermal system contains pressurised water at a temperature of about 250°C at a depth of about 2.5 kms. When this water rises to the surface, the pressure on the water reduces and the water boils to become a mix of about 80% water and 20% steam. These resources are utilised and generate electricity (steam turbine and binary cycle plants).

Currently the following power stations operate on the Wairakei – Tauhara geothermal system:

- Wairakei Power Station (including a binary cycle plant) – Contact Energy Ltd. The power station commenced operation in 1958 and recently a binary plant has been commissioned on the site.
- Poihipi Road Power Station – Constructed and commissioned by Mercury Geotherm in 1998 and acquired by Contact Energy Ltd in 2001

In addition to the above, Contact Energy Ltd holds resource consents to develop a 20 MW power station at Centennial Drive in the industrial area to the north of Taupo Town. These consents have been partially implemented and progress toward the development of a new power station there is being made.

In 2007 Geotherm Group Ltd (In Receivership) was granted resource consents to take and discharge up to 70,000 and 65,000 tonnes / day respectively of geothermal fluid and to build and operate a power station at a site located at the intersection of Poihipi Road and Tukairangi Road about 2 kms from the Poihipi Road Power Station.

Contact Energy Ltd has advised that it is undertaking investigations of the Tauhara field with a view to the development of further electricity generation. Other parties including iwi are interested in the further development of the geothermal resources.

Thus, the Wairakei – Tauhara geothermal system has been used for electricity generation for many years. The Poihipi Road Power Station has been developed relatively recently and further proposals are consented but as yet not developed. Further electricity generation proposals are likely to be put forward in the future.

# 2.0 Overview of the Project

Contact Energy Ltd (Contact) has made application for resource consents to establish a new geothermal power station in the Te Mihi area of the Wairakei steamfield. Currently steam derived from the Wairakei steamfield is utilised in the Wairakei Power Station.

This power station commenced operations in 1958. Increasing maintenance costs and environmental issues with the current cooling system employed (river water cooling) and discharges to the Waikato River mean the plant is reaching the end of its useful life and it is unlikely to run beyond 2026 when

the current resource consents applying to Wairakei plant expire (includes the consents to extract geothermal steam / fluids).

As already noted, there are significant environmental issues associated with discharges from the Wairakei power scheme to the Waikato River. The existing cooling system for the Wairakei Power Station relies on drawing water from the Waikato River and discharging the water back into the river together with steam condensate. This results in the discharge of warmer water containing geothermal trace elements into the Waikato River. The current consent conditions for Wairakei require significant reductions in the concentration of contaminants in the discharge (particularly hydrogen sulphide and mercury) within specified time frames (in the case of H<sub>2</sub>S, 3 years from commencement of consent – May 2007). Very substantial costs are required to achieve the reductions specified.

Further, the current Wairakei suite of consents provide for the discharge of up to 60,000 tonnes/day of separated geothermal water to the Waikato River (104711). Conditions of this consent require significant reductions in the arsenic and mercury concentrations of the discharge over a defined timeline. Again, significant costs are involved.

Notwithstanding the above issues regarding the operation of the Wairakei Power Station and steamfield operation, it is understood that the Wairakei steamfield and any extensions thereto are likely to be able to supply steam for electricity generation for many years (and well beyond the 2026 expiry date of the Wairakei consents).

Accordingly, Contact proposes to construct and operate a new geothermal power station at Te Mihi some 5km west of the existing Wairakei Power Station. It is intended that the station will comprise three 78MW generating units with the first two commencing operations in 2011 and the third in 2016. An alternative scenario being considered by Contact is to have all units in operation in 2011.

The Te Mihi Power Station will generate some 220MW net of electricity, 60MW more than is generated at the Wairakei plant. Once the Te Mihi plant is fully operational, the Wairakei Station will be phased out and ultimately decommissioned. However, one of the Wairakei A Power Station Low Pressure (LP) units may continue to operate for some years if LP steam from the Western Borefield is economically used in this way. The existing binary cycle station at Wairakei (commissioned in 2005) will continue to operate.

Once the Te Mihi Power Station is fully operational, the discharge of hydrogen sulphide and mercury from the Wairakei Power Station cooling water discharges will decrease to negligible levels and the total heat discharge will also decrease significantly as the station will be largely decommissioned.

Construction of the Te Mihi Power Station will also involve the construction of a new switchyard adjacent to the Power Station and a 220kV transmission line looping from the existing Wairakei – Whakamaru 220KV line which is located about 1km away from the power station site.

Currently, the Wairakei Power Station consents held by Contact provide for the taking of up to 245,000 tonnes/day of geothermal fluid for electricity generation and associated purposes. This consent (RC 104706) expires in June 2026. The geothermal fluid required to operate the proposed Te Mihi Power Station will be sourced via this consent. As this consent is in place, issues related to accessing the resource and to some effects issues (such as potential ground surface subsidence) are not directly concerned other than the reinjection proposed as part of the Te Mihi proposal will be part of a discharge strategy the primary objective of which is to address subsidence issues.

### 3.0 Power Station Technology

The proposed Te Mihi Power Station will draw geothermal fluid from the Wairakei geothermal field from the following areas of current production:

- Western Borefield - two phase fluid (steam / water mix) from wells drilled to about 600m depth

- Te Mihi Borefield – dry steam from a shallow (300m – 400m) steam zone and two phase fluid from a deep reservoir of hot water (2,500m deep). The Te Mihi borefield also provides steam for the Poihipi Road Station

The power station is to be a conventional steam turbine plant. In the Assessment of Environmental Effects forming part of the applications, the option of adopting a binary cycle plant rather than a steam turbine was put forward. The applicant now confirms in its Evidence in Chief (E in C)(refer Pummer para 39) that the binary plant option is no longer being pursued.

A full description of the geothermal power plant and process is included in the AEE.

The power station will draw geothermal fluid mainly from the Te Mihi borefield. The use of 'double flash' technology will provide for the generation of about 20 – 25% more power from the same amount of fluid currently extracted for the Wairakei Power Station (A & B). Double flash technology provides for the use of steam at different pressures in a dual admission turbine.

At the well head, geothermal fluid is separated into intermediate pressure steam (IP) and brine. Both are piped to the power station where the separated brine is flashed to generate low pressure steam (LP).

The IP and LP steam are expanded through steam turbines to drive electricity generators.

Steam vents near the power station are provided for start up and pressure control.

After passing through the turbines the steam will be condensed using direct contact condensers (refer E in C, Pummer para 40). Closed circuit, mechanical draft cooling towers are to be employed. When the steam is condensed in the condenser, some non condensable gases remain and are removed from the condensers by gas extractors and discharged to the atmosphere.

The applicant has clarified the construction staging of the proposal (refer Rebuttal Evidence, Pummer paras 3 to 7). In summary this is:

Stage 1 – installation and commissioning of first two turbine units, along with all associated plant (condensers, cooling towers, transformers, switchyard and transmission equipment). The first unit will take 26 months from the beginning of site works to be commissioned, while the second unit will take a further two to three months to be commissioned. Stage 1 planned to be concluded in 2011. Two turbines then operating at Te Mihi and four at Wairakei.

Stage 2 – third and final turbine installed and commissioned in 2016. Estimated that third turbine will need to be ordered in mid-late 2013, meaning that Stage 2 work to provide pedestal and structural support for third turbine will need to begin in mid-2013. Stage 2 works will include all associated plant for third turbine (condensers, cooling towers, LP flash vessels etc). Once third turbine operative at Te Mihi, one 11.2 MW LP turbine will still operate at Wairakei (along with Wairakei binary plant) and the Poihipi power station.

### **3.1 Reinjection of Geothermal Fluid etc**

Contact Energy Ltd currently holds a number of resource consents providing for the reinjection of geothermal fluid, steam condensate and cooling water blow down. These provide for reinjection of geothermal fluid etc from the Wairakei and Poihipi Road Power Stations. However, Contact's consents to take geothermal fluid for these power schemes provide for a much larger volume than is provided for in the reinjection consents. Because of this, currently, a significant volume of separated geothermal fluid and condensate is discharged to the Waikato River (consented at 60,000 tonnes/day and 35,000 tonnes/day respectively).

The Te Mihi proposal includes an application to reinject up to 95,000 tonnes/day of geothermal water, condensate, etc. Adding this volume to the volumes provided for by consents already held will enable Contact to reinject all separated geothermal water, condensate and blowdown that is produced from

the operation of the proposed Te Mihi and Poihipi Road Stations. Some of the condensate / cooling water blowdown is likely to be used to irrigate farmland if this is proved to be the best strategy. An application is included in the current package to discharge up to 6,500 tonnes / day on to land by irrigation and there is an existing consent to irrigate a further 8,500 tonnes/day (104723).

The current applications to provide for additional capacity to discharge separated geothermal water, condensate etc will provide for a greater degree of flexibility in the management of the Wairakei – Tauhara Geothermal System. The existing consents require the preparation of a Discharge Strategy as part of a required System Management Plan. The same approach is proposed in regard to the current applications. In terms of discharges, the greater flexibility now proposed will provide for the implementation of the objectives of the Draft Discharge Strategy forming part of the current applications.

The current reinjection application covers a very wide area and provides for reinjection only within the Wairakei – Tauhara system. Unlike the Wairakei and Poihipi reinjection consents, no outfield reinjection is proposed. The current application excludes some areas within the general application area (eg Wairakei Golf Course, Geotherm Group Ltd site, industrial areas on Centennial Drive immediately north of Taupo Town).

### **3.2 Other Discharges**

The Te Mihi proposal involves emissions to the air comprising warm, moist air from the cooling towers (cooling tower plumes) which also will contain non-condensable gases from the turbine condensers. Such non condensable gases include primarily carbon dioxide, hydrogen sulphide and mercury. There are also trace levels of a range of other gases including hydrogen, methane and nitrogen.

A consent is sought for these discharges.

An air discharge consent is also sought for the existing Poihipi Road Power Station as the current air discharge permit for that plant expires in December 2011.

A permit to discharge contaminants to the air from all geothermal steamfield equipment within the overall Wairakei – Tauhara Geothermal system is also sought.

Discharge of domestic sewage from the Te Mihi Power Station is proposed to be by ground soakage from a septic tank system. An application is made for this discharge.

## **4.0 General Description of Site and Locality**

The site for the Te Mihi Power Station is located on rolling, rural, open pastureland above gullies that form the catchments of the Te Rautehuia and Wairakei streams and which contain the production wells of the existing Te Mihi and Western borefield. Existing steamfield pipelines cross the northern side of the site and also pass over the southern side of the site to the Te Mihi borefield and the Poihipi Road Power Station. The single circuit Poihipi Road transmission line passes the east side of the power station site, and joins the Wairakei – Whakamaru B transmission line approximately 1km northeast of the proposed site.

The surrounding farmland includes some shelter belts of exotic tree species and the occasional self-sown native tree. The Wairakei borefield land is generally covered with scrubby vegetation. The soils are generally volcanic ash and pumice and are generally free-draining.

The legal description of the power station site is part of Section 4.50 355555 and part of Section 1 SO 58808 (CT SA4GC/233). The land is in the ownership of the Commissioner of Crown Lands (Section 4) and Landcorp Farming (Section 1).

Most of the Te Mihi and Western borefield is also in the ownership of the Commissioner of Crown Lands with the northern sector of the Te Mihi borefield in Landcorp Farming hands.

In addition to grazing, other uses in the vicinity of the Te Mihi Power Station site include the Taupo Saleyards, a horse riding school (L and A Price, Oruanui Road), Taupo Pony Club, Poihipi Road Power Station and a number of lifestyle blocks on Oruanui Road and Link Road.

Access to the Power Station site is from Oruanui Road which is a sealed collector road. Oruanui Road runs off Poihipi Road which is a regional road intersecting with State Highway 1 some 1km north of Taupo.

Contact Energy will need to have access agreements in place over all areas subject of the applications to enable works to be done. It is noted that one submission (McLachlan and MacPower Ltd) raises property questions regarding land in the vicinity of the Poihipi Road Power Station which is subject of the current applications (within the reinjection area). This matter will presumably be subject of evidence at the hearing.

#### **4.1 Power Station – Physical Description**

The site is about 10ha in area with some 6.5 ha of this being occupied by structures. A new sealed access road is to be established from Oruanui Road to the site. This will be used for construction and ongoing access purposes. All roads, parking areas and other hard-standing areas will be paved with asphalt. The site will be surrounded by a security fence and some areas within the site (eg switchyard) will be surrounded by safety fencing.

The primary buildings at the Power Station will be the turbine hall and the cooling towers. Various secondary structures will be required. A large electrical switchyard is to be located nearby the turbine hall. An existing transmission line (to Poihipi Road Power Station) will be diverted and reconstructed to connect to the new power station.

Various other plant including transformers, gas extraction equipment, steam separation vessels, steam discharge silencers and steam / water pipelines will also be required. Pipelines on the steamfield will be located above ground due to insulation and thermal expansion requirements and to facilitate maintenance and inspections. This is normal practice with geothermal power schemes.

The **turbine hall** will be 130m long x 22m wide plus 8m on the north side for an electrical annex. The building will be 26.4m high (indicative) from the reconfigured site level of 516m asl. The building will be of concrete foundations and lower walls with steel portal framing and metal cladding.

The mechanical draft cooling towers are the other major structure making up the development. There are 3 cooling tower 'blocks', one for each turbine each comprising either 8 cells or an alternative arrangement involving 6 cells.

The **cooling tower structures** (8 cells) will be 80m long by 35m wide and 16m high from a site level of 516m asl (same as for the turbine hall). The alternative arrangement of 6 cells involves a cooling tower structure of 60m long x 40m and 16m high but probably on a raised site level of 518m asl, ie effectively 18m high (relative to a turbine hall height of 26.4m).

The three cooling towers are set out in a row immediately to the south of the turbine hall. To reduce recirculation of the cooling tower plumes back to the cooling tower inlets, the orientation of the cooling towers is required to be parallel to the prevailing wind.

The cooling towers will be similar in appearance to the Poihipi Road Power Station cooling tower.

A **switchyard** is to be located adjacent to the power station in order to combine the outputs of the 3 generators and connect them (via a transmission circuit) to the Wairakei – Whakamaru B transmission line. The switchyard is to be approximately 170m x 110m. The approximate height of the switchyard equipment is 5.5m with lightening poles extending to 25m. Since the applications were lodged, Transpower has decided that the configuration of the switchyard will be a 'breaker and a half' arrangement. This results in a switchyard of the above dimensions. This is a slightly larger than

originally proposed and subject to the switchyard application area. This results in the area extending some 10m into area shown on the consent applications for power transmission lines.

Currently a 220kV single circuit 220kV **transmission line** connects the Poihipi Road Power Station to the Wairakei – Whakamaru B (WRK-WKM B) transmission line at tower 14A on that line. Transpower (owner and operator of the line) requires that the WRK-WKM B lines be looped in and out of the new power station for security of supply reasons. There will be four double circuit lattice steel towers constructed from the WRK-WKM B line to the Te Mihi switchyard. The new double circuit line will be located to the west of the present Poihipi Road transmission line. The Poihipi Road Power Station will be connected to the Te Mihi switchyard still as a single circuit line but one tower will require relocation. Once the new Te Mihi Power Station is constructed the redundant sections of the existing Poihipi Road transmission line from WRK-WKM B to the power station will be dismantled.

The new double circuit line towers will be up to 45m high (refer Evidence in Chief of Pummer para 160). It is noted however that Exhibit BP17 attaching to the Pummer evidence showing double circuit tower 'general arrangements' provides tower profiles to a maximum height of only 37m (termination tower).

Mr Pummer in his rebuttal evidence (para 8 and Table 1) has clarified that the tower heights are subject to detailed design including associated detailed site surveys that have not yet been undertaken, and that the maximum height of any of the tower structures will not exceed 45m.

#### **4.2 District Plan Activity Status for Power Station, Switchyard, Transmission Lines**

The Taupo District Plan became operative on the 11<sup>th</sup> of October 2007. The subject site is shown on planning maps A12 and B10 and is between two Environments; the eastern side of the site is within the Industrial Environment and the western side is within the Rural Environment. Two Fault Lines traverse the site, running generally in a north south direction. The eastern side of the site is within the Hot Ground Hazard Area, and most of the site (except for a small portion at the north western end) is within the 40 DBA Leq Noise Control Boundary. There are no other notations shown on the planning maps.

In terms of the Rural Environment, the Power Station proposed fails to meet several performance standards outlined in section 4b.3 of the District Plan in relation to the maximum height of structures, maximum site coverage, the minimum building setbacks and the maximum noise levels. As this activity fails to meet these performance standards and is not provided for under any of the other rules, pursuant to Rule 4b.1.7 this part of the application is a Discretionary Activity.

In terms of the Industrial Environment the Power Station fails to meet several performance standards outlined in section 4d.3 in relation to the maximum height of structures, the minimum building setbacks and the maximum noise standards. Thus as this activity fails to meet these performance standards, pursuant to Rule 4d.1.3 this part of the application is for a Restricted Discretionary Activity.

In terms of the failure to meet the noise standards for both the Rural and Industrial Environments, it is noted that the normal operation of the Power Station will comply with the maximum noise levels, however occasional steam venting will exceeds the prescribed levels.

Section 4e.14 of the District Plan makes provision for Network Utilities. The proposed Transmission Towers, Lines and Switchyard meet the District Plan definition of a Network Utility and are provided for as a permitted activity by Rule 4e.14.2 - iv. However these structures fail to meet the performance standards which outline a maximum voltage conveyance for transmission lines, and a maximum height and diameter restriction for masts and poles outside legal roads. Therefore pursuant to Rule 4e.14.5 this part of the application is for a Restricted Discretionary Activity.

While three separate land use consents have been applied for, they are interdependent one to another. It is generally accepted that the most stringent activity status shall be applicable when considering a project as a whole. Therefore in terms of the Taupo District Plan the overall activity status of the proposal is Discretionary.

### 4.3 Steam Lines – District Plan Activity Status

The geothermal steam lines are required to be placed above ground due to insulation and thermal expansion requirements. These steam lines are provided for within the Rural Environment pursuant to Rule 4b.1.4 which provides that any activity involving continued operation, maintenance and minor upgrading of existing geothermal steamfields is a permitted activity. There are no Performance Standards that must be met.

Within the Industrial Environment steam lines are captured by the Permitted Activity Rule 4d.1.1. However they are required to meet all of the Performance Standards for this Environment and the relevant District Wide Performance Standards. Of particular relevance is the minimum setbacks outlined in section 4d.3.3. Failure to meet these standards would result in the lines becoming a Restricted Discretionary Activity pursuant to Rule 4d.1.3. It is assumed that once the detailed design of the project is undertaken, it will then become clear if any steamlines require consent in terms of this rule.

Ms Platts in her E in C questions whether land use consents are required for steam lines. Other than the possibility noted above, such activities are considered to be a permitted activity in regard to the Te Mihi proposal.

## 5.0 Applications for Resource Consent Made

As noted, the applicant already holds a number of resource consents secured as part of the Wairakei package recently granted which will be able to be used for the purposes of the Te Mihi project. The relevant consents held are:

- Take up to 245,000 tonnes/day of geothermal fluid (104706). This is the main Wairakei geothermal fluid take and this can be utilised for the proposed Te Mihi Power Station (the take is not specific to any power station in particular).
- Water take for up to 10,000 tonnes/day well drilling, investigation, testing, monitoring, maintenance, operational, cooling water make-up and ancillary purposes from any or all of the Te Rautehuia, Waiharuru and Waipouwerawera Streams and the Waikato River (104709).

It is proposed that water from the Te Rautehuia Stream be taken for Te Mihi Power Station fresh water supply requirements in terms of this consent which is not limited to any particular power station.

- Steamfield activities – the following consents will adequately cover ongoing steamfield activities:
  - Discharges associated with well drilling, testing, maintenance (104717)
  - Discharge of antescalants (well cleansing) (104719) to land via wells
  - Discharge of steamline condensate, silica, water, cooling water and condensate onto or into land (104720)
  - Several generic consents for activities on the beds of streams (104727), earthworks / tracking (104728) and the construction of wells (104729)

Finally, as noted in 3.1 above, the applicant holds resource consent for the discharge of up to 144,000 tonnes/day geothermal water, condensate, cooling water and chemicals into land and underground water through reinjection / injection wells (104718). This consent will provide for some of the reinjection of geothermal water etc from the proposed Te Mihi Power Station – in conjunction with further consents sought.

When the applications were initially lodged with Environment Waikato in July 2007, that Authority did not challenge the applicant's intention to rely on these existing consents for relevant parts of the Te Mihi project. I agree with this position.

The new consents required for the project and for which applications have been made are as follows:

## **5.1 Regional Consents**

### **5.1.1 Discharges to Land and Groundwater**

- Discharge permit to discharge up to 95,000 tonnes per day of geothermal water, steam condensate, cooling water blow-down, suspended material, and added chemicals into land and underground water through reinjection wells within the boundaries of the Wairakei – Tauhara Geothermal System.
- Discharge permit to discharge by irrigation up to 6,500 tonnes per day of cooling water blowdown and condensate onto land (and by seepage into underground water)
- Discharge permit to discharge up to 50 cubic metres per day of water including contaminants and sewage into land and underground water through septic tanks and associated soakage facilities

### **5.1.2 Discharges to Air**

- Discharge permit to discharge contaminants to air from the proposed Te Mihi Geothermal Power Station and associated structures
- Discharge permit to discharge contaminants to air from the Poihipi Road Power Station and associated structures, including geothermal wells, pipelines and geothermal steamfield equipment (to commence on 1 January 2012)
- Discharge permit to discharge contaminants to air from geothermal wells, flash plants, pipelines and all associated geothermal steamfield equipment within the Wairakei – Tauhara Geothermal System west of the Waikato River

Plans showing the areas to which the above applications relate are presented with the resource consent applications lodged.

## **5.2 District Land Use Consents**

- To construct, operate and maintain all structures and facilities associated with a geothermal power station on the Wairakei – Tauhara Geothermal System and including all ancillary equipment, but excluding the new switchyard and 220kV transmission line described in the separate but associated resource consent applications
- To construct, operate and maintain a new switchyard adjacent to, and associated with, a new power station
- To construct, operate and maintain a 220kV transmission line, associated support structures, equipment and facilities associated with a new geothermal power station on the Wairakei – Tauhara Geothermal System, including realignment of a section of the existing Poihipi Road Power Station transmission line and modification works necessary to enable connection of the new line to the existing Wairakei – Whakamaru B transmission line.

Plans showing the areas to which the above applications relate are presented with the resource consent applications lodged.

It is understood that separate consents are sought for the switchyard and transmission line components of the overall package of works because these works are to be owned and operated by Transpower and the consents will be ultimately operated by that company.

I am not aware of any additional consents that are required to undertake the Te Mihi Power Station project. Neither Environment Waikato nor Taupo District Council advised the applicant that further consents needed to be applied for prior to applications being called in by the Minister for the Environment.

## 6.0 Application Procedure and ‘Call in’

The applications were lodged with Environment Waikato (EW) and Taupo District Council (TDC) on 31 July 2007. Following review by those authorities, requests for further information were made by each Council to the applicant under s92 of the Resource Management Act 1991.

The EW request was dated 27 August 2007 and related to consultation, geothermal field modelling and air discharge matters. TDC made an initial s92 request dated 10 August highlighting that peer reviews had been commissioned on several aspects of the project (landscape / visual, noise, traffic and hazardous substances). Following this, and in response to queries from TDC peer reviewers additional requests for further information were made.

It is understood that the applicant responded to all requests for further information by the Councils and that neither EW nor TDC considered (or considers) that the applicant has not adequately met the requests made.

The applications were not progressed to public notification. On 20 December 2007 the Minister for the Environment advised that he intended to call in the Te Mihi proposal and that he would appoint a Board of Inquiry to consider and decide the applications for resource consent.

Public Notice of the Minister’s direction to call in the proposal was given on 9 February 2008. In the Public Notice the Minister stated as follows:

*“I consider these matters are a proposal of national significance and I have therefore made a direction that they be called in and referred to a Board of Inquiry in accordance with sections 140 to 150AA of the Resource Management Act 1991.*

*“My reasons for calling in the matters involved in the proposal are as follows:*

- *The proposal is relevant to New Zealand’s international obligations to the global environment in terms of the Kyoto Protocol including the proposal’s contribution towards the achievement of the target of 90% of electricity generation to be from renewable energy sources by 2025 as set out in the New Zealand Energy Strategy to 2050.*
- *Geothermal systems are a natural resource that is limited to a relatively small area of New Zealand. This proposal will involve a significant use of this limited resource when viewed in the context of the totality of geothermal systems available for development.”*

The abovementioned Public Notice invited interested persons to make submissions on any of the applications lodged by Contact for resource consents for the Te Mihi Power Station. Submissions closed on 7 March 2008 and a total of 24 submissions were received.

These submissions are to be heard at the Board of Inquiry hearing that is to commence in Taupo on 21 July 2008.

## 7.0 Submissions

Of the 24 submissions received the outcomes sought are as follows:

- 3 Support
- 8 Neutral
- 6 Oppose
- 5 Mixed outcomes
- 2 Not stated

Attached as Appendix 1 is a summary sheet of the submissions. A total of 15 submitters state they wish to be heard and one (Ministry of Economic Development) indicates it may wish to be heard. At the Prehearing Meeting held in Taupo on 21 May one submitter (JJ & JM McGrath and family) withdrew their wish to be heard (ie total to be heard is currently 14).

In broad terms, the topics / issues raised in submissions fall into the following categories (some submissions fall under more than one category):

- Impact on the environment – 14 submissions
- Impact on local residents – 8 submissions
- Cultural issues – 4 submissions
- Impact on geothermal systems – 5 submissions
- Implications for Policies, Plans and / or Consents – 7 submissions
- Impacts on national energy, portfolio – 5 submissions

The submissions will be discussed in the sections that follow considering effects on the environment and the provisions of relevant statutory documents.

## 8.0 Adequacy of Information provided by Applicant

As noted in 6.0 above, before the applications were called in by the Minister, both EW and TDC requested and received further information from the applicant regarding the applications.

This information is understood to have been considered to be adequate for the purposes of those authorities and no further delay in notification would have occurred on this basis.

I am not aware of any particular information that is needed to be sought at this time pursuant to s92 of the RMA that should delay the progress of the applications to hearing by the Board of Inquiry commencing on 21 July 2008.

## 9.0 Prehearing Meetings

Formal prehearing meetings have been conducted with the applicant and invited submitters on 21 May and 6 June 2008.

Reports by the chairpersons of those meetings (Ms Dorothy Wakeling on 21 May and Mr Morrie Love on 6 June 2008) have been prepared and sent to the Board of Inquiry and to all parties to the proceedings.

The outcomes of those meetings will be referred to in the discussion re effects and the consideration of the statutory documents.

## 10.0 Statutory Framework for Decisions on the Applications

In considering the applications for the Te Mihi Power Station and the submissions received, the Board of Inquiry must, subject to Part II of the RMA, have regard to (s104):

- (a) any actual and potential effects on the environment of allowing the activity; and
- (b) any relevant provisions of –
  - (i) a national policy statement;

- (ii) a New Zealand coastal policy statement:
  - (iii) a regional policy statement or proposed regional policy statement:
  - (iv) a plan or proposed plan; and
- (c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.

The following sections of this report provide a commentary on these matters to which the Board must have regard in its decision making.

## 11.0 Effects of the Te Mihi Proposal on the Environment

### 11.1 The Existing Environment for Assessment Purposes

Geotherm Group Ltd (In Receivership) has, in its submission and in evidence produced, (R Matthews, J Burnell) raised concerns that the proposed Te Mihi reinjection discharges may have an adverse effect on the successful implementation of the consented, but as yet undeveloped geothermal power scheme.

The Geotherm consents provide for the take and reinjection of geothermal fluid within a defined area generally in the vicinity of the Poihipi Road/Tukairangi Road intersection. All wells must be contained within the consented area. The area covered by the Geotherm consents is excluded from but surrounded by the Te Mihi reinjection consent applications. The consents were granted in May 2007 and have an expiry date of June 2026. To date, one test well (GGL1) has been drilled.

It is understood that Contact may argue that the Geotherm project does not form part of the existing environment for the purpose of assessing the effects of the Te Mihi applications. This is on the basis that while consented, the Geotherm project is unlikely to be implemented. Witnesses for Contact query the viability of the Geotherm proposal (Carey para 39, O'Sullivan Para 32), at least to the full consented output.

For its part Geotherm Group Ltd (In Receivership) hold a different view. Mr Downey in his E in C states that (para 12) :

*Based on the work undertaken by the Receivers' specialist advisors since appointment, the Receivers are satisfied the Project has a range of development options, all of which are viable, and the resource consents granted to Geotherm will be exercised.*

Mr Matthews echoes these views and considers that the consented project should be considered to form part of the environment within which the Te Mihi proposal will occur and in terms of which effects are to be considered (para 2.8).

This matter may be the subject of legal submissions at the hearing. Relevant matters that the Board will need to refer to include:

- The Geotherm consents were approved prior to the Te Mihi applications being lodged
- Although the Company that obtained the consents is in receivership, the consents are valid and may be implemented by other parties
- The Geotherm consents were granted quite recently (May 2007)
- The Geotherm consents do include mechanisms to afford measures of protection to the geothermal production or electricity production of Contact Energy (not directed at any particular Contact project).

Should the Board hold that the Geotherm project is part of the environment in terms of which the Te Mihi consents are assessed and that actual or potential adverse effects may occur to the Geotherm

project, various mechanisms are proposed in evidence by Mr Matthews to avoid, remedy or mitigate the effects. These mechanisms are the subject of further discussion in the commentary in section 15 of this report.

## 11.2 Effects on the Steamfield

The proposed Te Mihi Power Station relies on the existing Wairakei consents held by Contact for access to the geothermal resource (RC 104706; expires 2026). The General Conditions forming part of these existing consents includes the requirement that the consent holder shall develop a System Management Plan for the Wairakei – Tauhara Geothermal System. The System Management Plan is to be approved by Environment Waikato. Contact Energy has provided a draft System Management Plan as Part C of the documentation submitted as part of the Te Mihi Power Station Proposal applications. The System Management Plan is to be approved by Environment Waikato who may consult with the Peer Review Panel in this task (set up under Condition 1 of the General Conditions).

The overall purpose of the System Management Plan is to assist Environment Waikato with the efficient and integrated management of the operation and effects of the Wairakei - Tauhara Geothermal System in the context of it being a “Development Geothermal System” as defined in the Waikato Regional Policy Statement and the proposed Waikato Regional Plan (refer Sections 13.2).

The System Management Plan is to include a Discharge Strategy. This is to have as its primary objective the need to address the adverse effects of subsidences. Secondary objectives are:

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

The Wairakei – Tauhara Geothermal System covers a large area. The existing Wairakei reinjection consent (RC 104718) provides for the discharge of up to 144,000 tonnes / day of geothermal water, condensate etc. The areas for reinjection include both infield and outfield areas, the latter being known as the Aratiatia and Poihipi West outfield areas.

The achievement of the objectives of the System Management Plan requires complex monitoring and reporting (annual) of a large range of parameters including reservoir pressures, subsidence, geochemistry, well data, surface heat flows, springs, flora and fauna.

The Te Mihi Power Station proposal will, as noted above, rely to a large degree on the exercise of the existing Wairakei Consents to access the geothermal resource and for reinjection. However, consent for additional 95,000 tonnes / day of additional reinjection of geothermal fluid, condensate etc is sought. This reinjection is to be infield reinjection. Initial areas for Te Mihi reinjection are understood to be near the Waikato River (area known as Aratiatia flats) and an area of land between Poihipi Road and State Highway 1.

The applicant proposes that the management of the reinjection provided for by this application be undertaken in the identical manner to the consented Wairakei reinjection; that is, in accordance with a Discharge Strategy which forms part of a System Management Plan. The additional reinjection capacity provided by the Te Mihi applications will provide greater flexibility in System Management and enable all separated geothermal water and condensate to be reinjected / injected and for a portion of the condensate / cooling water blowdown to be used to irrigate pasture if this is seen to be consistent with the Discharge Strategy objectives.

Flexibility in the measures / methods provided to discharge fluid / condensate etc is understood to be essential in the achievement of the objectives of the Discharge Strategy.

The strategy now proposed is consistent with the provisions of the Waikato Regional Policy Statement, the Proposed Waikato Regional Plan and with the approved regime put in place for the existing Wairakei consents.

### 11.3 Effects on Other Users of the Geothermal Resource

As referenced in section 11.1 of this report, submitters have expressed concern that the Te Mihi proposal may have an adverse effect on the implementation of the proposed Geotherm Power Station for which resource consents were granted in early 2007.

The submitters are concerned that the proposed discharge of geothermal fluid, condensate etc by reinjection as sought by Contact in these applications may adversely affect the Geotherm project and the exercise of the consents that are held. Concerns are raised by Geotherm Group Ltd (In Receivership) that Contact has not specified reinjection locations for Te Mihi. The submitter also states that the reservoir modelling undertaken has covered only a limited range of reinjection scenarios and that the models are based on the adoption of a steam turbine as against other alternatives (eg a binary plant).

Assuming that the Board does consider that the effects on the Geotherm proposal do need to be considered, the effects of the Te Mihi reinjection are a key consideration.

Technical evidence on this matter is provided by witnesses for Contact (Professor M J O'Sullivan), Geotherm Group (In Receivership) (Dr J Burnell), and Environment Waikato (Dr A Watson). All are highly qualified and experienced in the field of reservoir modelling and analysis.

In his E in C, Prof MJ O'Sullivan disputes the criticisms of submitters with regard to potential effects of the Contact reinjection on Geotherm operations. He concludes that the model of the Contact application scenario (TM2 – 95,000 t/day reinjection to infield plus all consented takes / discharges) shows that the Geotherm proposal obtains a small beneficial effect in that infield injection supports Geotherm's production a little longer (para 8 O'Sullivan E in C). Professor O'Sullivan states at para 32:

*All of the scenarios I have considered show the Geotherm wells declining rapidly in production rate, being unable to sustain a rate of even 10,000t/day. Some scenarios (such as TM2) provide a marginal benefits for Geotherm, others (such as the full injection Scenario 12) provide a marginal short term benefit for Geotherm, but medium to long term detriment. I would not expect variations in the scenarios from whose which I have modelled to alter that picture. In summary, therefore, the outlook for the Geotherm project is poor whatever production and injection scenario Contact adopts. Any differences will at most be of marginal benefit or detriment to Geotherm, and will not overcome the fundamental difficulties with that project.*

In his E in C on behalf of Geotherm Group, Dr John Burnell outlines the results of modelling he has undertaken to try and ascertain the degree of effect three reinjection scenarios for the Te Mihi Power Station (including the Contact application scenario TM2) could have Geotherm operations in future. His modelling indicates that while the increased reinjection proposed by Contact increases mass production at the Geotherm site, the produced fluid will be cooler. He points out however that the results of the models used by both himself and Prof O'Sullivan should only be used as indicators of what may happen rather than be relied upon as certain predictions, due to the uncertainty that exists about the conditions that will be found in the region between Reinjection Areas 1 and 2 and the Geotherm Property (para 6.16 Burnell E in C).

Dr Burnell points out that avoiding direct returns of cold reinjection fluid to the production zone is important in designing a reinjection system, and that best practice is to locate reinjection so that long and/or complex hydraulic connections between reinjection and production zones occur (para 6.17 Burnell E in C). At para 6.18 he states his concern that:

*Reinjection Areas 1 and 2 may not provide a long enough hydraulic connection to Geotherm's production wells. Further, part of the reinjection area of Contact's application (Exhibit SGD2, Schedule One – Plan 124922 – RC01) is directly adjacent to the Geotherm property. In my opinion, reinjection into that area could have a significant negative impact on Geotherm's production.*

Further at para 7.7 he states that:

*To counter uncertainty about possible direct flow of cooler fluid along fractures from the reinjection to production areas, it would be prudent to consider a buffer zone between the reinjection areas and the Geotherm production wells.*

The buffer zones recommended by Dr Burnell are 1.5km from the Geotherm site for reinjection of spent geothermal and cooling water, and 3km from the Geotherm site for reinjection of condensate.

Dr Watson on behalf of Environment Waikato does not consider that the modelling undertaken in the part of the geothermal area adjacent to the Geotherm site can provide results that the Board can rely on. He is concerned about the very real possibility of faults in the area hydraulically connecting reinjection areas directly to the Geotherm area, particularly in light of the very sparse scientific information available to construct the model in the Geotherm part of the reservoir (paras 23 and 24 Watson E in C).

In conclusion on the buffer zone matter, Dr Watson states at para 26 of his E in C:

*To limit any effect of Contact's reinjection on Geotherm's project, injection areas as far away from Geotherm's area would be best. If the Board was sufficiently concerned about the likelihood of an adverse effect on Geotherm's production, it could permit the injection application but introduce a buffer zone between Geotherm's boundary and Contact's injection area. It might permit only a small injection rate immediately adjacent to Contact's side of the buffer zone. It might also arrange that if and when the Geotherm project was to go ahead, Contact would be required to carry out tracer tests, to ensure that there is no direct route back to Geotherm's production. If such a direct route was found then modification of Contact's injection scheme could be called for.*

In his rebuttal evidence, Mr Carey notes that the extent of the buffer areas around the Geotherm site as proposed by Mr Matthews would dominate management of a significant part of the south-western area of the Wairakei field. Mr Carey proposes an alternative 500m buffer around the Geotherm site that in his view is more reasonable, and includes a larger offset on the predominant North East – South West strike of fault lines in the western part of the Wairakei field. Mr Careys rebuttal evidence is supported by the rebuttal evidence of Professor O'Sullivan.

The reinjection buffer is discussed in more detail in the commentary in section 15 of this report.

## **11.4 Air Quality**

A number of submitters have expressed concern regarding the effects of the Te Mihi proposal and Poihipi Road Power Station for air quality in the vicinity. These concerns include the cumulative effects of the current proposal and existing and consented but as yet undeveloped proposals. Here it is noted that the current set of applications includes a discharge to air application for the existing Poihipi Road Power Station as the air discharge consent for that operation is to expire fairly soon (end 2011).

In his E in C, the applicant's air quality adviser Dr Craig Stevenson describes the processes leading to emissions to the air as follows (para 20-23):

20. *The geothermal fluid that is extracted from the wells in the Wairakei steamfield contains carbon dioxide, hydrogen sulphide, and mercury that transfer into the steam phase when the geothermal fluid is flashed to produce the steam used in the power station turbines.*

*These substances are the predominant constituents of the non-condensable gas that must be removed from the turbine condensers to avoid excessive backpressure that would otherwise reduce turbine efficiency.*

21. *In the proposed Te Mihi power station, the non-condensable gas will be discharged to air in the buoyant plumes of warm air from the cooling towers.*
22. *Hydrogen sulphide is a contaminant of potential concern, largely because of its characteristic "rotten egg" odour. Mercury is of potential concern because of its toxicity. Carbon dioxide is of concern because it is a greenhouse gas.*
23. *The non-condensable gas stream also contains trace levels of a range of other gases, including hydrogen, methane and nitrogen. These gases are essentially non-toxic. Methane emissions are included in the assessment of greenhouse gas emissions.*

Regarding steamfield discharges, Dr Stevenson states that there is essentially no contaminant discharges to air during the normal operation of the steamfield. It is the discharge of non condensable gases from the power station (via the cooling tower plume) that involves contaminant discharges.

Dr Stevenson has undertaken (cumulative) dispersion modelling assessment of the emissions from the existing and proposed geothermal power stations in the area (Wairakei, Poihipi, Rotokawa 1 and 1A, Rotokawa 2 (under construction) Te Mihi (proposed) and Geotherm (consented but not developed). Hydrogen sulphide (H<sub>2</sub>S) concentrations of 70 ug/m<sup>3</sup> (1 hour average) has been used as a guideline for assessing acceptability of odour effects from this gas (note that the WHO guideline for risks of adverse health effects is 150 ug/m<sup>3</sup> of H<sub>2</sub>S (24 hour average) – ie much higher than the 70 ug/m<sup>3</sup> 1 hour average odour effects level.

Dr Stevenson concludes that current H<sub>2</sub>S emissions from the Wairakei Power Station dominate H<sub>2</sub>S concentrations within about 3-4 km of that plant. At para 7 of his E in C he concludes:

- *with the commissioning of the Rotokawa 2 power station and decommissioning of the Wairakei station, the emissions from the Rotokawa power stations will dominate hydrogen sulphide concentrations over much of the modelling domain*
- *the maximum concentrations of hydrogen sulphide in the vicinity of the Te Mihi and Poihipi power stations will originate predominantly from emissions from the Rotokawa power stations*
- *the maximum contributions to hydrogen sulphide concentrations resulting from emissions from the Te Mihi and Poihipi power stations will not exceed the 70 ug/m<sup>3</sup> guideline used in this assessment, except within the Te Mihi site*
- *maximum contributions to hydrogen sulphide concentrations fall below 20 ug/m<sup>3</sup> beyond 2.5 km in any direction for emissions from Te Mihi power station and beyond 1.4 km for emissions from Poihipi power station*

Dr Stevenson also concludes that (para 8 onwards)

- *maximum predicted mercury concentration contributions in the immediate vicinity of any of the power stations are at about the global background mercury concentrations, so that there is no appreciable risk of adverse effects to human health or the biosystem*
- *shadowing by cooling tower plumes will almost always be contained within the power station sites*
- *no grounded visible plumes are predicted, so that ground level fogging or icing is not likely to occur*

- *cooling tower plumes will often be visible to people who have a view to the tops of the cooling towers or slightly above, and will, less frequently, be visible to heights up to 350m above the cooling towers*
8. *There will be essentially no contaminant discharges to air during normal operation of the steamfield.*
  9. *Cooling tower drift losses will have negligible effects on local icing or ground contamination.*
  10. *Greenhouse gas emissions from the proposed Te Mihi power station will be about 1% of those from the New Zealand electricity generation sector. The greenhouse gas emission factor, in terms of tonnes of carbon dioxide equivalent per GWh of electricity generated will be about 12% of that for a modern high efficiency gas powered station and about 5% of that for a coal-fired power station like Huntly.*
  11. *There are significant process, health and safety, or cost problems associated with all of the identified alternatives to discharge of non-condensable gases to air. None were considered satisfactory alternatives to the present discharge of non-condensable gases at Wairakei power station at the time of the consent renewal for those discharges. The proposed Te Mihi power station will greatly reduce the ambient air concentrations of hydrogen sulphide, to the level where any odour nuisances arising from the Wairakei discharges (which are very infrequent, to judge by the complaint record) are unlikely anywhere as a result of the operation of Contact Energy geothermal power stations in the area. Accordingly, there is even less reason to consider that alternatives to the proposed discharge of non-condensable gases from the Te Mihi or Poihipi power stations to air in the cooling tower plumes are required than for the case at Wairakei.*

It is noted that prior to the Ministerial Call-in, Environment Waikato had engaged an air quality specialist (Dr B Graham) to review the application and work of Dr Stevenson. It is evident that there has been subsequent liaison between the applicant and EW regarding air discharges including the framing of conditions as put forward by Mr Daysh in his E in C. Dr Graham notes in his E in C that the conditions were discussed and agreed between himself, Mr Daysh and Mr Pummer (Contact) on 22 May 2008, and he is generally in support of the conditions proposed by Mr Daysh.

While it is noted that with the decommissioning of Wairakei, H<sub>2</sub>S concentrations in the Te Mihi and Poihipi areas will be dominated by emissions from the Rotokawa power stations, the Te Mihi and Poihipi Station will nevertheless contribute to overall H<sub>2</sub>S loading. The concentrations are well below levels where effects on health are at issue. But for some proportion of the time, the models show a higher than 70ug/m<sup>3</sup> odour acceptability guideline in the vicinity of Link Road. It is apparent that such concentrations are modelled for the area even if Te Mihi is excluded.

In the draft conditions provided by Mr Daysh in his evidence, a consent limit for the H<sub>2</sub>S is set. These limits are higher than the emission rates used in the dispersion modelling for the Te Mihi and Poihipi Power Stations. In the explanation provided by Dr Stevenson (para 165), those rates were calculated to accommodate the

*“variability in the hydrogen sulphide content of the geothermal fluid combined with future changes in the source of steam supplied to the power stations .....*”

The validity of this increase over modelled rates should be carefully considered by the Board of Inquiry. In his rebuttal evidence, Dr Stevenson notes that paragraphs 162-173 of his E in C presents dispersion modelling of emissions at the proposed consent limits for hydrogen sulphide and shows that these effects will not be more than minor.

Evidence for the applicant is that emissions from the Te Mihi and Poihipi Power Stations will make little contribution to the maximum concentrations in their vicinity due to the emissions from the Rotokawa Power Stations.

Further, Contact proposes that the H<sub>2</sub>S discharge consent limit for Te Mihi apply as a combined limit for discharges from the existing Wairakei Power Station (consent 940443) and Te Mihi (overall limit not to exceed 180 kilograms per hour).

While this seems a reasonable approach whilst Wairakei Power Station continues to operate, it will largely be replaced by Te Mihi. This will result in much improved dispersion of the non-condensable gases and far lower concentrations of H<sub>2</sub>S in the (what will then be) new dispersion field (para 218 – Stevenson E in C). However, while the dispersion of non condensable gases will be improved, it is assumed that the overall volume of such gas generated remains much the same. The applicant has confirmed by way of the rebuttal evidence of Dr Stevenson that this will be the case (as far as can be predicted) thus making it appropriate to retain the 180 kilograms/hour H<sub>2</sub>S discharge proposed in the draft consents.

Dr Graham (for Environment Waikato) in para 5.2 of his E in C puts forward his opinion that an emission limit for H<sub>2</sub>S discharges is important because the assessed effects were based on a specific emission rate. Any significant variation from this rate would result in corresponding changes in the ambient impacts. The requirement for annual testing of the emissions will also provide an appropriate check on any such variations.

Mr Matthews in paras 4.14 to 4.16 of his E in C for Geotherm Group Ltd (In Receivership) notes that there is some uncertainty in the Contact air modelling assessment regarding the cumulative effects of the Te Mihi proposal and the Geotherm project, given the difference between the discharge rates used in the modelling and the greater discharge rates proposed in the conditions put forward by Mr Daysh. He is concerned that the conditions included in any air discharge consent granted for Te Mihi should ensure that the effect, in combination with the consented Geotherm discharge, does not adversely effect air quality and does not compromise the exercise of the Geotherm consent. He concludes that the consent limits should be based on what has been assessed in the modelling, that is discharges of 28.3 grammes per second for the Te Mihi proposal and 7.9 grams per second for the Poihipi power station. As noted already above, Dr Stevenson does not support this position.

The draft consent conditions provided by Mr Daysh also include ambient H<sub>2</sub>S monitoring at locations to be confirmed with Environment Waikato. Dr Graham confirms in paras 5.3 and 5.4 of his E in C that a properly designed and operated ambient air monitoring programme for H<sub>2</sub>S is important and will be an essential resource for the investigation of any complaints about odour.

## **11.5 Effects on Ground Water and Water Supplies**

The applicant seeks a consent to discharge up to 50 m<sup>3</sup>/day of sewage to ground through a soakage system following septic tank treatment.

Consent is also sought to discharge by irrigation up to 6,500 tonnes/day of cooling water blowdown and condensate onto a large area of grazing land in the northern sector of the overall (reinjection) application area.

Concerns have been raised by some submitters regarding the possible contamination of groundwater bores used for water supply as a result mainly of the discharge of sewage to land.

The applicant has not yet determined whether a conventional septic tank system or a larger on site “package” plant will be installed. Whilst either option would be adequate to service the operational stage of the Te Mihi Power Station (only some 2-3 persons generally on site), up to 400 persons will be on site for up to 2 years in the construction phase. The construction workforce would not be accommodated with a septic tank system, and portaloos would be used. A larger package plant (incorporating discharge by ground soakage) would be designed to service the construction as well as the operational workforce.

Contact’s draft consent (Daysh Exhibit SGD2) proposes:

- Limit on discharge to 20m<sup>3</sup>/day (being adequate for construction workforce)

- A hydraulic loading rate, 5 day BOD limit suspended solids level
- EW to monitor groundwater if required
- Field to be at least 400m from any bore used for domestic water supply

The appropriateness of the detailed conditions and whether a specific monitoring condition is required should be considered by EW.

The nearest domestic bores are located to the west of the power station site. Contact's evidence is that groundwater flow in the vicinity is west to east, ie towards the Waikato River and that the domestic bores are "upstream" of the power station (refer Cameron E in C para 20). On this basis, the sewage discharge will have no effects on these water supply bores. The closest bores used for domestic purposes on the eastern (downstream) side of the Power Station site are understood to be a significant distance away, such that groundwater contamination is not an issue. Details could be confirmed by the applicant at the hearing.

Discussions at the first prehearing meeting included an agreement by the applicant to undertake water quality sampling of one neighbour's well.

With regard to the proposal to discharge cooling water blowdown and condensate to land by irrigation, this application is made in order that the applicant is able to define the parameter within which it is to work if it is to proceed with the irrigation. As set out in Dr Stevenson's evidence (para 301) a range of further investigations are required prior to Contact deciding to design and proceed with irrigation. He states that design aspects will depend on the final power station technology chosen (para 251).

The approach proposed for this consent by Contact is essentially the same as for the existing Poihipi consent (104723) for discharges to land by irrigation. It is proposed that the Te Mihi discharge to land be subject to the Wairakei General Conditions including a Discharge Strategy forming part of the System Management Plan. This is a sensible approach. Controls to limit hydrological effects are proposed as a limit on contaminant discharge.

The availability of the option to irrigate cooling water blowdown and condensate to land offers flexibility in the overall Discharge Strategy.

As there are surface water courses in the area proposed for irrigation, the establishment of a setback buffer from these should be considered as a consent condition. In his rebuttal evidence, Mr Daysh sets out that he does not think a buffer is required, as proposed condition 4(b) for discharge consent 116787 already precludes runoff of water from land associated with this discharge. I accept that position, in order to avoid a "belts and braces" approach to the issue.

## 11.6 Discharges to the Waikato River

There are no discharges to the Waikato River sought as part of the Te Mihi Power Station applications. However, the development of the Te Mihi project will result in significant reductions in current authorized discharges to the Waikato River from the Wairakei Power Station which will be largely decommissioned when Te Mihi is fully operational.

Contact Energy Ltd applied for a range of resource consents for the continued operation of the Wairakei Geothermal Power Plant in March 2001.

The design of the Wairakei Power Station includes abstracting cooling water from the Waikato River, condensing geothermal steam onto the cooling water, and discharging the cooling water/condensate mixture back into the Waikato River. A resource consent for the discharge of up to  $17.2\text{m}^3\text{s}^{-1}$  of cooling water to the Waikato River commenced on 20 August 2007 (Environment Waikato consent number 104712). These discharges contain heat and significant concentrations of geothermal trace elements, in particular  $\text{H}_2\text{S}$  which is toxic to aquatic animals.

Condition 10 of consent 104712 requires that total hydrogen sulphide concentrations in the cooling water discharge are reduced to  $80\text{mg m}^{-3}$  by the 3<sup>rd</sup> anniversary of the commencement of the consent

(i.e., by 20 August 2010). Further condition is required that Contact Energy uses its 'best endeavours' to reduce total hydrogen sulphide concentrations in the cooling water to  $50 \text{ mg m}^{-3}$  ( $520 \text{ kg week}^{-1}$ ) by the 3<sup>rd</sup> anniversary. A 'best endeavours' condition for reducing mercury in the discharge is also included. Contact advises that treatment works to achieve these reductions might cost up to \$26m in present day dollars.

As noted, the Te Mihi Power Station is to largely replace the Wairakei Power Station. The volume of cooling water that will be abstracted from and discharged back into the Waikato River as parts of the Wairakei Power Station are decommissioned will likely be reduced in approximate proportion to the reduction in plant output. In those circumstances, the mass loading of hydrogen sulphide will reduce significantly. This is a significant positive effect on the environment resulting from the Te Mihi proposal.

As the first two turbines are programmed to commence operations in 2011, the applicant proposes to seek authority to defer the required reductions in H<sub>2</sub>S loadings required as part of the Wairakei discharge consent. An application has been lodged with Environment Waikato to vary consent conditions 10 and 11 of Consent 104712 accordingly. This application is not part of the suite of applications before the Board of Inquiry as a S127 application to vary conditions of consent cannot be called in by the Minister.

The s127 application has not been progressed by Environment Waikato pending the outcome of the current Te Mihi applications. Should the Te Mihi applications be granted, it is assumed that the application to vary consent conditions on consent 104712 would proceed.

## **11.7 Effects of ReInjection on Surface Features including Subsidence**

Contact has sought consent to discharge up to 95,000 tonnes / day of geothermal fluid / condensate by reinjection. This is in addition to currently consented reinjection.

In its submission, the Taupo District Council states that it

*'has consistently maintained that "infield" reinjection of all geothermal fluid (plus the addition of other "make up" fluid) is necessary to stop current subsidence and to prevent future subsidence. Council therefore welcomes any increase in the amount of geothermal fluid reinjected by Contact Energy infield.'*

The Council considers that the proposed discharge of 6,500 tonnes/day of cooling water blowdown and condensate onto land by irrigation should instead be reinjected.

In his E in C, Mr C Bromley states at para 4.13

*There is no certainty at this point that increased reinjection will slow or halt subsidence or even that slowing or halting subsidence rates is necessary in order to implement the primary objective of the Discharge Strategy under Contact Energy's existing consents (which addresses the adverse effects of subsidence)*

Mr Bromley notes that infield reinjection is likely to result in a decline in steam upflow into the shallow steam zones feeding surface discharges (eg Karapiti). At para 4.10 Mr Bromley says that conversely the predicted rise in deep liquid pressures over a long period (decades) may result in the gradual recovery of some chloride spring discharges (eg Spa Park).

Generally, Mr Bromley states there may be a mix of benefits and adverse effects from targeted reinjection designed to slow subsidence. The potential for a mix of such effects will be managed by the applicant through successive revisions of the Discharge Strategy with regard to the hierarchy of objectives for the Discharge Strategy.

At para 4.16, Mr Bromley states

*'I believe that Contact Energy's reinjection application will provide the flexibility in future to increase the volume of geothermal water injected, and to allow reinjection over a wider area than that currently consented. The extension of the reinjection area southwards to encompass much of northern Tauhara will allow targeted reinjection of Wairakei fluid adjacent to subsidence bowls on the outskirts of Taupo if this forms part of the approved Discharge Strategy in future. It will also better facilitate integrated management of the Wairakei-Tauhara Geothermal System.'*

Dr Watson for EW traverses the subsidence issue in paras 27 to 33 of his E in C. He notes that in Environment Court hearings of earlier Contact applications a minimum reservoir pressure was set but no limit on pressure increases was imposed, despite the Court rejecting a proposal to significantly increase the pressure beneath Taupo town. In his view subsidence may be most extreme where a localised steam zone is condensed, producing a rapid and large localized pressure reduction and hence compaction. This could be caused by cooling or, ironically, by an increase in reservoir pressure around the steam zone.

Dr Watson clearly notes however while his opinion is firm and based on physics, there is no evidence to support it. Earlier, he expresses confidence in both Prof O'Sullivan's reservoir modelling results in that part of the reservoir where the pressure is to be monitored, and his predicted increases in pressure rises.

His concluding paragraph on the subsidence issue is as follows:

*I have suggested that Contact not inject near to Geotherm if the protection of Geotherm's project is important, thus depriving Contact of reinjection area, and for entirely different reasons I have suggested that the rate of injection near Taupo be low enough to avoid increasing the reservoir pressure until subsidence research has produced results, thus preventing it from taking advantage of the injection capacity of that area. At the same time I can clearly see the wider benefits of the Te Mihi application, and in particular the benefit of undertaking the extra injection. These are competing requirements, because the injection area is not unlimited. I believe my reasoning to be correct, but I am not able to suggest how this conflict of requirements can be met, except to suggest as a first step that Contact re-examine its infield injection options.*

Mr Brocklesby in his E in C suggests that the issue of the effects of increased reinjection on subsidence is best considered by the peer review panel, who have the ability to recommend changes to reinjection rates etc under the existing adaptive management scheme. Mr Bromley in his rebuttal evidence supports this suggested approach, as opposed to imposing an arbitrary (in his view) maximum pressure rate increase through consent conditions.

With regard to the proposed discharge of cooling water blowdown condensate to land, it is acknowledged that this activity would provide a further degree of flexibility in the Discharge Strategy. In his rebuttal evidence Mr Carey offers explanation of the advantages of the surface discharge of condensate, summarised as follows:

- Land irrigation has few adverse effects if undertaken at appropriate volumes
- Condensate is some 70 degrees Celsius cooler than separated geothermal water, thus if the condensate volume is not required to address subsidence effects, it is better from a production sustainability perspective not to reinject it
- The condensate represents an additional source of irrigation water for farming operations which is in short supply in the upper Waikato catchment.

Finally, it is noted that, notwithstanding the implications of reinjection for the reservoir, surface features /subsidence etc the activity provides an alternative to discharging geothermal fluid, condensate etc to water - and primarily to the Waikato River. This is a significantly beneficial aspect.

## **11.8 Visual Effects**

The site and its surroundings are described in the E in C of Mr Pummer who also describes the dimensions of the structures involved. Evidence regarding landscape and visual effects is provided by

Mr B Coombs. Mr Coombs has proposed visual / landscape mitigation measures be implemented and that land use consent conditions include that a Landscape Management Plan be prepared and certified by the Taupo District Council. The Landscape Management Plan is to include an associated Planting Plan.

Mr Coombs concludes at para 6 E in C:

- *When considered and assessed in the context of the existing landscape character, the established pattern of electricity generation and transmission infrastructure in the wider area, the sensitivity of the receiving environment, and the proposed landscape mitigation recommendations, the landscape and visual effects of the Power Station are appropriate.*

The landscape and visual assessment undertaken as part of the Te Mihi applications has been subject to expert peer review engaged by Taupo District Council. The draft conditions of consent put forward in evidence by Mr Daysh have been discussed with the District Council by Mr Daysh.

Several submitters raised concerns regarding the visual effects of the Te Mihi Power Station including nearby residents / property owners, (Mr & Mrs Ellery, Miss A & Miss L Price, Mr & Mrs Vanner, Mr Houghton, Mr Birdsall and Mrs Koster). At the Prehearing Meeting of 2 May, some parties promoted the employment of a solid screen of planting along the elevated land to the west of the power station site to afford visual screening for neighbouring properties. Neighbours also discussed species to be planted.

In his E in C, Mr Coombs at Para 129 confirms that he is willing to consider a more solid screen if that is what the neighbours want. Mr Coombs in his rebuttal evidence elaborates further on his discussions with neighbours, and presents an updated Landscape Mitigation Plan that includes a solid planting screen of exotic species.

It is noted that the landscape and visual assessment has been undertaken based on structure heights that are consistent with the dimensions provided in Mr Pummer's evidence (refer Section 4.1 above). Mr Daysh's draft conditions of the land use consent require that the activity be undertaken in general accordance with nominated information including the Pummer evidence and plans attached as a Schedule. These plans include an elevation for structures not to be exceeded (set in terms of metres above sea level). This is a reasonable approach.

Visual and Landscape effects have been addressed in the evidence of Gemma Platts for Taupo District Council (paras 6.5.1 to 6.5.5). Boffa Miskell Limited (Frank Boffa) were engaged by the District Council to review the evidence of Mr Coombs and the draft recommended conditions. The Boffa review confirms that the visual/landscape effects of the Te Mihi development can be appropriately mitigated, subject to some alterations to the conditions of consent proposed by Mr Coombs. The altered conditions are those numbered 25 and 26 in the set of conditions appended to the evidence of Ms Platts.

The conditions include a requirement for a Landscape Management Plan to be prepared and reviewed by Council, to be tailored to account for the finalised layout and location of the proposed power station. A specific requirement of the landscape mitigation within the landscape management plan is for the focus to be as far as is possible and practicable on the mitigation of visual effects from the existing residential sites identified by Mr Coombes in his statement of evidence.

Ms Platts considers that subject to the implementation of the revised conditions 25 and 26 attached to her E in C, the landscape and visual effects associated with the proposal can be appropriately mitigated to a level whereby the effects will be no more than minor.

The proposed conditions appear to adequately recognise and address the concerns of neighbours with regards to visual effects on them from the Te Mihi proposal. They have been accepted by Mr Daysh and are included in his revised set of draft conditions attached to his rebuttal evidence.

## 11.9 Noise Effects

A Technical Report on Noise Effects was prepared by Mr M Hunt as part of the Te Mihi applications AEE.

The noise assessment undertaken by the applicant confirms that:

- Operational noise from the Te Mihi Power Station will comply with the Taupo District Plan noise limits for the Rural Area (including night time levels)
- Construction noise will comply with the relevant NZ Standard – NZS6803 1999 Acoustics – Construction Noise.

Noise from emergency steam venting cannot effectively be controlled by the application of general District Plan noise standards. Steam vents are utilized during start up and occasionally at other times. Usually the steam venting occurs for a short time only, but on rare occasions may continue for one hour or so.

Mr Hunt recommends that Contact be required to adopt the best practical option (in terms of S16 of the RMA) to address planned and unplanned steam venting noise. Conditions to this effect are proposed by Mr Daysh.

Taupo District Council engaged an expert peer review of the Technical Report on Noise Effects firstly by Mr N Hegley and a subsequent expert review was undertaken on behalf of the Council by Mr G Warren of Marshall Day Acoustics Ltd. Councils position as set out in the E in C of Ms Platts, is that the steam venting conditions (numbered 31 – 33 in the draft conditions attached as Appendix One to Ms Platts E in C) as reviewed by Mr Warren are appropriate to minimise the potential noise nuisance effects of the proposal. Other proposed conditions to address noise require construction activities to be undertaken in accordance with NZS 6803:1999, sealing of the construction access road, and management of the construction lay down area to minimise disruption to sites to the north. All these conditions have been reviewed and are regarded as appropriate by the District Council to mitigate adverse noise effects on the closest dwellings to the construction area.

Several submitters raise concerns regarding noise. General operational noise aspects for several neighbours are addressed in evidence by Mr Hunt. He does not consider the Power Station construction and operation will cause any unreasonable noise levels at these properties of these submitters (ie Koster, Ellery, Hansen).

Mr Hunt also addresses concerns regarding cumulative noise effects in submissions by Geotherm Group (In Receivership) and Mr & Mrs McLachlan and MacPower Ltd (refer paras 112-113, 115 of Hunt E in C). Mr Hunt does not consider the cumulative effects of noise to be an issue. Mr Matthews (for Geotherm) maintains that appropriate conditions (including establishment of a noise boundary and the specification of a noise standard) should be put in place to address cumulative effects, and to ensure that ability of the Geotherm development to meet the noise limits specified in its consent is not jeopardised. Expert acoustic evidence supporting the submitters' contention has not however been exchanged and may be provided at the hearing.

The Board may wish to consider imposing an operational noise limit condition on the landuse consent required for the power station. This matter is further discussed in the commentary in Section 15 of this report on the draft conditions of consent.

At the Prehearing Meeting of 21 May 2008, Miss L & Miss A Price whose property is close to the Contact site expressed concerns that construction noise in particular may adversely affect activities at the riding school they operate on their property. Particular concern was expressed that the entry road to the site was located close to their boundary and that construction noise effects arising from the construction laydown area may upset horses and potentially result in danger to riders and horses alike.

The applicant proposes a 100m buffer be established from the boundary of the Price's property (and the adjacent Ellery property). Further, the applicant proposes to move the access road further away from the relevant landowners properties (and to seal it), and to establish activity specific management regimes for the use of the construction laydown areas.

Three conditions (13, 14, and 17) to address the issue are proposed in the draft conditions presented by Mr Daysh in his rebuttal evidence. These conditions respectively provide for the 100m buffer area, activities to be managed to avoid unnecessary disruption to the neighbouring properties to the north of the consent area, and a Construction Management Plan to be provided to Taupo District Council for approval.

The board may wish to consider whether the setback proposed fully addresses the possible "spooking" of a horse reacting to an isolated loud noise (eg a large object falling off a forklift truck or the like). While Mr Pummer in his rebuttal evidence (para 10) points out that neither Contact nor their contractors intend to be damaging expensive equipment through such occurrences, the possibility remains that such isolated one off noise events may occur.

The submitters may respond to these proposals at the hearing (no evidence was exchanged by submitters regarding these points).

### **11.10 Traffic Effects and Management**

Vehicular traffic will access the power station site off Oruanui Road. This is a District Council collector road and links with Poihipi Road (District Council Regional arterial road) and State Highway 1, a short distance north of the Control Gates Bridge, Taupo. Oruanui Road also connects with Link Road which intersects with State Highway 1 several kilometres north of the State Highway 1 and 5 intersection.

The traffic related effects of the proposal relate almost exclusively to the construction phase and are addressed in evidence by Mr B Harries whose conclusions are set out in paras 10 and 11 as follows:

10. *As a brief summary of my evidence to follow, it is my view that the proposal can be accommodated by the local road network with no more than minor adverse traffic effects, subject to the implementation of some roading improvements at the Poihipi Road / SH1 and Poihipi Road / Oruanui Road intersections, and at the entranceway to the site on Oruanui Road.*
11. *In addition, I recommend that a detailed Construction Traffic Management Plan ("CTMP") be developed and implemented, to the satisfaction of the Council and Transit New Zealand ("Transit NZ"), to manage traffic demands generated during the construction phase of this proposal.*

Taupo District Council and Transit New Zealand have raised concerns regarding construction traffic impacts..It is understood that agreement has largely been reached between these parties and Contact as to conditions to avoid, remedy or mitigate traffic effects. This matter is further discussed in section 15 of this report.

### **11.11 Effect on Property Values / Compensation**

Several submitters consider that the Te Mihi proposal will result in a devaluation of their properties and seek compensation (amongst other things) for loss of value and amenity.

Issues regarding amenity effects are discussed in other sections of this report (visual effects, noise, air quality etc). The applicant has not provided any evidence regarding the effect of the proposed Te Mihi Power Station on property values in the vicinity. Evidence has yet to be provided by submitters.

It is noted that the Poihipi Power Station is located nearby and commenced operations in 2001. It may be useful to review any impacts the development of that plant had in terms of land values in the vicinity.

## 11.12 Effects on Transmission of Electricity from the Geotherm Group Ltd Converted Project

Geotherm Group Ltd (In Receivership) and A & A R McLachlan and MacPower Ltd seek assurances in their submissions that the transmission capacity in the revised transmission line arrangement proposed by Contact is adequate to accommodate the output from the Geotherm proposal should it be developed.

The area of the National Grid that the Te Mihi Power Station is to connect into is known as the "Wairakei ring". Mr G F Sise has provided evidence regarding transmission aspects of the Te Mihi Power Station and has assessed the relevant capacity of the Wairakei ring to transmit electricity. His constraint assessment includes projects within or to the east or north of the Wairakei ring that are consented (ie includes Geotherm project). Mr Sise concludes at para 8 of his E in C:

*The probability of OHK\_WRK\_2 reaching its limit during normal operation of the grid and connected generating stations is so low that the frequency of this event could not readily be estimated. In a qualitative sense, I have concluded that the constraint is unlikely to limit power transfers under normal operating conditions, either now or in 2012. This conclusion applies regardless of whether Te Mihi is developed in one or two stages.*

No expert evidence has been called by the submitters in response to Mr Sise's evidence.

## 11.13 Effects on the Environment from Hazardous Substances

A range of hazardous substances will be stored / used at the proposed Te Mihi Power Station (oils, acids / alkalis, diesel, biocides, miscellaneous solvents, paint, etc).

Best practice management procedures are proposed to be implemented in the use and management of hazardous substances on the site through the applicant's Environmental Management System. This is described by Mr D Ray in his E in C.

Draft conditions of consent are recommended by Mr Daysh and which include a requirement for an Emergency Management Plan for hazardous substances.

Taupo District Council has engaged expert peer review of the hazardous substances aspect of the applications by Mr Norbert Schaffoener of Resources Limited. Mr Schaffoener has reviewed the proposed conditions of consent put forward by Mr Daysh, and suggests alterations to conditions 28(h) and 28(f) to ensure their ongoing effectiveness. Based on the advice of Mr Schaffoener, Ms Platts concludes that subject to the imposition of the amended conditions the potential effects of the proposal associated with the management of hazardous substances associated with the site will be appropriately mitigated.

It is understood that Contact are agreeable to the amended conditions put forward by Mr Schaffoener on behalf of Taupo District Council. The amended conditions have been included in the draft conditions numbered 28-31 attached as Exhibit SGD 7 to the rebuttal evidence of Mr Daysh.

## 12.0 Other Matters

### 12.1 Implications for Existing or Approved Renewable Energy Projects

Wind Farm Developments (Australia) Ltd has consents to develop a wind farm in Hawkes Bay. Their submissions seeks the inclusion of a condition (presumably on the land use consent) that –

*"the project shall not result in the loss of generation from any existing or approved renewable generation projects as at 7/03/08"*

In his E in C, Mr Hunt for Contact concludes that the proposed condition is not workable under current Electricity Governance Rules (para 25).

The submitter has not provided any evidence supporting the proposed condition. In considering if such a condition should be imposed, the Board should have regard to the following:

- The workability of the condition (ie to which consent would it apply, how would the relevant Council practically monitor and enforce it, etc)
- Whether such a condition is an appropriate resource management condition which serves to avoid, remedy or mitigate an adverse effect on the environment.

## 12.2 Poihipi Specific Issues

In their submission Mr A & Mrs A McLachlan and MacPower Ltd have raised property issues associated with the Poihipi Road Power Station.

Mr McLachlan expands on his concerns in his E in C. They cover a range of property and other issues that are summarised as follows:

- Lack of consultation with McLachlan by Contact re Te Mihi proposal and Poihipi air discharge consent extension.
- Alleged failure by Contact (and Vector Limited) to comply with High Court and Court of Appeal decision re definition of boundaries of the Poihipi Power Station.
- Current legal action is being undertaken between Contact/Vector and McLachlan interests re property access and acquisition issues which allegedly affect Contact's ability to access land for reinjection from both the Te Mihi and Poihipi stations.
- Alleged unauthorised discharges of gases from Te Mihi by Contact, with H<sub>2</sub>S concentrations significantly in excess of the authorised and safe limits.
- Contact should be required to return all condensate and separated geothermal fluid from the Poihipi Power Station back to its source at Te Mihi, and reinject that fluid beneath in its own land.
- the planned 65MWe of electricity approved from the Geotherm station will be constrained by Contact injecting electricity into the Wairakei-Whakamaru circuit without upgrading the circuit capacity.
- Should consent be granted to the Te Mihi proposal, constraints are needed on the location of any new wells and appropriate monitoring and reporting requirements imposed.

For Contact, Mr E J Kilty discusses these matters at para 24 onwards in his E in C. Some of these matters are further addressed in the rebuttal evidence of Mr Carey and Mr Daysh.

It is noted that, while an air discharge permit from the Poihipi Road Power Station is sought, the other applications do not seek approvals to extend or otherwise change the Poihipi Road Power Station. Further it is noted that some of the matters set out above are before the Courts, which prevents further consideration of them in these proceedings.

## 13.0 Consideration in Terms of Relevant Provisions of Statutory Documents

As noted in Section 10.0, the Board is to have regard to the relevant provisions of the applicable statutory documents. Those considered to be relevant to the Te Mihi Power Station proposal applications are as follows and are discussed below:

- Taupo Operative District Plan
- Waikato Regional Policy Statement
- Waikato Regional Plan
- National Policy Statement on Electricity Transmission.

### 13.1 Taupo District Plan

#### Objectives and Policies

The Operative Taupo District Plan is the district planning document that governs land use and development for the land that is the subject of the Te Mihi power station application. The following assessment considers the objectives and policies that are regarded as being relevant to these applications.

#### *Rural Environment Objectives and Policies – Section 3b.2*

##### **OBJECTIVE 1**

*3b.2.1 The protection of the rural amenity and character of the Rural Environment.*

##### **POLICIES**

- i. Maintain and enhance the amenity and character of the Rural Environment by providing land use performance standards and subdivision rules to manage the scale and density of development.*
- iii. Maintain the open space and dispersed building character.*
- iv. Provide for a range of productive land use activities within the Rural Environment while ensuring any adverse effects are avoided, remedied or mitigated.*

#### Comment

Objective 1 and the related policies recognise that the rural environment is generally characterised by a low density of development, large open spaces and the use of productive land. The immediate environment surrounding the proposed power station site generally fits this description, however the greater environment contains other geothermal power stations including Poihipi to the south and Wairakei to the east.

Landscaping of the power station and its location within a low lying part of the site will reduce its visual dominance within the context of its surrounds. The visual and other amenity related effects of the proposal are discussed in Section 11.0 of this report. The majority of the site will remain as open space, particularly after construction is completed, with the balance being available for primary production purposes.

Thus it is considered the proposal will not be contrary to the above objective and policies as it is within the context of the general environment and will not compromise that rural amenity and character of its surrounds.

##### **OBJECTIVE 4**

*3b.2.4 The efficient and effective functioning of the Rural Environment by enabling the use and development of natural and physical resources, while ensuring appropriate environmental outcomes are achieved.*

##### **POLICIES**

- i. *Control activities which may potentially restrict or compromise the operation of existing activities of the Rural Environment including the creation of new rural allotments that may lead to conflict between residential and rural activity.*
- iii. *Avoid subdivision and development of rural land that will put pressure on rural infrastructure and may require an increase in the level of service now or in the future.*
- v. *To recognise the important role of resource use and development in the Rural Environment, by providing for the continued operation and associated development of existing electricity generation facilities and network utilities by allowing their use, maintenance and minor upgrading where all significant adverse effects are avoided, remedied or mitigated.*

Comment

This proposal is consistent with the above objective as it seeks to utilise the geothermal resource available to generate electricity for supply into the National Grid. The related policies above support this objective, but also identify the need to recognise the operation of existing activities and mitigate adverse effects. It is considered that the proposal will also be consistent with these policies in that the land use activities of the surrounding area will be able to continue in a similar manner and existing roading infrastructure can be utilised and where necessary upgraded by the applicant to accommodate the project. Overall any adverse effects of this activity can be avoided, remedied or mitigated with the imposition of and adherence to appropriate conditions.

**OBJECTIVE 5**

*3b.2.5 The protection of adjoining Environments from the adverse effects of activities within the Rural Environment.*

**POLICY**

- i. *Manage the potential for adverse effects of activities in the Rural Environment at the interface of this and other more sensitive Environments.*

Comment

The majority of the site of the power station, switchyard and transmission line applications is within the Rural Zone of the Taupo District Plan, with a smaller area of the subject site being within the Industrial Zone. The Industrial Zone is less sensitive to the potential adverse effects that may be generated by the power station and associated activity and therefore protection of adjoining environments is not considered to be necessary. Thus the proposal is consistent with Objective 5 above and the associated policy.

**Industrial Environment Objectives and Policies – Section 3d.2**

**OBJECTIVE 1**

*3d.2.1 The maintenance of the environmental qualities and functioning of the Industrial Environment.*

**POLICIES**

- i. *Maintain the qualities of the Industrial Environment through controlling the bulk, location and nature of activities, to ensure an appropriate scale and intensity of buildings and activities that are consistent with an industrial scale of development; i.e. an appropriate density of activity and level of environmental effects, while allowing the functioning of the area to be maintained.*
- ii. *Encourage a wide range of activities within the Industrial Environment, including any activity with nuisance elements not appropriate for any other Environment, while ensuring any adverse effects are avoided, remedied or mitigated.*

**OBJECTIVE 2**

*3d.2.2 The protection of adjoining Environments from the adverse effects of activities within the Industrial Environment.*

**POLICY**

- i. *Control the effects of activities within the Industrial Environment so the scale of development and level of environmental effects does not adversely affect the amenity of the other Environments of the District.*

## Comments

The above objectives and policies seek to provide for an industrial environment in which a wide range of activities are able to establish provided that adverse effect can be appropriately avoided, remedied or mitigated. A large portion of the power station is proposed to be located partially within the Industrial Zone and given the nature of the activity it is located appropriately. Therefore the proposal is consistent with these objectives and policies.

## *Land Development Objectives and Policies – Section 3e.2*

### **OBJECTIVE 4**

*3e.2.4 Avoid the degradation of Taupo District's lakes, waterways and aquifers from effluent and waste water resulting from land development.*

### **POLICIES**

- i. Implement integrated land management strategies in conjunction with Regional Authorities that will avoid, remedy or mitigate adverse environmental effects on Taupo District's lakes, waterways and aquifers.*

## Comment

The proposed power station will not be located within close proximity to any lakes or waterways and the applicant has prepared a Land Management Practices report as part of the application and this includes procedures for earthworks and construction. Mr Daysh proposes that compliance with this report be a condition of land use consent (refer to Evidence in Chief of S Daysh). Sewage effluent disposal is to be considered as part of the discharge consent sought by Contact Energy. Provided that appropriate conditions can be applied to ensure adverse effects are avoided or mitigated, it is considered that the application is consistent with this objective and policy.

### **OBJECTIVE 5**

*3e.2.5 Ensure land development does not detract from the amenity value or qualities of the local environment.*

### **POLICIES**

- i. Ensure that proposals for the subdivision and development of land assess the particular amenity values of the area including the physical characteristics of the land and avoids, remedies or mitigates any adverse effects.*

## Comment

The proposed power station will be consistent with the character and amenity of the surrounding environment. This area is clearly identified by the Taupo District Plan as being suitable for development and use of the geothermal resource as the site is partially within the Industrial Environment where provision is made of such activities.

Due to the physical constraints of the site (including contour and the presence of fault lines) the applicant has chosen to locate the power station over the boundary between the Industrial and Rural Environment. It is considered that appropriate conditions can be imposed to ensure that adverse effects upon the amenity values of the area are avoided or mitigated.

Thus it is considered the proposal will not be contrary to the above objective and policy.

## *Traffic and Transport Objectives and Policies – Section 3f.2*

#### OBJECTIVE 1

*3f.2.1 The safe and efficient operation of the roading network, and movement of traffic, including cyclists and pedestrians within the District.*

#### POLICIES

- i. Ensure activities avoid, remedy or mitigate any adverse effects on the operation and function of the roading network, including the movement of traffic cyclists and pedestrians, as accordance with the Roding Hierarchy.*
- ii. Encourage activities, including the design and location of new vehicle crossings, to provide for the safe and efficient movement of traffic, including cyclists and pedestrians.*

#### Comment

The above objective and policies seek to ensure that activities do not prevent safe and efficient operation of the roading network by which those activities are accessed. The proposed activity will result in a significant increase in traffic movements during the construction period, with traffic movements being relatively low after this. This temporary increase will require several upgrades to be undertaken and the development of a traffic management plan (refer Section 11.9) of this report). With these measures in place it is considered that the proposal will be consistent with the above objective and policies.

### Tangata Whenua Cultural Values Objectives and Policies – Section 3g.2

#### OBJECTIVE 1

*3g.2.1 Recognise and provide for the cultural and spiritual values of Tangata Whenua in managing the effects of activities within the District.*

#### POLICIES

- i. Take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) in the management of the natural and physical resources of the District.*
- ii. Ensure activities have regard for the cultural values of Tangata Whenua as Kaitiaki of their culture, traditions, ancestral lands, water and other taonga.*
- iii. Ensure activities on or near Sites of Significance to Tangata Whenua are undertaken in a manner which provides for the cultural and spiritual value and significance of the site.*

#### Comment

Contact Energy have undertaken consultation with local iwi. A procedure has been decided upon in the event that kōiwi or other culturally significant items are discovered during construction. Culturally significant sites have been identified in a Cultural Impact Assessment prepared by iwi and protection mechanisms for these sites are proposed in the draft conditions of consent prepared by Mr Daysh on behalf of Contact Energy. Consultation between these parties is on going, and provision has been made for iwi involvement in the future (such as the formation of a Hapu Review Panel). Appropriate consent conditions are under consideration by the parties and as already noted, communication is on going.

### Natural Hazards and Unstable Ground Objectives and Policies – Section 3l.2

#### OBJECTIVE 1

*3l.2.1 Protection of activities, development and life from the adverse effects of natural hazards.*

#### POLICIES

- i. Control the design and location of activities and development within identified natural hazard areas, or areas which have significant potential to be affected by a natural hazard, to avoid or mitigate the effects of the natural hazard.*
- ii. Manage the location, design, and type of new activities and development to avoid or mitigate the adverse effects of flooding, erosion, ground rupture and deformation, hot ground and land instability on development and the community.*

## OBJECTIVE 2

*3l.2.2 Activities and development do not create, accelerate, displace, or increase the effects of a natural hazard.*

### POLICIES

- i. Ensure that activities do not alter or change the nature of a natural hazard event, increase the intensity of a natural hazard event or increase the risk of the event occurring.*
- ii. Ensure that activities and structures do not increase the risk to the community or the environment from the effects of natural hazards.*
- iii. Ensure that where development occurs within areas subject to the effects of natural hazards, property owners and/or occupiers are informed of and manage the risk.*
- iv. Control the location and presence of hazardous substances in areas subject to natural hazards to ensure that there is no increase in the effects of the natural hazard or risk to the community from hazardous substances.*

### Comment

The Taupo District Plan maps identify two fault lines traversing the subject site. The location of the proposed power station and associated structures has been selected in order to avoid these fault lines, therefore reducing the risk to the structures. While the power station is located outside of the Hot Ground Hazard Area, the site is within a geothermal field and it is subject to some risk of subsidence. This risk can be mitigated by the adoption of the Discharge Strategy that has as its principal objective to address the adverse effects of substance (refer Sections 11.1, 11.6 of this report). The final design of all structures should also take this into account.

It is not considered that the proposed activity will result in any acceleration or displacement of these hazards and will not present an increased risk to the community. Therefore the application is regarded as being consistent with the above objectives and policies.

## Hazardous Substances Objectives and Policies – Section 3m.2

### OBJECTIVE 1

*3m.2.1 Protection of the environment and the health and safety of the community, from the adverse effects of hazardous substances associated with hazardous facilities.*

### POLICIES

- i. Ensure that hazardous facilities are appropriately located to avoid or mitigate adverse effects on the environment and unacceptable risks to the environment and community.*
- ii. Ensure that hazardous facilities are designed and managed to avoid or mitigate adverse effects and unacceptable risks to the environment and community.*

### Comment

The above objective and policies seek to ensure that the storage and use of hazardous substances is undertaken in a manner that does not present a risk to the community and potential adverse effects are avoided, remedied or mitigated. The applicant has prepared a Land Management Practices report which includes procedures for the management of the hazardous substances that will be used on site. It is intended that the recommendations of this document will be adopted by Contact Energy in the construction and operation of the Te Mihi power station. Appropriate conditions of consent are proposed by Mr Daysh. With these measures in place, it is considered that the activity will be consistent with objective 1 and the related policies above.

## Network Utilities Objectives and Policies – Section 3n.2

### OBJECTIVE 1

*3n.2.1 To enable the operation, maintenance and upgrading of existing Network Utilities and the provision of new Network Utilities.*

#### **POLICIES**

- ii. *Provide for the establishment of new Network Utilities in a way that, as far as practicable, recognises the characteristics and amenity of the different Environment areas.*
- iii. *Have regard for the technical and operational requirements of Network Utilities and the contribution they make to the functioning and well being of the community.*

#### **OBJECTIVE 2**

**3n.2.2** *Network Utilities are designed and located to avoid, remedy or mitigate adverse effects on the environment and protect the health and safety of the community.*

#### **POLICIES**

- i. *The establishment, operation, maintenance or upgrading of Network Utilities does not compromise the health and safety of the community*
- ii. *Avoid, remedy or mitigate the potential adverse effects of the location and siting of new Network Utilities on significant landscape features and the amenity and character of the District.*
- iv. *Encourage Network Utilities to avoid, remedy or mitigate adverse effects on the environment by co-siting or sharing facilities where this is technically practical and feasible while having regard to the best practicable option for the siting or sharing of facilities.*
- v. *Recognise that Network Utility services can maintain and enhance the social and economic well-being of communities.*

#### Comment

The above objectives and policies recognise the essential need for network utilities but identify that consideration must be given to the amenity of the area in which they are located, the health and safety of the community and measures to ensure that adverse effects are mitigated. As part of this application, realignment of the existing 220kV transmission line to the Poihipi Road Power Station is proposed to connect the Te Mihi Power Station into the national grid via the Te Mihi switch yard. Given that the transmission towers are an existing feature of the environment it is considered that the realignment will largely maintain the current character of the area and sufficient separation is provided between the lines and public areas such as roads. Therefore the proposal is not regarded as being contrary to these objectives and policies.

### **Geothermal Activity Objectives and Policies – Section 3o.2**

#### **OBJECTIVE 1**

**3o.2.1** *Enable and manage the effects of land use activities associated with geothermal resource use and development.*

#### **POLICIES**

- ii. *To enable land uses associated with the use of geothermal resources in a manner which avoids, remedies or mitigates adverse effects on the environment.*
- iii. *To control the land use effects associated with the use of geothermal resources by way of environmental performance standards in rules and conditions on resource consents.*

#### Comment

The above objective and policies provide for the use and development of the geothermal resource where the potential adverse land use effects can be avoided, remedied or mitigated. The applicant has proposed various measures and conditions to control and manage the potential land use effects of this activity. These effects include the appearance of the buildings and structures, traffic generation, earthworks and noise. Some such matters remain the subject of discussions between the applicant and some submitters.

## **13.2 Regional Planning Documents**

The Waikato Regional Policy Statement (WRPS) and the Waikato Regional Plan (WRP) are the two regional planning documents that govern the use and development of the geothermal resources of the Waikato region.

The WRPS became operative on 1 October 2000, with the exception of provisions relating to Biodiversity which became operative on 8 November 2002. The geothermal provisions were the subject of Plan Change 1 to the WRPS that became operative on 21 December 2007.

The WRP became operative on 30 August 2007, with the exception of (amongst other sections) the Geothermal module that was the subject of Variation 2. The latest version of Variation 2 - Geothermal has been agreed between the appellants and s274 parties, and includes the Environment Court ruling of 19 November 2006. These provisions are no longer subject of challenge. The analysis set out below addresses the provisions of the latest version of Variation 2 to the WRP.

There are three chapters of the WRPS and the WRP that are of relevance to this proposed activities. These are the sections covering Energy, Geothermal, and Air Quality. The relationship of the proposed activity to these policy sections is examined as follows.

### **Geothermal**

Under the WRPS/WRP geothermal provisions, the Waikato Regional geo-thermal resource is divided into management units termed "Geothermal Systems".

Within the Geothermal Systems, specific "geothermal features" are also identified, some of which hold the further classification of "Significant geothermal features".

Policy 3 "Classification of Systems" of the WRPS stipulates that five classes of Geothermal Systems can be identified in the WRP, based upon:

- *System size*
- *Vulnerability of Significant Geothermal Features to extractive uses*
- *Existing Use*

One class of Geothermal System is called a **Development Geothermal System**, within which development will be enabled because:

- i. the system contains few Geothermal Features that are moderately to highly vulnerable, or*
- ii. the existing Geothermal Features are significantly impaired by lawfully established large takes, or*
- iii. the system is already subject to large scale energy use and development*

*and in any case there is no evidence of a flow of subsurface geothermal fluid to or from a system described in b), c), or d) below.*

Policy 1 "Identification of Geothermal Systems" in Section 7.4 of the WRP identifies the Wairakei-Tauhara geothermal system as a **Development Geothermal System**.

Table 7.1 of the WRP sets out the following reasons why the Wairakei-Tauhara system is so classified:

- *The system is already subject to large scale energy use and development.*
- *Existing surface features are significantly impaired by legally established large takes.*
- *No evidence of a flow of subsurface geothermal fluid to or from a Protected Geothermal System.*

The classification of the Wairakei-Tauhara Field as a Development Geothermal System is clearly set out through the regional policy provisions.

The WRPS and WRP policy provisions relate to geothermal systems in general, and also include more targeted provisions that relate to various aspects of the use and development of specific Geothermal Systems according to their classification.

### **Use and Development**

The following group of policy provisions from the WRPS and WRP specifically address the use and development of Development Geothermal Systems:

#### **WRPS 3.7.2.1 - Development Geothermal Systems**

**Objective:** *Large scale take, use and discharge of geothermal energy and water enabled within Development Geothermal Systems in a manner that:*

- *is efficient and allows the controlled depletion of energy so as to provide for the energy needs of current and future generations;*
- *remedies or mitigates significant adverse effects on Significant Geothermal Features; and*
- *avoids, remedies, or mitigates adverse effects on other natural and physical resources including overlying structures (the built environment).*

#### **Policy One: Management of Use and Development in Development Geothermal Systems**

*Provide for large scale use and development of geothermal energy and water, promote efficient use of the resource and recognise there will be controlled depletion.*

#### **Policy Two: Integrated System Management Required for Development Geothermal Systems**

*Each Development Geothermal System shall be managed in an integrated manner through:*

- a. *A System Management Plan that defines, by reference to all relevant policies in Chapter 3.7 of this Policy Statement, the objectives for the management of the system and provides as appropriate for:*
  - i. *operational flexibility and adaptive management including provision for subsequent uses;*
  - ii. *reservoir modelling and subsidence modelling;*
  - iii. *a discharge strategy, including provision for reinjection/injection;*
  - iv. *a mechanism(s) to ensure coordination and promote cooperation between all consent holders for large takes;*
  - v. *research, monitoring and reporting;*
  - vi. *non-statutory review of the System Management Plan if in the opinion of the consent holders and the Waikato Regional Council, such amendments are minor.*
- b. *a peer review panel for the purpose of assisting the consent authority to manage the system so as to achieve the objectives of the System Management Plan;*
- c. *resource consent conditions; and*
- d. *a system liaison group/forum where appropriate.*

#### **WRP Objective 1**

*Where geothermal energy and water is taken, it shall be used and managed efficiently.*

#### **WRP Policy 3: Management of Use and Development in Development Geothermal Systems**

*Control the depletion of energy in Development Geothermal Systems through stepped production based on reservoir modelling that:*

- *considers the capacity of the system as a whole; and*
- *considers the reasonably foreseeable needs of present and future generations; and*
- *promotes efficient management and use of the system.*

#### **WRP Policy 4: Integrated System Management of Development Geothermal Systems**

*Each Development Geothermal System shall have an up to date approved System Management Plan that defines the objectives to be achieved in relation to the System having regard to the relevant policies in the RPS.*

#### **Policy 5: Multiple Operators**

*Ensure mechanisms (multiple operator agreements such as steamfield management agreements and field operation protocols) are in place where more than one consent holder for large takes is to exist within a system. Any such mechanism shall address the following matters to the satisfaction of the Waikato Regional Council (Environment Waikato):*

- i) coordination and cooperation between consent holders*
- ii) processes and procedures for assignment of responsibility and/or liability between consent holders for adverse environmental effects*
- iii) identification of potential interference effects between consent holders*
- iv) processes and procedures for avoiding, remedying or mitigating significant adverse environmental effects related to ii) and iii) above*
- v) amendment of the System Management Plan*
- vi) processes and procedures for dispute resolution of technical and consent related matters*
- vii) processes and procedures for changes to the mechanisms, such as changes incorporating consent durations and transfers to new parties*
- viii) siting of wells to avoid interference effects and to achieve efficient use and appropriate reinjection/production*
- ix) monitoring, information and data access arrangements, including the apportioning of costs*
- x) compliance with consent conditions, including joint reporting.*

*There is a strong preference for formal agreement(s) between consent holders but an applicant may demonstrate achievement of this policy by other mechanisms.*

#### **Comment**

The Te Mihi power station project will, through controlled depletion of the geothermal resource, (the rate of which considers and is based on the capacity of the Wairakei-Tauhara geothermal system as a whole) enable the energy needs of current and future generations to be provided for in an efficient manner. At the same time the proposal includes measures intended to remedy or mitigate adverse effects on other natural and physical resources, including the Waikato River, significant geothermal features and the built environment. This is to be achieved by way of a continuation of the existing management regime codified in the consents already held by Contact for the Wairakei-Tauhara geothermal system. Draft conditions of consent are prepared Mr Daysh which are intended to achieve these ends.

Should the Board confirm that the proposed management regime and other effects mitigations controls are appropriate, the establishment and operation of the proposed activities will thus be consistent with the Objective and Policy One of the WRPS, and Objective One and Policy Three of the WRP as set out above.

The applicant has submitted a draft System Management Plan (SMP) as part of the information accompanying the applications for resource consent. The draft SMP has partially been prepared to support the consent applications and partially to ensure compliance with conditions of the 2001 consents. It contains the information required by Policy Two of the WRPS and Policy Four of the WRP and to that end is consistent with those regional policy provisions.

WRP Policy 5 seeks to ensure that where there are multiple large take holders in a system, activities are undertaken in a co-ordinated manner to ensure integrated management of the resource and adequate control of adverse effects. This includes amendment of the SMP if required. In this case the only other holder of a consent to take a large amount of geothermal fluid from the Wairakei-

Tauhara system is Geotherm Group Ltd (In Receivership). The SMP provided is in a draft form and not yet approved. To the extent relevant, the proposal is consistent with WRP Policy 5.

### **Discharge and Reinjection**

The following group of policy provisions from the WRPS and WRP specifically addresses discharges from and reinjection to Development Geothermal Systems:

#### ***WRPS Policy Three: Reinjection / Injection***

*For large takes of geothermal energy and water from Development Geothermal Systems, the geothermal water remaining after use is to be reinjected / injected in accordance with a Discharge Strategy forming part of a System Management Plan which shall consider the following matters, as relevant to:*

- i. Dispose of waste water;*
- ii. Return geothermal water to that system;*
- iii. Facilitate further extraction of energy from the system;*
- iv. Avoid or mitigate potential differential subsidence, and remedy or mitigate the adverse effects of subsidence, particularly in the built environment*
- v. Reduce the risk of hydrothermal eruptions particularly in the built environment;*
- vi. Remedy or mitigate significant adverse effects on Significant Geothermal Features; and*
- vii. Avoid, remedy or mitigate contamination of surface and ground waters.*

*Such Discharge Strategy shall also have regard to:*

- i. Any likely benefits to or adverse effects on the system or its productive capacity;*
- ii. The need for adaptive management and flexibility over time.*
- iii. The benefits, costs and adverse effects of the Discharge Strategy;*
- iv. The need to avoid or mitigate potential differential subsidence, and remedy or mitigate the adverse effects of subsidence, particularly in the built environment; and*
- v. The need to reduce the risk of hydrothermal eruptions particularly in the built environment.*

#### ***WRP Objective 7***

*Significant adverse effects on fresh water and land arising from the discharge of geothermal energy and water avoided.*

#### ***WRP Policy 12: Discharges of Geothermal Energy and Water onto Land and into Fresh Water***

*Ensure that discharges of geothermal energy and water onto land and into fresh water after efficient and appropriate use are limited such that the adverse effects are no more than minor.*

#### ***WRP Policy 13: Discharge Strategy for Large Discharges of Geothermal Energy and Water in Development Geothermal Systems***

*For large discharges of geothermal energy and water, reinjection / injection is to be undertaken in accordance with a Discharge Strategy prepared for each Development Geothermal System.*

### **Comment**

The draft SMP provided with the application contains a Discharge Strategy as required by WRPS Policy Three and WRP Policy 13 above. The Discharge Strategy adequately addresses the matters listed in Policy Three that must be considered.

In particular the Discharge Strategy addresses the need for adaptive management and flexibility over time by way of the large areas sought within which reinjection of geothermal water and surface irrigation of cooling water condensate and blowdown can be undertaken. The large reinjection area sought also allows flexibility of reinjection locations that may be required to avoid subsidence effects (refer Section 11.1 of this report).

Measures to mitigate any adverse effects on significant geothermal features are also set out. Measures are discussed in greater detail immediately below.

The proposal to establish and operate the Te Mihi Power Station with its associated increase in amounts of geothermal fluid being reinjected is consistent with WRP Objective 7 and Policy 12 as set out above. Significant adverse effects on fresh water will be avoided through the reduction in geothermal water discharges to the Waikato River, while the surface irrigation of the condensate and blowdown may create a degree of benefit to the rural land it affects (subject to compliance with appropriate conditions). The establishment of the power station itself represents an efficient and appropriate use of the geothermal energy resource, as explained in greater detail earlier in this report.

### **Significant Geothermal Features**

The following group of policy provisions from the WRPS and WRP specifically address Significant Geothermal Features within Development Geothermal Systems:

**WRPS Policy Five: Management of Significant Geothermal Features in Development Geothermal Systems**

*Allow for the efficient take, use, and discharge of geothermal energy and water in Development Geothermal Systems while remedying or mitigating within the Regional Geothermal Resource, significant adverse effects on Significant Geothermal Features.*

**WRP Objective 2**

*In Development Geothermal Systems, significant adverse effects on Significant Geothermal Features arising from the take of geothermal energy and water to be remedied or mitigated within the Regional Geothermal Resource*

**WRP Policy 6: Significant Geothermal Features in Development Geothermal Systems**

*Where significant adverse effects on Significant Geothermal Features in Development Geothermal Systems are to be remedied or mitigated, the remediation and mitigation may include:*

- *the take and return of geothermal water being managed to remedy or mitigate significant adverse effects on those Significant Geothermal Features affected, or*
- *adverse effects on features of the same or similar type (defined in the glossary) being remedied or mitigated to an extent commensurate with the adverse effect being caused ('like for like' mitigation).*

**WRP Policy 10: Adverse Effects of Land Use and Take, Use and Discharge of Water on Significant Geothermal Features**

*Ensure that land use and the take, use and discharge of non-geothermal water avoid significant adverse effects on Significant Geothermal Features.*

### **Comment**

Within the Wairakei-Tauhara geothermal system there are 11 different Significant Geothermal Features. Among the features are the Craters of the Moon and the Broadlands Road Reserve.

The applicant notes that the Significant Geothermal Features within the system may be adversely affected due to stable/declining heat flows across the system as a whole, which may be exacerbated by the proposed increased levels of re-injection. However the applicant contends in the draft SMP that any such adverse effects will not be significant, and if they do occur will be on the extent of the features rather than on their intensity or other characteristics.

The applicant proposes to continue the current approach of providing off-site mitigation of any adverse effects caused on significant geothermal features. This mitigation is primarily through the Wairakei Environmental Mitigation Charitable Trust (WEMCT) and the Wairakei Charitable Trust (WCT).

The approach put forward by the applicant is consistent with the regional policy provisions set out above. The off-site mitigation measures address whatever level of effect that may occur on the

Significant Geothermal Features regardless of their magnitude. The reinjection regime that is proposed to be intensified is in itself a mitigation measure. The Discharge Strategy is a feasible instrument which has amongst its objectives “remedying or mitigating adverse effects on significant geothermal features”.

### **Effects of Take, Use and Discharge**

The following group of policy provisions from the WRPS and WRP specifically address adverse effects of take, use and discharge in Development Geothermal Systems:

**WRPS Policy Adverse Effects of Take, Use, and Discharge in Development Geothermal Systems Six:**

*When taking, using, or discharging geothermal energy and water in Development Geothermal Systems, avoid, remedy, or mitigate the adverse effects on non-geothermal natural and physical resources, including overlying structures (the built environment).*

**WRP Objective 5**

*In Development Geothermal Systems, adverse effects on other natural and physical resources including overlying structures (the built environment), such as those resulting from subsidence and land instability, arising from the take, use, and discharge of geothermal energy or water to be avoided, remedied or mitigated.*

**WRP Policy 11: Effects of Geothermal Resource Use on Other Natural and Physical Resources, including Overlying Structures (the Built Environment)**

*When taking, using, or discharging geothermal energy and water in Development Geothermal Systems, avoid, remedy or mitigate the adverse effects on non-geothermal natural and physical resources, including overlying structures (the built environment).*

*Where there is scientific uncertainty and a threat of serious or irreversible adverse effects on natural and physical resources including overlying structures (the built environment) adopt a precautionary approach.*

### **Comment**

The Wairakei-Tauhara geothermal system underlies significant urbanised areas of Taupo, and peri-urban areas around the fringes of the town. In the past there have been recorded subsidences in various locations around Taupo. The draft SMP provided by the applicant records that in some of these areas it is an agreed assumption that the subsidence is caused by activities undertaken by geothermal power development, while in other locations such as the Crown Road/Invergarry Road area it has not been proven that the applicants activities have caused subsidence.

The primary objective of the Discharge Strategy contained within the draft SMP is to address the adverse effects of subsidence, rather than the subsidence itself. In order to achieve this objective the applicant proposes in the draft SMP the following range of measures (these measures are in large part a continuation of the regime confirmed by the Environment Court in relation to the current consents for Wairakei held by the applicant):

- Repairing any damage to buildings and structures that is proven to be caused by subsidence produced from the applicant’s activities.
- Continuation of benchmark modelling and house inspection programmes (in association with BRANZ and consultant civil engineers), with repeat surveys undertaken at regular intervals to be determined.
- Enhancement of existing reservoir simulation models, and development of a rock mechanics modelling package that can be integrated with the reservoir simulation model to produce a 2D subsidence model.

- Instigation of a long term investigation project to prepare an investigation programme that provides greater clarity on the cause and extent of subsidence.
- Specifically with regard to minimising potential subsidence in Taupo town, the maintenance of required minimum pressures at depth in the Tauhara field.

The applicant has also adopted a pro-active policy of submitting to Taupo District Council plan changes and variations to ensure that landuse decisions adequately reflect underlying geothermal conditions and address risk to new urban development from geothermal extraction activities.

The above measures are consistent with the requirements of the listed regional policy provisions. It is has been identified through previous consenting processes that there is a lack of certainty with regard to the ability to adequately predict future subsidence from geothermal extraction activity. The modelling and investigation work proposed will contribute to a reduction in that uncertainty, while the ongoing building and benchmark surveying will detect any subsidence induced effects that may be occurring over time. The large reinjection area sought by the applicant will assist in remedying and mitigating subsidence related effects through providing alternative reinjection locations.

### **Air Quality**

The following group of policy provisions from the WRPS and WRP are most relevant to air quality issues as they relate to the proposed activities:

#### **WRPS Regional and Local Air Quality**

**Objective:** *Significant characteristics of areas of:*

- *High air quality protected*
- *Degraded air quality enhanced*
- *Other air quality maintained*

#### **WRPS Policy 4: Adverse Effects on Human Health**

*Discharges to air managed in a way that is designed to avoid adverse effects on human health*

#### **WRP Objective 1:**

*Significant characteristics of air quality as identified in Table 6-1 are:*

- protected where they are high*
- enhanced where they are degraded*
- otherwise maintained.*

#### **WRP Objective 2:**

*No significant adverse effects from individual site sources on the characteristics of air quality beyond property boundary.*

#### **WRP Objective 3:**

*Cumulative effects of discharges on ambient air quality do not:*

- present more than a minor threat to the health of humans, flora and fauna*
- cause odour that is objectionable to the extent that it causes an adverse effect*
- result in levels of suspended or deposited particulate matter that are objectionable to the extent that they cause adverse effects*
- have a significant adverse effect on visibility*
- cause accelerated corrosion of structures*
- cause significant adverse effects on the relationship tangata whenua as Kaitiaki have with their identified taonga such as air, ancestral lands, water and waahi tapu.*

**WRP Policy 2: Managing Effects of Other Discharges**

Manage other discharges of contaminants to air through controlled and discretionary activity rules having particular regard to the effects of the discharge on:

- a. ambient air quality compared to the Regional Ambient Air Quality Guidelines (RAAQG) levels provided in Chapter 6.3,
- b. ambient air quality compared to internationally accepted air quality guidelines or standards for managing and understanding the effects of contaminants on human health, the health of flora and fauna and amenity values,
- c. ambient odour and particulate matter levels compared to the guidelines for assessment provided in Chapter 6.4 of the Plan for odour and particulate matter
- d. adverse effects from contaminants that are hazardous in ambient air, particularly with respect to human health,
- e. the significant characteristics of air quality within an area,
- f. significant adverse effects of the discharge on the identified values of tangata whenua as Kaitiaki,
- g. the sensitivity of the receiving environment,
- h. existing ambient air quality and any cumulative effects as a result of the discharge on the receiving environment,
- i. nationally accepted codes of practice for the relevant activity.

**WRP Policy 5: Positive Benefits of Resource Use**

Recognise the positive benefits to people and communities arising from activities that affect air quality by enabling a range of activities to use the air (including existing activities) whilst ensuring that:

- a. high quality air resources are protected,
- b. degraded air quality is enhanced,
- c. adverse effects on air quality are avoided, remedied or mitigated.

**Comment**

The air discharges from the proposed activities will contain non-condensable gases, which most significantly include hydrogen sulphide. The composition of the air discharge thus has the potential to cause nuisance odour and possibly adversely affect human health. The applicant has put forward expert evidence that asserts that the proposed air discharges will not pose an adverse effect to human health (refer Section 11.3 of this report). Subject to evidence to the contrary being provided by submitters, the proposal must be regarded as consistent with the policy provisions set out above as they relate to the management of the effects of air discharges.

As set out elsewhere in this report a range of positive effects will accrue to people and communities as a result of the proposed activity, which is consistent with WRP Policy 5 above.

**Energy**

The WRPS energy provisions sets out the following objective and policy of relevance to the proposed activities:

**Objective:**

*Efficient use of energy within the Waikato Region*

**Policy One: Energy Efficiency and Conservation**

*To promote efficiency and conservation in the production, transmission and consumption of energy.*

The proposed activities will contribute to the efficient use of energy within the region. The extraction, generation and disposal techniques proposed promote efficiency and conservation and to that end the overall project is consistent with the policy provisions set out above.

### 13.3 National Policy Statement – Electricity Transmission

The National Policy Statement (NPS) on Electricity Transmission was gazetted on 13 March 2008 and took effect in April 2008. The matter of national significance to which the NPS applies is “*the need to operate, maintain, develop and upgrade the electricity transmission network*”.

The NPS is relevant due to the proposed new switchyard and transmission line that will facilitate the transfer of electricity generated at the Te Mihi power station to the national grid operated by Transpower.

The objective of the NPS is:

*To recognise the national significance of the electricity transmission network by facilitating the operation, maintenance and upgrade of the existing transmission network and the establishment of new transmission resources to meet the needs of present and future generations, while:*

- *managing the adverse environmental effects of the network; and*
- *managing the adverse effects of other activities on the network.*

The NPS then sets out 14 policies to give effect to the above objective. The most relevant of those to the proposed activities are as follows:

#### **Policy 1**

*In achieving the purpose of the Act, decision-makers must recognise and provide for the national, regional and local benefits of sustainable, secure and efficient electricity transmission. The benefits relevant to any particular project or development of the electricity transmission network may include:*

- *maintained or improved security of supply of electricity; or*
- *efficient transfer of energy through a reduction of transmission losses; or*
- *the facilitation of the use and development of new electricity generation, including renewable generation which assists in the management of the effects of climate change; or*
- *enhanced supply of electricity through the removal of points of congestion.*

*The above list of benefits is not intended to be exhaustive and a particular policy, plan, project or development may have or recognise other benefits.*

#### **Policy 2**

*In achieving the purpose of the Act, decision-makers must recognise and provide for the effective operation, maintenance, upgrading and development of the electricity transmission network.*

#### **Policy 3**

*When considering measures to avoid, remedy or mitigate adverse environmental effects of transmission activities, decision-makers must consider the constraints imposed on achieving those measures by the technical and operational requirements of the network.*

#### **Policy 4**

*When considering the environmental effects of new transmission infrastructure or major upgrades of existing transmission infrastructure, decision-makers must have regard to the extent to which any adverse effects have been avoided, remedied or mitigated by the route, site and method selection.*

#### **Policy 5**

*When considering the environmental effects of transmission activities associated with transmission assets, decision-makers must enable the reasonable operational, maintenance and minor upgrade requirements of established electricity transmission assets.*

### **Policy 7**

*Planning and development of the transmission system should minimise adverse effects on urban amenity and avoid adverse effects on town centres and areas of high recreational value or amenity and existing sensitive activities.*

### **Policy 8**

*In rural environments, planning and development of the transmission system should seek to avoid adverse effects on outstanding natural landscapes, areas of high natural character and areas of high recreation value and amenity and existing sensitive activities.*

### **Comment**

The nature and location of the transmission components of the project will not adversely affect any town centre or existing sensitive activities, nor any areas of high recreation and amenity value. They will achieve national, regional and local benefits through the facilitation of the use and development of the existing geothermal resource via the new Te Mihi power station, while at the same time measures to remedy or mitigate adverse effects are put forward in evidence in chief by Mr Daysh.

## **14.0 Part II of the Resource Management Act 1991**

In deciding the applications for the Te Mihi proposal, the Board will have regard to Part II of the RMA (Purposes and Principles). Section 5 (1) establishes the purpose of the RMA is

- *to promote the sustainable management of natural and physical resources:*

Section 5 (2) defines “sustainable management”

*(2) In this Act, “sustainable management” means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

Section 5 of the Act requires a broad overall judgement on whether or not a proposal promotes the sustainable management of natural and physical resources. That approach allows for a comparison of conflicting considerations, their scale or degree and their relative significance.

Geothermal resources are a natural and physical resource. Contact already holds consents to extract the resource and use it for the generation of electricity (at Wairakei). The current applications seek authority to use that resource in a new power station at Te Mihi and generate a greater amount of electricity from that extracted resource. Increased and extended reinjection is also sought.

In reviewing whether this proposal enables people and their communities to provide for their social, economic and cultural wellbeing and for their health and safety, the applicant’s witnesses point out that the Te Mihi Power Station will produce electricity from renewable sources.

As such, it will not only provide for the general needs of the community and for its health and safety in the provision of electricity but it will do so in a manner that is consistent with and contributes to current Government Policy and international commitments eg:

- National Energy Efficiency and Conservation Strategy
- New Zealand Energy Strategy to 2050
- Kyoto Protocol

The specific benefits of the Te Mihi project are outlined in Mr D T Hunt's E in C (para 15) and placed in a statutory context by Mr M Chrisp at para 33 of his E in C.

Evidence in support of the proposal from this general perspective is also provided by Rose Feary on behalf of the Energy Efficiency and Conservation Authority, and by Dr Richard Hawke for the Ministry of Economic Development.

In terms of sustaining the potential of natural and physical resources to meet future needs, Mr Chrisp notes at para 36 of his E in C that the reinjection proposal will be undertaken in a manner that enables field pressure to be maintained at required levels. In this context attention is also drawn to the improvements in water quality that will be facilitated by this development.

Here, it is also noted that the Waikato Regional Policy Statement provides, as the Objective for Development Geothermal Systems, for large scale take, use and discharge of geothermal energy and water from such systems in a manner that:

*is efficient and allows the controlled depletion of energy so as to provide for the energy needs of current and future generations.*

Issues regarding the implications for the Te Mihi project for the life supporting capacity of air, water or soil are addressed by Mr Bromley, Dr Stevenson and by Mr Chrisp (para 37).

Mr Matthews, in paragraphs 3.1 to 3.13 of his E in C, emphasises that all the same benefits and positive factors associated with the Te Mihi proposal equally apply to the Geotherm project. He points out that care is required in the assessment of the Contact application to ensure that the benefits it will generate are not at the expense of similar benefits from the use of renewable energy that Geotherm already has consents for.

The identification of any adverse effects on the environment arising from the activities proposed and the measures proposed to avoid, remedy or mitigate these effects is addressed in the evidence of various Contact witnesses and in Section 11.0 of this report.

## Section 6

In considering if the proposal before the Board achieves the purpose of the RMA (sustainable management of natural and physical resources) the following matters of **national importance** are to be recognised and provided for:

- (a) *The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- (b) *The protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*
- (c) *The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
- (d) *The maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- (e) *The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.*
- ((f) *the protection of historic heritage from inappropriate subdivision, use, and development)*
- ((g) *the protection of recognised customary activities).*

Mr Chrisp reviews this provision at para 39 of his E in C.

He considers there are no outstanding natural features of landscapes affected by the applications. It is noted that two of the Landscape Amenity Management Areas identified in the Taupo District Plan (Karapita (LMA01) Kiriohineki (LMA02)) are located within the reinjection application area and the air discharge application area. While these features are identified in the Taupo District Plan, there is no

requirement to obtain a land use consent for works affecting these areas where those works are otherwise permitted. Steamfield operations are a permitted activity.

As discussed in Mr Bromley's E IN C (refer paras 4.8 – 4.9) any increase in pressures at reservoir depth in response to increased reinjection is likely to reduce the steam upflow into the shallow stream zone which feeds the surface discharges. This outcome might have an adverse effect on the extent and health of thermo – tolerant vegetation (eg ferns) in some areas. Such effects should be considered in relation to s6(c) above. Any such effects may be able to be addressed in the implementation of the Discharge Strategy.

With regard to s6(e), a Cultural Impact Assessment prepared by Te Kapa O Te Rangiita Ki Oruanui identified 3 culturally significant sites. These area:

- Raparapa Maunga
- A rock art feature
- Te Mihi Maunga

The first two features are located to the north of the power station site and Te Mihi Maunga is located to the south of the site close to Poihipi Road.

In the draft conditions, Mr Daysh proposes, in the Power Station land use consent that a cultural condition be included requiring that the current holder shall ensure that no operations or maintenance of the Te Mihi Power Station be undertaken within 100m of these features. A plan showing the exclusion zones was attached to the draft conditions, and has been further refined to reflect recent consultation between the applicant and Te Rangiita Ki Oruanui. The further refined plan is attached to the revised conditions attached to the rebuttal evidence of Mr Daysh (Exhibit SGD 8).

While this recognition is valuable, the sites are well clear of the Power Station site to which the land use consent relates. Two sites are within the area proposed for discharge of cooling water blowdown / condensate and all are within the area proposed for reinjection in that application. While the infrastructure associated with the irrigation and the reinjection is a permitted activity (in district land use terms) the board should consider the issue of incorporating the exclusion zones into the resource consents for irrigation and reinjection to provide protection for these features.

In terms of the protection of historic heritage (s6(f)), the Archaeological Assessment forming part of the applications identifies 2 recorded archaeological sites:

- U 17/17 – rock art and shelter site
- U 17/65 – Te Mihi earthworks site

These are not in the power station site area, nor are they identified in the District Plan. These appear to be the same rock art feature and Te Mihi Maunga identified by the Cultural Impact Assessment.

As such, protection from adverse effects arising from the project can be achieved as discussed above. Further, as these are recorded sites any works on the sites associated with the power station and steamfield development would require an authorisation by the NZ Historic Places Trust.

## Section 7

The Board will also have particular regard to the matters set out in (a) – (j) of s7 in considering if the Te Mihi Power Station proposal achieves the purpose of the Act. These are:

- (a) *Kaitiakitanga:*
- ((aa) *The ethic of stewardship:*)
- (b) *The efficient use and development of natural and physical resources:*
- ((ba) *the efficiency of the end use of energy:*)
- (c) *The maintenance and enhancement of amenity values:*
- (d) *Intrinsic values of ecosystems:*

- (e) *Repealed.*
- (f) *Maintenance and enhancement of the quality of the environment:*
- (g) *Any finite characteristics of natural and physical resources:*
- (h) *The protection of the habitat of trout and salmon:*
- ((i) *the effects of climate change:)*
- ((j) *the benefits to be derived from the use and development of renewable energy.)*

Mr Chrisp addresses these matters in paras 47 – 52 of his E in C. The following aspects are highlighted:

### **Kaitiakitanga**

The role of Kaitiakitanga rests with Te Kapa O Te Rangīiita ki Oruanui, the local hapu in the area. Te Kapa O Te Rangīiita ki Oruanui is a submitter to these applications and is supported in its views by a submission by the Tuwharetoa Maori Trust Board. Progress in addressing issues raised was made at the Prehearing Meeting conducted on 6 June 2008 (refer Meeting Notes).

In particular, agreement was reached regarding a consent condition setting in place an appropriate protocol to be adhered to in the event that there is the discovery of a cultural / archaeological site in the course of the Power Station development (applies to all 3 land use consents sought).

Also, the General Conditions to the Wairakei consents are proposed to also apply to the Te Mihi reinjection and surface irrigation discharge consents. These General Conditions require that a Peer Review Panel be established comprising 3 independent technical experts and 1 representative appointed by the Wairakei hapu (General Condition 1.2).

While the Panel has not yet been established, it is a key element in the overall strategy of the Wairakei (and Te Mihi (if granted)) consents. The General Conditions (Nos 2.1, 2.2) provide for the exercise of the Kaitiaki role. In this regard, a Heads of Agreement was signed between Contact and the Wairakei hapu in February 2004 (refer Advice Note to General Conditions 2.2).

At the Prehearing Meeting of 6 June 2008 the issue of hapu representation was discussed. While a representative of Wairakei hapu is to sit on the Peer Review Panel, the individual Wairakei hapu (3 No.) and the Tauhara hapu felt that a mechanism was needed to enable their particular issues to be addressed where matters peculiar to their own rohe were affected.

The formation of a Hapu Review Panel to advise and liaise with the hapu representative on the Peer Review Panel was favourably viewed by the parties attending the Prehearing Meeting. The mechanism to establish and operate the Hapu Review Panel was seen as being outside of the resource consents (if granted) and to be included in a Memorandum of Understanding between Contact and the hapu. This is considered to be a sensible approach and would avoid any need to change the Wairakei General Conditions. It is understood that a Memorandum of Understanding has subsequently been signed by the applicant and Te Kapa O Te Rangīiita ki Oruanui and that this MOU addresses the provision of a Hapu Review Panel.

Other aspects of s7 of particular relevance to this proposal include:

- The production of more electricity from Te Mihi than is currently generated at Wairakei from the same geothermal resource take (refer E in C of B Pummer para 7) – s7(ba).
- While the Te Mihi Power Station will discharge greenhouse gases, the emission factor per GWh is very low compared with production of electricity from gas or coal fired power stations (refer E in C of C Stevenson para 213) – s7(i) re climate change.
- The benefits to be derived from the use and development of renewable energy are discussed in the E in C of Mr D Hunt (para 15). The term “renewable energy” is defined in s2, RMA to include energy produced from geothermal sources – s7(j). Mr Chrisp in his E in C notes that the Te Mihi development would be consistent with s7(j). Mr Matthews (para 3.10 E in C)

agrees but notes that this also the case for the Geotherm project, and that any adverse effect on that project would be inconsistent with Section 7(j) on the same basis.

## Section 8

In considering the application by Contact, the Board is required to take into account the principles of the Treaty of Waitangi. In this regard, the Board will consider:

- The adequacy of consultation with iwi and the outcomes of that consultation.
- The measures that are proposed to provide protection to sites / items of cultural significance
- Measures proposed to recognise and provide for Kaitiakitanga

It is noted that iwi submitters have not exchanged any evidence and that a Memorandum of Understanding has been signed by the applicant and Ngati te Rangiita ki Oruanui.

## 15.0 Conditions

Should the Board decide to grant the applications, appropriate conditions of consent will need to be imposed.

Mr Daysh has provided a revised draft set of conditions in his rebuttal evidence that supercedes the draft conditions appended to his E in C. The revised draft conditions are attached for reference as Appendix 2.

The revised draft conditions largely incorporate the conditions proposed by Taupo District Council and Environment Waikato (apart from two District amendments), and also includes various other conditions to satisfy the concerns of submitters (particularly with regards to noise and visual/landscape effects).

I have reviewed the conditions and consider that they are largely appropriate. There are several issues/conditions however where I feel a commentary is required and I provide this as follows

### General Condition Compliance

Mr Daysh proposes conditions that require the Te Mihi consents to comply with the General Conditions (GC's) for the Wairakei Consents (in particular consent no.104718). One implication of that approach is uncertainty that may arise at the time of expiry of the Wairakei consents in 2026, and whether the Te Mihi consents could still be made to comply with the Wairakei GC's once consent 104718 has expired.

To address this issue, Mr Brocklesby in his E in C suggests a condition under s128 of the Act that will allow EW to review the Te Mihi consents within the 6 months preceeding the expiry of the Wairakei consent (30/06/2026), with the intent of ensuring that the relevant requirements under the General Conditions of the Wairakei consent can continue after its expiry on 20/06/2026 to be imposed on the Te Mihi consent. This condition would require EW to undertake a formal review under s128 with attendant time and financial cost. An alternative to this review condition could simply be to amend the relevant conditions proposed by Mr Daysh to read as follows (or similar to the same effect):

*The exercise of this consent is subject to compliance with the General Conditions that apply to consent 104718, regardless of whether consent 104718 is live or has expired.*

A further alternative is simply to append the GC's of the Wairakei consent to the Te Mihi consent as a Schedule or Appendix, and make appropriate reference to them in the conditions.

Mr Matthews in his E in C proposes amendments to the General Conditions for the Wairakei consents, in order to ensure that the Te Mihi GC's recognise the potential for adverse effects such that they would become a stand alone set of GC's for the Te Mihi consent (if granted).

The following issues should be addressed by the Board when considering whether or not to impose the conditions proposed by Mr Matthews (assuming that the Board is mindful to grant consent to the substantive applications):

- The amendments to the GC's would not have the effect of altering the GC's applicable to the existing Wairakei consents. That could only be achieved by way of an application to change consent conditions pursuant to s127 of the RMA.
- The parallel existence of one set of general conditions for the Wairakei consents and an amended set of general conditions for the Te Mihi consents, all relating to the same field, will potentially lead to difficulties in terms of practical and efficient monitoring and enforcement of the consent conditions for the regulatory body. It would be difficult for Environment Waikato to understand what activities were being undertaken under the auspice of which set of general conditions. Further, two parallel sets of GC's raises questions of consistency with Waikato Regional Policy Statement and Plan provisions that require integrated and efficient management of Development Geothermal Systems
- Should the Te Mihi consents be granted subject to conditions that include a reinjection buffer around the Geotherm site, reinjection could still be undertaken within the buffer under the auspice of the Wairakei discharge consents. This would then make the protection afforded to the Geotherm site by the Te Mihi consent relatively meaningless.

#### Reinjection Buffers – Geotherm Site

As referenced in Section 11 of this report, Mr Matthews in his E in C proposes various conditions of consent to avoid, remedy or mitigate potential adverse effects of the Te Mihi proposal on the Geotherm project. The proposed conditions are largely modelled on conditions imposed on the Geotherm consents to avoid, remedy or mitigate potential adverse effects on the existing consented Wairakei activities. In addition to the GC amendments discussed above, they include (amongst other conditions) two new conditions establishing reinjection buffers around the Geotherm site as discussed in section 11.3 of this report (1.5km from the Geotherm site for reinjection of spent geothermal and cooling water, and 3km from the Geotherm site for reinjection of condensate).

Mr Carey in his rebuttal evidence proposes an alternative 500m buffer around the Geotherm site that in his view is more reasonable, and includes a larger offset on the predominant North East – South West strike of fault lines in the western part of the Wairakei field.

Professor O'Sullivan in his rebuttal evidence says that the creation of an area of lower geothermal pressure (a "pressure sink") in the Te Mihi area than in the Geotherm site means that underground water will naturally travel from the higher pressure area (Geotherm) toward the lower pressure area (Te Mihi). On that basis it is his opinion that most injection is likely to flow towards the Contact steamfields where pressure drawdown is the greatest. For that and other reasons as set out in his rebuttal evidence Professor O'Sullivan does not see the need to establish the reinjection buffers for a distance any greater than as proposed in the rebuttal evidence of Mr Carey.

The applicant, Geotherm Group Ltd (In Receivership) and EW have had recent discussions regarding this issue and as of the time this report was prepared, no overall resolution had been reached.

It is noted that an area in the south-western sector of the Te Mihi re-injection area (near the Poihipi Road/State Highway 1 intersection) is outside the area for re-injection under the Wairakei consents. Thus a buffer zone located in this area would not encounter the implementation issues already noted where areas are consented for re-injection under the Wairakei consents.

It is understood that Contact is considering this area for re-injection. It is also understood that there may be some basis for suggesting that this area may have a level of hydrological connection to the Geotherm site. These matters may be the subject of expert testimony at the hearing.

Should the Board be of a mind to require a buffer, Mr Daysh in the draft condition number 6 of the reinjection consent (Exhibit SGD9) attached to his rebuttal evidence has suggested a condition to implement the 500m buffer. This condition could be readily amended should the Board decide that a greater buffer is required. Alternatively it could be deleted if it is decided that no buffer at all is required.

Condition number 7 of the reinjection consent (Exhibit SGD9) implements a suggestion of Mr Brocklesby that the buffer should apply until the lapse date of the Geotherm consents, and then apply thereafter only if the Geotherm consents are being exercised at a reasonable level. Mr Daysh has adopted 6000 tonnes per day as the "reasonable level" trigger due to the Waikato Regional Plan using that figure to distinguish medium sized from large geothermal takes.

In general I agree with the approach embodied in condition 7, however the Board needs to consider whether 6000 tonnes per day is an appropriate figure to define a "reasonable level", bearing in mind that Geotherm have the right to implement their consents to whatever level they desire up to the maximum limits specified in the consents.

### Traffic Effects and Management

Over recent weeks the applicant, Taupo District Council and Transit New Zealand have considered appropriate measures to avoid, remedy or mitigate the effects of construction traffic from the Te Mihi proposal on local roads and on key intersections with State Highway 1 (Poihipi Road/S H 1 intersection in particular). The outcome of these discussions is that, as is currently understood, the Traffic Management Conditions attached to Mr Daysh's rebuttal evidence (Conditions 18-25, Exhibit SGD 8) are acceptable to Taupo District Council and Transit New Zealand. In general terms the agreed conditions relate to:

- Improvements at the Poihipi Road/S H 1 intersection (provision of left turn slip lane for northbound slip lane on SH 1)
- Various specified upgrade works/commitments on local roads in the vicinity of the Te Mihi site
- Preparation and implementation of a Construction Traffic Management Plan including traffic management procedures to minimize interaction between construction traffic and normal peak flows (including nominated travel demand management measures).

It is noted that the proposed conditions do not include any specific carparking requirements. "No stopping" restrictions are to be posted on Poihipi and Oruanui Roads in the vicinity of the site to prevent vehicles parking on the road rather than on the site. However to minimize traffic generation, the travel demand management measures noted include minimising on-site parking as far as possible (to encourage high levels of vehicle occupancy). These measures seem consistent and mutually supporting.

Further it is noted that it is not proposed to include a suite of traffic effects/management conditions on the switchyard and transmission line consents. Mr Daysh in his E in C does not consider it necessary or desirable to duplicate all of the power station conditions and management plans on these other consents. Neither Taupo District Council or Transit has taken issue with this position as far as traffic effects and management are concerned.

While the specific roading improvements/upgrades etc required in the power station consent do not require duplication on the switchyard and transmission line consents, there may be merit in including the requirement for the construction traffic management plan particularly for the switchyard being the more intensive work. Should the Board consider that there is merit in including a Construction Traffic Management Plan condition in the switchyard consent, the wording proposed by Mr Daysh for the proposed power station consent is appropriate with minimal amendment by including a provision to the effect that:

*This Construction Traffic Management Plan shall not be inconsistent with and may be prepared in conjunction with the Construction Traffic Management Plan required in accordance with Condition 24 of the landuse consent for the construction and operation of the Te Mihi Geothermal Power Station.*

#### Construction Management Plan - Switchyard

In like terms to the Construction Traffic Management Plan, there may also be merit in including a requirement for a Construction Management Plan on the switchyard landuse consent, given that the construction of the switchyard is in its own right a major construction work. Further, adherence to a CMP will be the principal mechanism to afford some noise and amenity protection to neighbouring landowners during the construction phase of the switchyard.

#### Visual/Landscape

Conditions 26 and 27 in Exhibit SGD 7 attached to the rebuttal evidence of Mr Daysh are in accordance with the requirements from Taupo District Council to address visual/landscape effects, as discussed in section 11.8 of this report. It is assumed that the revised landscape mitigation plan attached to the rebuttal evidence of Mr Coombs will form part of the overall Landscape Management Plan required by conditions 26 and 27.

#### Operational Noise

The imposition of an operational noise condition on the power station landuse consent would provide ongoing certainty for adjacent landowners as to the level of permitted operational noise the power station and switchyard can generate, and to allow more efficient and effective monitoring by Council.

Mr Hunt in his rebuttal evidence (para 16) sees no reason why for completeness a condition for operational noise could not be included. The wording of such a condition is identified in the rebuttal evidence of Mr Daysh (para 62). I agree with the wording of that condition that requires compliance with Taupo District Plan noise limits at or within the notional boundary of any rural dwelling existing at 21 July 2008, and the noise to be measured and assessed in accordance with NZS 6801:2008 and NZS 6802:2008 respectively.

In considering this aspect it should be noted that the land use consent has no expiry date and assuming that the power station is built, the consent will manage its operation for decades. District Plan rules change with ongoing reviews and staff change over time. For such practical reasons, an operational noise condition should be detailed in the landuse consent.

Further, such a condition should be included in the switchyard consent should the Board have any questions regarding the noise generated by that activity (if there indeed is any).

#### Contact disagreements with Taupo District Council amendments

Mr Daysh notes in his rebuttal evidence that he does not agree with two amendments sought by Taupo District Council, and thus has not included them in the revised draft conditions. The areas of disagreement are:

- (i) an amendment to grant Taupo District Council the ability to review consent conditions potentially once every year for the first five years and then four yearly after that, as opposed to the original frequency of four yearly.

Mr Daysh considers that reviews should not be possible during the construction phase of the project as that phase is governed by a number of management plans that require approval by Council, compliance with which will be locked into conditions of the construction contract for the project. From my own experience I am inclined to agree with his position. I note however that allowing reviews to occur during the construction phase will provide Council with a large factor of safety to address any

adverse effects that may arise, however slim the chances are given the Management Plan approval process.

(ii) an advice note that advises that future pipelines associated with development may require resource consents.

Mr Daysh asserts that such pipelines are covered by the landuse consent sought for the proposal, and that expansion of the existing steamfield and pipe network is a permitted activity in the Rural Environment and is not subject to any performance standards. I agree with his position.

# Appendix 1 List of Submissions

**Table 5: List of Submissions**

Sub No.	Submitter	Position / Heard	Reason	Relief Sought
24	<b>Birdsall, Anthony &amp; Koster, Linda</b>	Not stated Wish to be heard	Risk of groundwater contamination Devaluation of Property Visual Impact and Noise H2S increase	Local groundwater bores monitored with Contact to supply water if contaminated Station relocated to Eastern boundary Structures screened – banks/tree planting
9	<b>Department of Conservation</b>	Neutral Do not wish to be heard	Supports resulting decrease in discharge to the Waikato River (and increased deep reinjection) by decommissioning Wairakei. Supports use of more advanced technology than Wairakei.	None
8	<b>Dutton Price, Miss Lynley; Dutton Price, Miss Alison</b>	Oppose Do not wish to be heard	Devaluation of property Visual impact Noise and Smell Pollution of water supply	Compensation for loss of lifestyle and devaluation of property
13	<b>Ellery, Mr. Grant and Mrs. Francis</b>	Oppose Wish to be heard	Devaluation of property (so a private company can make profits for shareholders). Inadequate consultation – work started before consultation. Disruptions of rural lifestyle – construction noise, dust, too close. Likely contamination of water bore by reinjection	Compensation for disruption and loss of property value Shelterbelt for visual and noise screening Provision of alternative water supply if current supply contaminated
12	<b>Energy Efficiency and Conservation Authority</b>	Support Wish to be heard	NZ demand for energy will increase. Generation capacity needed. Proposal consistent with sustainable energy policies and strategies. Result in nationally significant benefits due to contribution to 90% renewable energy target, security of supply and positive effect on climate change.	Approve applications.
4	<b>Environment Waikato</b>	Neutral (EW applications) Wish to be heard	To promote consistency with Councils geothermal policies and existing consents.	Consents to be consistent with Council geothermal policy Conditions to be enforceable and compatible with existing consents

**Table 5: List of Submissions**

Sub No.	Submitter	Position / Heard	Reason	Relief Sought
7	Fish & Game NZ, Eastern Region	Support	Alternatives to hydro generation should be promoted.	Not identified.
		Do not wish to be heard	No fisheries or game bird resources or their habitat will be adversely affected.	
19	Geotherm Group Ltd	Mixed	Opposes any aspect of the project that adversely impacts on Geotherm Project	Reinjection should be limited to those locations modelled. Condition to ensure reinjection does not adversely affect Geotherm Consent.
			Specific reinjection locations not defined. Modelling not cover all reasonably feasible reinjection scenarios.	Condition to protect range of development options available to Geotherm.
			Contact has not allowed for different development options under Geotherm consents	Ambient monitoring. Condition to ensure combined effects with consented Geotherm discharge does not adversely affect air quality or Geotherm Consent.
		Wish to be heard	Need to calibrate model against actual emissions. Modelling of H2S emissions needs to take additional factors into account.	Conditions to ensure cumulative noise levels from Te Mihi and existing consented activities do not exceed District Plan levels and impact on Geotherm's ability to meet its consent noise limits.
			Cumulative noise effects with exercise of Geotherm consents not assessed	Conditions to assist in determination of any impacts on these areas, such as a monitoring programme, established in consultation with other users.
			Significant geothermal features in area (e.g. Craters of the Moon)	Conditions to ensure project does not adversely affect Geotherm's ability to export electricity (inefficient use under s7(b) RMA). Discounting of benefits of Contact and/or Geotherm project if it does.
5	Hansen, Mr. Graham & Mrs. Isobel	Oppose	Construction and operation noise effects will disrupt rural quiet.	Compensation for disruption and loss of property value.
		Do not wish to be heard	Reduction in property value. Work already commenced before consents being granted.	
18	Houghton, Mr. Ray	Opposes	Discharge of steam will detract from rural landscape. Cumulative adverse effect with the existing discharge. Adverse traffic effects and safety concerns. Cumulative odour effects on neighbours.	Decline the full proposal.
		Wish to be heard	Reverse sensitivity – Further development potential impacted by need for Contact's written consent as affected party and restricted covenants.	Mitigate traffic effects of 200 employees using intersection. TDC and Transit solution. Change to intersection layout

**Table 5: List of Submissions**

Sub No.	Submitter	Position / Heard	Reason	Relief Sought
1	Macphal, Ms. Sarah; Campbell, Mr. Ian	Oppose	Impact on environment	None stated.
		Do not wish to be heard	Loss of value of property	
21	Major Electricity Users' Group	Neutral  Do not wish to be heard	<p>Call-in was unwarranted. Reliance on NZ's obligations under the Kyoto Protocol obligations is not sufficiently material to call it in and is a minor effect to be considered by the Environment Court.</p> <p>The 90% renewable target is a "political vision" (not a National Policy Statement in terms of the RMA) and only one of a number of possible future scenarios. Relying on ad hoc political targets as criteria for call-in or putting weight on these reasons will allow key developments to be dictated by Ministerial whim. BOI should test robustness of effects across other scenarios than 90% renewable target.</p> <p>While this is a large geothermal project other large geothermal projects have been consented recently without call-in.</p>	BOI should give little weight to the Minister's reasons for the call in when balancing effects
10	McGrath, J.J & J.M and Family	Oppose EW applications  Wish to be heard	<p>Object to discharges to land and groundwater. Air discharges will cause unacceptable pollution. Should confine operation to areas identified in applications Definition of Geothermal System by Judge Whiting.</p>	<p>Re-injection should be to well or bores into the subterranean formations of same system as geothermal waters taken from.</p> <p>Not stated.</p>
15	McLachlan, Mr. Alistair; McLachlan, Ms. Ava Marie; MacPower Ltd	Oppose in Part	<p>Wish to protect Geotherm Group consents and to ensure there are no adverse cumulative effects with other existing and consented uses.</p> <p>Air quality – current discharges of gas from Poihipi Power Station exceed current consent limits</p> <p>Reinjection - Potential constraint on Geotherm Power Station reinjection</p> <p>Reinjection – Contact presently discharges contaminants without landowners' authorisations</p> <p>Noise – cumulative with effects of other activities both occurring and consented.</p>	<p>Conditions to meet concerns:</p> <p>Air - ensure that cumulative adverse effects have appropriate limits</p> <p>Reinjection – control reinjection so as not to constrain Geotherm consents or other existing consents on the same System and require that no generation activities occur until Contact has all necessary authorisations from landowners for reinjection of power station fluids.</p> <p>Noise – controls on cumulative effects</p>

**Table 5: List of Submissions**

Sub No.	Submitter	Position / Heard	Reason	Relief Sought
15	<b>McLachlan, Mr. Alistair;</b> <b>McLachlan, Ms. Ava Marie;</b> <b>MacPower Ltd</b>  <b>(cont.)</b>	Oppose in Part	Transmission – query adequacy of transmission capacity to meet project and Geotherm and other existing and consented generators	Transmission - require Contact to prove that adequate transmission exists for project, Geotherm and other consents.
			Where consent has potential to inhibit or adversely affect existing consents. / Cumulative effects with existing users.	Require consent to ensure it does not adversely affect the exercising of Geotherm’s consents and is consistent with controls on other consented activities. Appropriate controls on cumulative effects generally.
		Wish to be heard	<p>Project involves extension of land areas associated with Poihipi Power Station and activities</p> <p>Contact has recently drilled a new well within a short distance of the Geotherm boundary, contrary to undertakings given by Contact to Reconsenting Hearing 2001.</p>	<p>Extension of land areas – ensure such expansion is warranted and consistent with existing Court decisions re that station. Specify uses to which particular land areas may be put consistent with past decision and the demonstrated needs for any expansion.</p> <p>BOI should check use to be made of new well (on Geotherm boundary) and which power station it is associated with and conditions should address proximity of any new well to Geotherm boundary.</p>
6	<b>Ministry of Economic Development</b>	Support  May wish to be heard in clarification	<p>National benefits of a viable and renewable resource by making use of viable and renewable energy source, security of supply and avoiding greenhouse gas emissions.</p> <p>BOI should take into account the contribution Te Mihi will make to achieve the Government’s energy objectives.</p>	Approve the application for land use consent
22	<b>Tauhara North 3B Trust</b>	Mixed  Wish to be heard	<p>Rights of Nga hapu o Ngati Tuwharetoa. Key feature of the Treaty of Waitangi claims concerned dispossession and loss of rangatiratanga over the geothermal resource, degradation of geothermal taonga and exclusion from use and development of the resource.</p> <p>Waitangi Tribunals report <i>He Maunga Rongo: Report on Central North Island Claims</i> has important findings.</p> <p>Concerned about the discharge of contaminants and waste water onto land and into the aquifers linked to Taupo nui a Tia and effects on surface features.</p>	Consultation and communication and regular update on reinjection plans and monitoring adjacent to the interests of the Trust



**Table 5: List of Submissions**

Sub No.	Submitter	Position / Heard	Reason	Relief Sought
14	Te Kapa o Te Rangiita ki Oruanui	<p>Neither Supports nor Opposes (Neutral)</p> <hr/> <p>Wish to be heard</p>	<p>Clarify issues in consent applications that were not resolved in pre-consultation process. Issues are -</p> <ul style="list-style-type: none"> <li>Clarification of Land Trusts within the consented area.</li> <li>Consider staged reinjection for particular surface features and potential for enhancement of taonga/surface features.</li> <li>Exclusion zones for reinjection – possible enhancement of taonga/surface features.</li> <li>Discharges to land and integrity of groundwater.</li> <li>Sewage discharge in areas/site of significance in CIA</li> <li>Air modelling in areas/sites of significance</li> <li>CIA should include air discharge from Poihipi rd station.</li> <li>Geothermal steamfield</li> <li>Te Rau o te huia stream / traditional fishery</li> <li>Lack of consultation prior to lodging s127 variation</li> </ul> <p>Geothermal resource is taonga and have customary interests, including a right to develop. Decisions made now on future allocation may affect their relationship with taonga.</p>	<p>Clarify Land Trusts within consent application area.</p> <p>Consider taonga or surface features in Spa area and Onekeneke valley which may benefit from staged re-injection.</p> <p>Clarification of exclusion zones for reinjection, exclude Wairakei Valley?</p> <p>Clarify chemical constituents of discharge water.</p> <p>Identification of septic tank locations in CIA</p> <p>Drawing showing discharge modelling on CIA map.</p> <p>CIA report for air discharge from Poihipi Rd station</p> <p>Identification of historical sites in relation to steamfield.</p> <p>Clarify - monitoring, take and use from stream.</p> <p>Request pre-hearing meeting to discuss issues. Place the application on hold until the applicant can provide an opportunity to discuss the issues raised by Te Kapa o Te Rangiita ki Oruanui</p>
23	Toyota, Anna & Karz	<p>Support TDC Consents &amp; 116791 / Oppose EW (except 116791)</p> <p>Do not wish to be heard</p>	<p>No information provided</p>	<p>None stated.</p>

**Table 5: List of Submissions**

Sub No.	Submitter	Position / Heard	Reason	Relief Sought
11	Transit New Zealand, Hamilton Regional Office	Oppose  Wish to be heard	Construction traffic will utilise the Poihipi Rd/SH1 intersection which has known safety and capacity issues. The transportation assessment prepared by Traffic Design Group does not offer appropriate conditions to avoid, remedy or mitigate the traffic effects at the Poihipi Rd/SH1 intersection.	Application is declined.  Alternatively, require the upgrade of the intersection of Poihipi Road and SH1 in accordance with Stage 1a of the Western Kinloch Arterial Designation to the satisfaction of TDC (in consultation with Transit). Or ensure no construction traffic uses this intersection.
16	Tuwharetoa Maori Trust Board	Neither Supports nor Opposes (Neutral)  Wish to be heard	<p>Opportunity for Te kapa o Te Rangiita ki Oruanui to clarify their issues not resolved in pre-consultation process.</p> <p>Clarification of Land Trusts within the consented area.</p> <p>Consider staged reinjection for particular surface features and potential for enhancement of taonga/surface features.</p> <p>Exclusion zones for reinjection – possible enhancement of taonga/surface features.</p> <p>Discharges to land and integrity of groundwater.</p> <p>Sewage discharge in areas/site of significance in CIA</p> <p>Air modelling in areas/sites of significance</p> <p>CIA should include air discharge from Poihipi rd station.</p> <p>Geothermal steamfield</p> <p>Te Rau o te huia stream / traditional fishery</p> <p>Lack of consultation prior to lodging s127 variation</p> <p>Geothermal resource is taonga and have customary interests, including a right to develop. Decisions made now on future allocation may affect their relationship with taonga.</p>	<p>Clarify Land Trusts within consent application area.</p> <p>Consider taonga or surface features in Spa area and Onekeneke valley which may benefit from staged re-injection.</p> <p>Clarification of exclusion zones for reinjection, exclude Wairakei Valley?</p> <p>Clarify chemical constituents of discharge water.</p> <p>Identification of septic tank locations in CIA</p> <p>Drawing showing discharge modelling on CIA map.</p> <p>CIA report for air discharge from Poihipi Rd station</p> <p>Identification of historical sites in relation to steamfield.</p> <p>Clarify - monitoring, take and use from stream.</p> <p>Request pre-hearing meeting to discuss issues. Place the application on hold until the applicant can provide an opportunity to discuss the issues raised by Te Kapa o Te Rangiita ki Oruanui</p>
2	Vanner, Mr. Brett and Mrs. Heather	Neutral (TDC applications) Do not wish to be heard	Construction of structures and potential for visible structures (such as pipes) to devalue property	<p>Give careful consideration to construction of visible structures.</p> <p>Place pipes underground if possible.</p>

**Table 5: List of Submissions**

Sub No.	Submitter	Position / Heard	Reason	Relief Sought
20	Waikato Raupatu Trustee Company Ltd (Tainui)	Not stated  Wish to be heard	<p>The Waikato River is <i>te tupuna awa</i>, the ancestral river of the Waikato-Tainui.</p> <p>Concerns with discharges of geothermal fluids into the river. Irrigation of condensate to pasture may lead to additional nitrogen run-off to the river causing algal blooms. Algal blooms directly impact relationship of Waikato-Tainui with the River.</p> <p>Agreement in principle reflects a commitment by Crown and Waikato-Tainui to enter new era of co-management of the River.</p>	<p>Ensure the consents if granted and other associated and varied consents are consistent with the Waikato River Settlement and re-aligned with its outcomes and objectives.</p> <p>Include a clause as follows - <i>“Within 12 months of the Crown settling any claim made under the provisions of the Treaty of Waitangi Act (1975) WRC may, following service of notice on the consent holder, commence a review of the conditions of this consent pursuant to section 128(1)(a) of the RMA, for the purpose of ensuring that this consent is in alignment with the provisions of any such settled claim.”</i></p> <p>Conditions to cover staged reduction in operation of Wairakei Reinjection of steam condensate from both Wairakei and Te Mihi to the Wairakei-Tauhara field.</p>
3	Wind Farm Developments (Australia) Ltd	Neutral  Wish to be heard	<p>WFD is a third owner of the Hawkes Bay Wind Farm Ltd wind farm, approved for 75 turbines on the Maungaharuru Range. It is not clear that any adverse effects on the Hawkes Bay project are satisfactorily avoided, remedied or mitigated. Te Mihi’s contribution to national benefits will be reduced or not applicable if the development results in any constraining of output from the Hawkes Bay Wind Farm project.</p>	<p>Should the BOI approve the proposal WFD requires a consent condition that <i>“the project shall not result in the loss of generation from any existing or approved renewable generation projects as at the 7/03/08”</i>.</p>

# Appendix 2 Draft Resource Consent Conditions as attached to the Rebuttal Evidence of Mr S Daysh for Contact Energy Ltd