

# NEW ZEALAND GEOTHERMAL RESOURCE MANAGEMENT – A REGULATORY PERSPECTIVE

Katherine M. Luketina

Waikato Regional Council, 401 Grey St, Hamilton, PO Box 4010, Hamilton East, New Zealand

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## ABSTRACT

This paper provides an outline of the environmental regulatory framework in New Zealand with particular reference to geothermal systems in the Waikato Region. The Resource Management Act 1991 devolved regulatory power for resource management to the 12 Regional Councils, which are required to sustainably manage the use, development, and protection of natural and physical resources. The Councils are required to achieve this in a way which enables people and communities to provide for their well being, while providing for the needs of future generations.

Most of the geothermal resources of New Zealand fall within the Waikato Region. Waikato Regional Council has evolved a set of objectives, policies, and rules to preserve outstanding and unique natural geothermal features, while allowing controlled development of some fields. Drilling and other activities are prohibited on some fields set aside for preservation, small-scale use is permitted on others, and major development is allowed on others. Sustainable development is promoted through a 'single tapper' policy, where if a developer has legal access to most of the land overlying the resource, they may be given exclusive rights to develop and husband the resource with a long-term view.

Gone are the days of government 'think big' projects when the goal of national power generation was pursued with little or no regard to the value of geothermal characteristics for native traditional use, biodiversity, tourism, environmental amenity values, and the needs of future generations.

## 1 INTRODUCTION

Most countries agree that if the pressures being placed on the world's natural resources continue at their current rate then eventually the world will run out of resources and no longer be able to support human life. Following the United Nations-sponsored conference on the environment in Rio de Janeiro in 1992, there is widespread international agreement to pursue the goal of sustainable development. This involves managing natural and physical resources in order to provide a reasonable standard of living for the world's populations both now and into the future. Each country must pursue this goal in line with international understandings.

Part of New Zealand's response has been a set of several Acts of Parliament that work together to regulate and guide environmental use in a sustainable and integrated way. These acts work in accordance with the internationally accepted principles of Integrated Resource Management, which seeks to ensure that international environmental goals are achieved through locally appropriate practices with the agreement and participation of local communities and other stake-holders. Management of much of this process is devolved from central government to local government.

One of these New Zealand Acts is the Resource Management Act 1991 (the RMA) which sets out how people are to use air, land, and water (including geothermal fluid). Others include

the Hazardous Substances and New Organisms Act and the Biosecurity Act. The RMA devolves management of these resources to Regional Councils. This paper outlines the resulting geothermal policies of Waikato Regional Council and other Regional Councils with geothermal resources.

## 2 GEOTHERMAL RESOURCES IN NEW ZEALAND

Most of the 12 Regions of New Zealand have low temperature geothermal resources, and three also have high temperature geothermal systems with electricity-generating capabilities. These three Regions are:

- Northland, which has one high temperature system. This is used for electricity generation. It is the only high temperature system outside the Taupo Volcanic Zone.
- Bay of Plenty, which has eight high temperature systems, two of which are used for electricity;
- Waikato, which has 15, five of which are used for electricity.

All the Bay of Plenty and Waikato high temperature systems are found within the Taupo Volcanic Zone, which lies over an active subduction zone where the Pacific Plate is being forced under the Indian Plate.

## 3 RESOURCE MANAGEMENT ACT 1991

Section 14 of the RMA sets out restrictions on the use of geothermal water and heat. No person may take, use, dam, or divert water or geothermal heat unless allowed by a rule in a regional plan (regional plans are discussed later in the text), or by a resource consent issued by the relevant Regional Council, or unless the activity is for reasonable domestic use or for communal traditional use by the local Maori (the indigenous people of New Zealand).

Other sections that are relevant to geothermal use place restrictions on the discharge of contaminants to the environment, and on land uses such as drilling.

The RMA separates resource use activities into several classes:

- 1) "Permitted activity" is a small-scale activity with minimal potential for adverse environmental effects. It is allowed by a regional plan without a resource consent if it complies with certain conditions set down in the regional plan.
- 2) "Controlled activity" requires a resource consent, and has minor potential for adverse environmental effects. The consent will be granted if the activity meets certain conditions set down in the plan. The application for the consent is unlikely to be notified for public submission, and is generally decided by council staff.
- 3) "Discretionary activity" is a large-scale activity requiring a resource consent. The application will likely be publicly notified. If submissions against it are received, it will be decided by Councillors after a public hearing.
- 4) "Non-complying activity" means an activity which contravenes a rule in a plan and requires a resource consent. The application will likely be publicly notified.
- 5) "Prohibited Activity" means an activity which a plan expressly prohibits for which no resource consent shall be granted.

## 4 REGIONAL PLANS AND POLICY STATEMENTS

The Resource Management Act 1991 requires each Regional Council to put in place a Regional Policy Statement and a Regional Plan. The Regional Policy Statement sets the policy, and the Regional Plan provides the rules to implement the policy.

According to the RMA the purpose of the Regional Policy Statement is to:

“achieve the purpose of the Act by providing an overview of the resource management issues of the region and policies and methods to achieve integrated management of the natural and physical resources of the whole region”.

The purpose of the Regional Plan is to:

“assist a regional council to carry out any of its functions in order to achieve the purpose of this Act”.

There is a set procedure for developing the policy statement or plan:

1. Preparation
2. Consultation
3. Public Notification of proposed policy statement or plan
4. Submissions
5. Public Notification of Submissions
6. Further Submissions
7. Hearing by the Regional Council
8. Notification of Regional Council’s Decision
9. Reference (submissions) to the Environment Court
10. Environment Court Hearing
11. Amendment of the proposed policy statement or plan
12. Approval
13. Policy statement or plan made operative

## 5 WAIKATO REGIONAL COUNCIL POLICY

### 5.1 Regional Policy Statement

The geothermal section of the Waikato Regional Council’s Regional Policy Statement identifies the major geothermal management issues as being 1) Maintaining the variety of characteristics of the regional geothermal resource, and 2) Ensuring efficient take and use of the geothermal resource

For geothermal resources there are several considerations in terms of sustainable management which inform the Waikato Regional Council policies:

#### Sustainable production:

Ensuring that users, such as large geothermal power developments, do not take geothermal fluid from the earth faster than it can be replaced.

#### Biodiversity:

Ensuring that the biodiversity of geothermal micro-organisms, plants, and animals is maintained for its own intrinsic value and for possible use in industrial processes and medical applications.

#### Preservation of Features:

Ensuring that geothermal features that people value for their cultural, amenity, and scientific values such as geysers, mud pools, and silica terraces are maintained for future generations to enjoy and learn from.

#### Efficient Use:

Ensuring that when geothermal resources are used, they are used efficiently.

#### Maori values:

Ensuring that Maori traditional values are recognised and provided for.

### 5.2 Regional Plan

The Regional Plan sets out the rules for achieving the aims and objectives of the Regional Policy Statement. In the Geothermal Chapter, there are several broad concepts from which the rules derive:

#### Classification of Systems:

The geothermal systems of the region are classified into development, protected, or unclassified systems. System boundaries are defined according to resistivity contours and other survey information. Classifications and boundaries can be changed through a formal process by providing sufficient evidence that a change is warranted.

#### Protected systems:

Takes and discharges of geothermal water from and to land (other than those lawfully established prior to notification of the Plan) on protected systems will be prohibited.

#### Unclassified systems:

New takes and discharges from unclassified systems will be a discretionary activity. Existing uses lawfully established prior to notification of the Plan will be a permitted activity in unclassified systems.

#### Development systems:

The take from and discharge to land of less than 30 tonnes per day of geothermal fluid will be permitted (under certain conditions). Other takes and discharges up to 500 tonnes per day will be discretionary or controlled activities. The take and discharge of more than 500 tonnes per day will be a discretionary activity.

#### Significant Geothermal Features:

The Proposed Regional Plan contains a list of Significant Geothermal Features in the region, ranked in order of importance based on geophysical rarity, resilience, and viability. They are found on many of the geothermal systems mentioned above, including development systems. Resource consents are needed to do anything in or around a Significant Geothermal Feature.

## 6 BAY OF PLENTY REGIONAL COUNCIL

### 6.1 Regional Policy Statement

The Bay of Plenty Regional Policy Statement (RPS) uses the following geothermal management techniques:

#### Protection Levels:

The RPS divides its geothermal fields into two Protection Levels, Level One giving complete preservation, and Level Two allowing use of the geothermal resource as long as all adverse effects are avoided, remedied, or mitigated.

#### Geothermal features:

It requires that a register be compiled listing each geothermal site with geothermal surface features.

Use and allocation:

The RPS quantifies the amount of geothermal resource available for allocation from each field. The Regional Council will develop contemporary modelling data covering each known geothermal field in the region. Staged exploration and testing is required prior to any development. Single tapper organisations may be favoured over multiple user scenarios.

Hazard Risk:

The RPS requires assessment of geothermal hazard risk for any development. The Council may establish a geothermal hazard register for each geothermal field.

Discharge Effects:

The Council will actively encourage reinjection.

## 6.2 Regional Plan

The Bay of Plenty has not yet released a Regional Plan for the entire region. It has, however, released a Plan for the Rotorua Geothermal Field only. This field has New Zealand's most spectacular geysers and is one of the country's major tourist destinations. There is also heavy usage of shallow geothermal water for space heating, water heating, and bathing in motels and homes. The over-use of the resource for heating led to the decline in activity of the geysers, with some of them stopping altogether. In response, the Regional Council regulated to reduce the take from the field in recent years, and geyser activity is strengthening as a result, although has not and may not recover completely. A ongoing side-effect of this partial recovery is that houses that were built over seemingly extinct geothermal features are now having active geothermal springs sprout up in their floors and gardens. This is considered a nuisance.

The Rotorua Geothermal Regional Plan seeks to recharge the geyser activity with the following policies:

- Total extraction from the field has been limited to 1992 levels
- All fluid taken must be disposed of by reinjection rather than ground soakage. New developments must reinject their used fluid, plus an equal amount not currently being reinjected by another user.
- No extraction within a 1.5 kilometre radius of the geysers
- Protection of geothermal features.
- Allocating to users take quantities based on efficient use formulae.
- Identification of all users.

## 7 NORTHLAND REGIONAL COUNCIL

Northland does not have specific sections in its Regional Plan or Regional Policy Statement relating to geothermal resources. Activities such as geothermal drilling and the taking of geothermal fluids are discretionary activities, requiring resource consents.

## 8 THE RESOURCE CONSENT PROCESS

### 8.1 Assessment of Environmental Effects

According to rules set down in the RMA, a resource consent application must be accompanied by an assessment of any actual or potential effects that the activity may have on the environment and the ways in which any adverse effect on the environment may be mitigated.

### 8.2 Consultation

An application for a resource consent must include evidence that all reasonable steps have been taken by the applicant to engage in adequate consultation with interested parties. These parties may include adjacent landowners and occupiers of land, local iwi (native tribes), the Department of Conservation, the relevant district council, environmental groups and special interest groups such as fishing and hunting clubs.

### 8.3 Notification

Section 93 of the Act states that a resource consent application must be publicly notified and served on such persons who are likely to be directly affected by the application. This is done by placing advertisements in papers and sending letters to affected and interested parties. Notification is not required if all affected parties provide their approval.

### 8.4 Submissions

Submissions can be made in support, in opposition, or neutral to the application. If anyone submits in opposition to the application, the application and submissions have to be heard in a formal hearing process by a Hearings Committee.

### 8.5 Prehearing meetings

Prehearing meetings can be held between the applicant and submitters in order to address the concerns of the submitters. They can be anything from a brief meeting between the parties to a formal public meeting with an independent facilitator or chairman.

### 8.6 The Decision

If there were no submissions against the application, the decision is made by council staff. If there were submissions against the application a hearing is held. The Hearing Committee is usually made up of three elected council members. At the hearing, the applicant, the submitters, and council staff present evidence, as if in a law court. Then the Committee make their decision based on the evidence, stating whether the consents are to be granted, their duration, and what the conditions are.

### 8.7 Appeals

If the applicant does not agree with the decision made by council staff, they may appeal to the Council. In the case of a decision made by Hearings Committee, the applicant or any of the submitters may appeal to the Environment Court. Appeals may also be made to the High Court, but only on questions of law.

## 8.8 Costs

The costs associated with obtaining a consent depend on several factors such as:

- how detailed the applicant's Assessment of Environmental Effects needs to be,
- how long Council staff spend assessing the application,
- whether the application needs to be notified,
- whether there are submitters against the application, which leads to a hearing,
- whether the consent decision is appealed in the Environment Court.

## 8.9 Examples of costs

For a straightforward non-notified consent for a small operation the Environment Waikato charges might be a few hundred dollars. Applications which receive submissions which are resolved without the need for a hearing may involve costs up to about \$5000. Applications with significant environmental effects and which require public meetings and/or hearing may be more. For a large application such as a power station, where there are many interested and affected parties, and many potential environmental effects, Council processing charges alone can run to tens of thousands of dollars. The overall cost to the applicant might be in the \$100,000s.

## 8.10 Time Considerations

Regional Councils are constrained by the RMA to complete various stages of the consent process within specified time frames. However, other stages that the applicant is responsible for, such as consultation or providing the Council with information, may take much longer.

- Non-notified applications take about a month
- Notified applications which do not attract submissions may take two or three months
- Applications which require a full hearing may take years for several reasons. For example the applicant may prefer to enter into a (sometimes lengthy) process of obtaining the agreement of affected parties instead of going through the hearing process. Appeals also take approximately two years.

# 9 CONSENT CONDITIONS

## 9.1 General Conditions

Resource consent conditions fall into three main types:

- **Physical conditions** limiting the physical details of what the consent allows, e.g. volume of take or discharge, location of take or discharge.
- **Monitoring conditions** requiring environmental monitoring and reporting.
- **Standard conditions** relating to such administrative matters as site access, opportunity to review conditions, and consent-holder charges.

## 9.2 Bore Bonds

In the past two years Environment Waikato has adopted a policy of requiring for each land use consent to drill a deep geothermal well a \$200,000 bond to cover "abandonment"

costs in the event of the power company for some reason being unable or unwilling to close in the bore at the end of its useful life. Closure must be to the standards of the Code of Practice for Deep Geothermal Wells.

## 9.3 Annual Charges

All consents except the bore permits carry an annual charge. The charge ranges from about \$70 to about \$2000. Most geothermal power stations have about 15 consents at about \$1500 each, giving a total of about \$22,500 per annum. This charge covers such things as administration, general environmental information gathering, State of the Environment Reporting, and development of policy and plans.

## 9.4 Monitoring of Consent Conditions

The RMA requires Regional Councils to monitor consents. Each year in the Waikato Region, the consents for geothermal power stations are examined to see whether monitoring and reporting conditions have been complied with. The site is visited by Council staff, who also look unauthorised activities and potential hazards. Then Compliance Monitoring Reports are sent to the clients setting out the consent conditions which they have not complied with (if any), and any issues of concern to council staff.

## 9.5 Complaints

From time to time people make complaints regarding various activities of geothermal power stations. Examples include discharging pollutants to a river, dumping asbestos into geothermal features, discharging to air without a consent, creating a H<sub>2</sub>S odour nuisance, creating a steam nuisance across a road, taking more steam than their consent allows, and diverting a stream without a consent. All complaints have to be investigated. A staff member will usually go to the site and take samples, photos, and other evidence where appropriate, interviews people on site, and interviews the complainant. If the complaint is justified, prosecution may ensue. Usually it is enough to threaten to prosecute. Councils are able to recover all costs for a justifiable complaint.

## 9.6 Enforcement

If a person is doing something that contravenes any regulation or resource consent, or is likely to have an adverse effect on the environment, the Council can issue a legally enforceable **abatement notice** ordering them to stop. The person can appeal to the Environment Court against the abatement notice. If they do so, they can continue with the activity until the case is heard. In order to make sure that the person has no right of appeal, the Council can apply to the Environment Court for an **enforcement order**. This takes effect once the case is heard. To make sure that the person stops the activity immediately the Council can apply to the District Court or the Environment Court for an **interim enforcement order**. If granted, this will remain in force until the **enforcement order** is heard, or until it is cancelled.

In addition, people can be prosecuted for contravening those sections of the RMA which impose duties and restrictions in relation to land, subdivision, the coastal marine area, the beds of certain rivers and lakes, water, and discharges of contaminants, any enforcement order or abatement notice, and

a range of other provisions. Penalties include imprisonment for up to 2 years and fines of up to \$200,000 plus a further fine of up to \$10,000 for every day that the offence continues.

## 10 CASE STUDY: OHAAKI POWER STATION

### 10.1 Introduction

In 1997 Contact Energy Ltd started liaising with Environment Waikato regarding the forthcoming renewal of resource consents for the Ohaaki Geothermal Power Station. Several meetings were held and in late 1997 a draft application was presented to Environment Waikato for comment and feedback by staff. In the meantime Contact Energy Ltd were preparing their technical appendices and engaging in consultation meetings with affected parties including the local tribe Ngati Tahu (the local Maori tribe on whose land the station was built by the government) and local landowners. Environment Waikato staff also met with Ngati Tahu on several occasions.

An application was received from Contact Energy Limited on 24 April 1998 for fifteen resource consents:

- **Water** permit to take and use up to 60,000 tonnes per day of geothermal water
- **Water** permit to take and use up to 71,000 tonnes per day of water from the Waikato River for cooling
- **Water** permit to divert stormwater and to take and/or divert groundwater
- **Discharge** permit to discharge up to 54,000 tonnes per day of separated geothermal water via reinjection wells
- **Discharge** permit to discharge stormwater onto and into land
- **Discharge** permit to discharge up to 147,000 tonnes per day of stormwater to the Waikato River
- **Discharge** permit to discharge up to 2,000 tonnes per day of geothermal water to the Waikato River
- **Discharge** permit for the discharge of cooling water onto or into land) in the event of an emergency
- **Discharge** of antiscalants into land via wells (including in circumstances where they may enter water)
- **Discharge** permit to discharge sewage into land and underground water through septic tanks
- **Discharge** permit to discharge up to 2,400 tonnes per day of separated geothermal water to the Ohaaki Pool
- **Discharge** permit to discharge geothermal water from the Ohaaki Pool to the Waikato River
- **Discharge** permit to discharge debris to the Waikato River associated with the cleaning of the water intake screens
- **Land use** consent to construct and upgrade structures in, on, under, and/or over the bed of the Waikato River
- **Land use** consent for excavation, well drilling, metal extraction, earthworks, roadworks, less than 5 metres from the bed of the Waikato River.

The application requested a term of 25 years. The application was a 150 page document accompanied by a set of Technical Appendices of several hundred pages.

### 10.2 Submissions Received

The application was publicly notified in the local newspapers, and nine submissions were received. Six were in opposition, one was neutral, and two were in support subject to conditions

of consent. Land subsidence was a major issue for Ngati Tahu whose sacred sites and buildings were subsiding into the Waikato River.

### 10.3 Hearing

A Hearings Committee comprising of Councillors conducted a four day hearing for the purpose of enquiring into the application and submissions thereto. A site visit was held as part of the hearing, including a visit to sites of spiritual significance to Ngati Tahu.

### 10.4 The Adjournment

The Hearing was adjourned on the 3 September 1998 for a period of four weeks following a request from a submitter for the Committee to seek legal advice regarding whether the Committee was able to call an adjournment for a year in order to give the applicant time to satisfy the concerns of the submitter.

### 10.5 The Decision

The Hearing was closed on 2 October 1998. The Committee had received legal advice that an adjournment of one year was not allowed for in the RMA. The Committee recommended that the application be granted and that a term of 15 years be applied as:

- predictions beyond 15 years are difficult to provide with accuracy;
- significant effects have occurred over a period of 10 years;
- most submitters had relevant concerns about a longer term including effects, changes in technology, economic stability, site management of owners, new or otherwise.

### 10.6 The Appeal

On 26 November 1998 Mark Reihana, as a beneficial landowner of part of the Ohaaki land appealed to the Environment Court against the decision, on the grounds that the decision would result in further land subsidence. On the same day Contact Energy Ltd filed an appeal against the decision on the grounds that the term should be for 25 years. Contact also applied to the Court to have the Reihana appeal struck out on the grounds that Mr Reihana had not himself submitted to the application and therefore had no status before the court.

### 10.7 Granting of the consents

The Reihana appeal was subsequently struck out by the judge, who found that Mr Reihana was not a beneficial landowner, although his father was. Contact's appeal against the term was then withdrawn and the consents granted.

## 11 CONCLUSION

The Resource Management Act 1991 provides significant legislation to protect the environment and achieve sustainable management. It enables communities to participate in decisions regarding the environment. Users of the environment are required to prove that their activities will not have adverse effects on the environment, and are required to

remedy or mitigate any adverse effect that they cause. There

are significant penalties for causing environmental damage.