

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

In the Matter                      of the Resource Management Act 1991

And

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

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**BRIEF OF EVIDENCE IN CHIEF OF DAVID RAY**

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## Introduction

1. My name is David Erle Ray. I am an environmental engineer at the Hamilton office of Environmental Management Services Ltd.
2. I have the following qualifications and experience relevant to the evidence I shall give:
  - Bachelor of Engineering (Civil) degree from the University of Canterbury;
  - Master of Science degree (Resource and Environmental Planning) from the University of Waikato;
  - Chartered Professional Engineer;
  - Member of the New Zealand Water and Wastes Association;
  - 20 years experience in environmental engineering, resource management and environmental impact assessment, including:
    - (i) Management of a team of NIWA scientists investigating the impacts of the Wairakei Power Station cooling water and separated geothermal water discharges on the Waikato River;
    - (ii) Review and report on the incidence and effects of septic tank failures throughout NZ for the Ministry for the Environment;
    - (iii) Detailed investigations into the effects of septic tank leachate on groundwater and surface waters in several communities in the Rotorua Lakes area;
    - (iv) Involvement in the options assessment for a national accreditation system for advanced on-site wastewater treatment systems for MfE;
    - (v) Editor for the MfE's 'NZ Municipal Wastewater Monitoring Guidelines' (2002);
    - (vi) Review of effects of stormwater discharges on surface waters throughout the Wellington Region;
    - (vii) Investigation into the effects of urban stormwater on Lake Ellesmere;

- (viii) Conceptual design of stormwater attenuation system for the proposed Hawkes Bay Sports Park complex; and
  - (ix) Preliminary design and environmental impact assessment for irrigation proposal for stormwater runoff from the Marsden Point Port.
3. I confirm that I have read the 'Code of Conduct for Expert Witnesses' contained in the Environment Court Consolidated Practice Note 2006. My evidence has been prepared in compliance with that Code. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

### **Scope of Evidence**

4. My evidence will cover the land management practices at Contact Energy Limited's proposed new geothermal power station at Te Mihi, specifically:
- Contact Energy's Environmental Management System and ISO14001 accreditation;
  - sewage treatment and discharge of treated sewage into the ground;
  - a description of the hazardous substances proposed to be used at the site, and a general description of how they will be managed;
  - stormwater management and disposal; and
  - solid wastes management and disposal.
5. I wrote the report titled 'Te Mihi Power Station Land Management Practices', dated 26 July 2007.

### **Contact Energy's Environmental Management System**

6. Contact Energy operates an environmental management system called "Positive Contact". It specifies best practice site management procedures for a range of activities undertaken by Contact Energy with a view to ensuring that prescribed and sound practices are followed, that legislation, regulations and Company policies are complied with, and that the Company meets its obligations with respect to the environment and public and staff safety.

7. Positive Contact documentation includes a hierarchal structure of Instructions, Procedures and Checklists. 'Contact Standing Instructions' detail and define Company-wide policies, responsibilities and processes. 'Local Standing Instructions' and 'Procedures' are documents that relate to work practices at specific sites. 'Checklists' provide detailed instruction on how individual items of plant are to be serviced, and inventories of equipment and substances. Some examples of these documents are reproduced in Attachment A of my evidence. Some of these examples are specific to Wairakei Power Station; Contact Energy has informed me that similar documents will be produced for Te Mihi.
8. The Positive Contact documentation is a 'live' system that is continually revised and updated to take into account new items of plant and site practices, changes to Hazardous Substances and New Organisms (HSNO) Act requirements and new resource consents.
9. One of the emphases of these documents is on minimising the risk of spillage and dealing effectively, at source as far as possible, with any spillage that may occur. A key item that is addressed is maintenance of all plant containing hazardous substances, to minimise the risk of spills.
10. The relevant Positive Contact documentation will be revised and new Checklists will be prepared for all plant and work practices at the Te Mihi Power Station (Power Station) as detailed design of the Power Station is completed.
11. The Wairakei Geothermal Power Plant site achieved AS/NZS ISO 14001:2004 ("Environmental Management Systems – Requirements with Guidance for Use") accreditation in 2004. The Positive Contact system forms part of this accreditation.
12. A specific document that was prepared in relation to the Wairakei accreditation was the "Environmental Aspect Identification and Significance Register" (Procedure 03\_06\_3004). This Procedure sets out a risk-based identification and significance evaluation of the environmental impact of the 'Environmental Aspects' found at the generation sites (an Environmental Aspect is defined in ISO 14001 as "an organisation's activities, products or services that can interact with the environment"). This Procedure serves to further ensure that activities that are a potential risk to the environment are appropriately identified and managed to minimise that risk.

13. Contact Energy has informed me that it intends to apply for AS/NZS ISO 14001:2004 accreditation for the Te Mihi Power Station once it is operational.

### **Sewage management**

14. 'Sewage' is the wastewater that will be generated from personnel at the site, and can include toilet, kitchen and shower wastewater (if showers are installed). Sewage does not include industrial type wastewater.
15. Once operational, the Power Station will normally only have up to two or three staff on site, as most operations will be controlled remotely from Wairakei. This number of staff will generate less than 1 m<sup>3</sup> of sewage (including any grey water) per day. However, up to about 400 personnel will be on site for up to two years during construction of the Power Station. Two options are therefore being considered for sewage management:

Option 1: Installing a conventional septic tank system capable of dealing only with the small number of operational staff, and using portaloos and a 'grey water' disposal system for the construction phase of the project.

Option 2: Installing a larger, 'improved' proprietary on-site system (sometimes called a 'package plant') that has capacity for most if not all of the construction personnel (portaloos might still be used to augment the capacity of the on-site system when the construction force is at its peak).

16. Both of the above systems would use subsurface land disposal for the discharge of the treated wastewater. The Power Station site is well-suited to this form of wastewater disposal, because the volcanic subsoils are well drained and the groundwater table is low (at least 20 m below the ground surface, as discussed in Dr Cameron's evidence). Problems with land disposal systems usually occur where the soils are poorly drained (e.g. clay soils), and/or where the groundwater table is high.
17. Problems with on-site systems (and indeed any wastewater treatment system) can also occur if the system is not properly maintained. Therefore it is important that the on-site system for the Power Station is regularly inspected and maintained by a suitably experienced contractor. The agents for proprietary wastewater treatment systems usually offer this service as part of a package deal for the purchase of a treatment system.

*Option 1: Sewage system to cater for operational workforce only*

18. The discharge of treated sewage from a septic tank system such as is proposed for Option 1 is a permitted activity under Rule 3.5.7.5 of the Waikato Regional Plan, provided that a range of performance standards are met. The key criteria are that:
  - the volume of effluent shall not exceed 1.3 m<sup>3</sup>/day;
  - during times of wet winter groundwater level, there shall be at least 600 mm separation between the groundwater and the bottom of the disposal trench; and
  - the effective disposal area for the discharge shall be not less than 2,500 m<sup>2</sup>.
19. In my opinion, a septic tank disposal system can be designed, constructed and operated to meet easily the standards of Rule 3.5.7.5 at the Te Mihi site.
20. Sewage generated by operational personnel at the Power Station (excluding any 'grey water', i.e. wastewater from kitchen facilities) would be in the order of 40 L per person per day. Therefore the maximum sewage flow of 1.3 m<sup>3</sup>/day (1,300 L/day) allowed for under Rule 3.5.7.5 would provide for a workforce of up to about 30 people, far in excess of the number required for the day to day operation of the site.
21. During the construction phase, portaloos would be used to cater for the construction workforce. These would be serviced at least weekly by a specialist contractor.
22. It is possible that grey water volumes might exceed the 1.3 m<sup>3</sup>/day limit of Rule 3.5.7.5 of the Regional Plan during the peak of the construction phase. In this case a separate grey water treatment and disposal system would be used. This would fall within the present resource consent application for sewage disposal into the ground. I note that the Waikato Regional Plan makes no distinction between grey water and sewage.
23. The grey water disposal system, if it were required, would be designed, constructed and installed by a specialist on-site wastewater treatment company. I have discussed a preliminary design for a grey water system with one such company, Innoflow Technologies NZ Ltd. Innoflow advised

me that grey water treatment would require coarse solids removal using a simple solids screening mechanism, solids settling in a flow balancing tank, and discharge into the ground by way of a conventional 'soakage trench'. The soakage trench comprises a perforated pipe laid in a shallow trench filled with gravel.

*Assessment of effects*

24. The effects on the environment of discharging wastewater from a septic tank system that complies with the standards set out in Rule 3.5.7.5 of the Regional Plan will be negligible. I note that such a discharge is a permitted activity under the Regional Plan.
25. The effects of discharging screened grey water into the ground will also be negligible. Grey water from kitchens has a much lower concentration of contaminants than toilet wastes. For example, the nitrogen concentration of grey water is typically less than 10% that of toilet wastewater.

*Option 2: Sewage system to cater for construction workforce*

26. Option 2 would comprise what I refer to as an 'improved' on-site effluent treatment and disposal system. While a septic tank system comprises only primary treatment (solids removal), an improved system includes primary and secondary treatment.
27. Secondary treatment of wastewater involves an aeration treatment component, which facilitates the aerobic breakdown of the organic matter and associated compounds in the wastewater by aerobic bacteria. Aerobic treatment generally produces little odour, and can achieve low contaminant levels in the treated wastewater. By comparison, a septic tank is primarily a solids settling system, with some removal of contaminants by anaerobic decomposition.
28. I have obtained a preliminary design for Option 2 from Innoflow. Innoflow advised me that for 400 personnel, the design flow (toilet wastewater and grey water from kitchen facilities) would be a maximum of 16 m<sup>3</sup>/day. A discharge at this rate requires resource consent under the Waikato Regional Plan. I recommend that the resource consent allow for a discharge rate of 20 m<sup>3</sup>/day to allow for fluctuations in the sewage flow from the plant.

29. Innoflow's wastewater treatment system for this loading is the Advantex AX200, which comprises a recirculating textile packed bed reactor. The system operates by trickling screened effluent over a treatment media, on which aerobic bacteria grow and consume the organic matter in the wastewater. This comprises a secondary treatment system, which provides a much better level of treatment than a conventional septic tank system.
30. Innoflow's treatment system for this flow specifies a discharge quality of 15 g/m<sup>3</sup> suspended solids, and 15 g/m<sup>3</sup> 5-day biochemical oxygen demand (BOD<sub>5</sub>). BOD<sub>5</sub> is a measure of the organic matter concentration in the wastewater.
31. This effluent quality compares favourably with typical discharge characteristics of conventional septic tank systems of about 35 g/m<sup>3</sup> suspended solids (if fitted with a filter) and 120 g/m<sup>3</sup> BOD<sub>5</sub>.
32. Innoflow have confirmed that the system does not require a constant inflow for good performance. The discharge standards will still be met even when there are a small number of personnel at the Power Station.
33. The disposal field would be sited on Taupo pumice soils. The maximum loading rate for these soils would typically be about 15 mm/day (this will be confirmed by site investigations during detailed design). Therefore about a 1,200 m<sup>2</sup> area disposal field is required. Ample land is available at the site for a disposal field of this size. The effluent would be drip irrigated into the ground using subsurface dripper lines.
34. Irrespective of whether Option 1 or 2 is adopted, I am informed by Contact Energy that the on-site system will be designed, constructed, installed and maintained by a reputable company that specialises in on-site sewage systems.

#### *Assessment of effects*

35. The main issues of potential concern for the larger-scale sewage treatment and land disposal system (Option 2) are the discharge of contaminants to groundwater (principally nitrogen, phosphorus and pathogens), and odour. As I have stated earlier, the improved wastewater treatment system that would be used for Option 2 will have far lower discharge contaminant concentrations than those of a conventional septic tank system.

36. Soils have a large capacity for BOD removal, with soil bacteria consuming the organic matter as a food source. The proposed on site treatment system will achieve a BOD<sub>5</sub> concentration for the treated effluent of approximately 15 g/m<sup>3</sup>, which is relatively low. This BOD loading rate will be sustainable long term, as soil bacteria will easily be able to consume the organic matter in the treated wastewater at this concentration.
37. Unsaturated soils are highly effective at removing pathogens in wastewater. The Waikato Regional Plan requires that on-site effluent disposal systems have their disposal beds located at least 600 mm above the groundwater table, and that the effluent discharge rate into those soils does not saturate the soil beneath the disposal bed. This is to ensure that sufficient pathogen removal occurs in the unsaturated soils beneath the disposal system.
38. At the Te Mihi site, the groundwater table is in the order of 20 m below the ground surface, as discussed in Dr Cameron's evidence. Therefore there will be excellent removal of pathogens from the wastewater leachate before it enters the groundwater.
39. With a design population of 400 persons, there could possibly be a risk of nitrate contamination of groundwater if this number of people were using the system for many years. However the number of people using the sewage system will drop to less than 5 after the construction phase, and the number of operational personnel will stay at this level except during relatively infrequent major maintenance operations.
40. The closest neighbouring groundwater bore will be at least 400 m from any potential disposal field. Furthermore, as discussed in the evidence of Dr Cameron, groundwater at the Te Mihi site flows in an easterly direction, away from the closest neighbouring bores, which are to the west of the site. Therefore there is negligible potential for effects on neighbouring groundwater use.
41. Groundwater beneath the Power Station will eventually flow into the upper Waikato River rather than Lake Taupo.
42. Modern on-site sewage systems are designed to produce minimal odour, through use of carbon filters in any vents to the atmosphere. The Power Station site is remote from residential areas and dwellings, with the nearest inhabited dwelling being at least 400 m from the potential disposal field.

Therefore the potential for odour effects from the sewage system is negligible.

43. There have been instances where proprietary on-site wastewater treatment systems have failed due to inadequate design, construction and/or maintenance. To avoid this situation, the selected supplier of the system will be a recognised and reputable company, and I am informed by Contact Energy that a contract for the ongoing maintenance of the system will be put in place.
44. An alarm system will be incorporated into the design to provide warning of any malfunction of the wastewater treatment system, e.g. pump failure. This is a standard design feature of improved wastewater treatment systems. The alarm will either be connected via telemetry to the wastewater treatment specialist provider (who then provides response procedures), or connected to an alarm system on site, from where response can be provided.
45. I conclude that the effects of the treatment and disposal of wastewater by the larger-scale Option 2 sewage system will be no more than minor.
46. I recommend that the conditions for the resource consent for the treated effluent discharge specify a maximum BOD<sub>5</sub> of 20 g/m<sup>3</sup> and suspended solids of 30 g/m<sup>3</sup>. This will allow for a degree of variability in the treatment plant performance, and is consistent with the discharge standards in Rule 3.5.7.6 of the Waikato Regional Plan for improved on-site systems.
47. I further recommend that the consent conditions require that the hydraulic loading rate on the soils from the effluent disposal system be determined by a site investigation carried out by an appropriately experienced person, and that the loading rate does not exceed 50 mm/day.

#### **Hazardous substances management**

48. Hazardous substances that will be stored and/or used at the Power Station include the following:
  - mineral oils (including transformer insulating oil, turbine lubricating oil, and hydraulic oil);
  - acids and alkalis;
  - diesel;

- biocides; and
  - miscellaneous materials on a small scale or used or handled intermittently, such as cooling water sludges, organic solvents, degreasers, paint, and compressed gases.
49. The discharge of hazardous substances to the environment has the potential to cause significant adverse effects. Best practice management procedures are required to avoid such effects. These will be set out in detail within the Positive Contact Environmental Management System described above, which will include documentation that is specific to Te Mihi.
50. I address as follows the key features of the proposed management procedures for each of the hazardous substances that are to be used at the Power Station site. I emphasise that these measures will be set out in greater detail in the management plans for Te Mihi.
51. I note that Contact Energy has considerable experience with management of hazardous substances at its existing power stations throughout New Zealand (in particular, the Wairakei, Ohaaki and Poihipi Geothermal Power Stations).

#### *Mineral oils*

52. The total volume of oil stored on the site at any one time will be approximately 170,000 litres. Most of this oil will be held in the steam turbines and other plant within the turbine house. Smaller amounts will be held in items of plant around the site, such as transformers.
53. Plant within the turbine house or housed within other roofed structures will either have bunding around them to contain any oil spills, or other means to prevent drainage of fluids outside the building (e.g. floor drains leading to storage sumps, or location of plant within pits). These bunds or storage sumps will have a storage volume of at least 110% of the largest oil volume within the item(s) of plant within the bunded area.
54. Where oil is stored in plant not covered by a roof, the bunded area will have a volume of at least 120% of the largest plant oil storage volume, to allow for temporary storage of rainfall collected within the bunding. Alternatively, a system will be put in place to ensure that rainfall collecting within bunded areas is drained within 24 hours.

55. All bunded areas will be inspected on at least a weekly basis to check for collection of rainwater and/or spilled oil. Rainwater collecting within the bunded area will be drained to a plate separator.
56. A 'fail-safe' method of draining water will be implemented to avoid unsupervised or unintended drainage of the bunded area. This could be either a locked valve system or a manual pump out system.
57. The contents of the bunded areas will be visually checked before being drained to the plate separator, to check that there have been no oil spills. If an oil spill is observed, it will be cleaned up using absorbent material and oil disposed of off site by an approved waste management contractor. The source of the spill will be identified and repaired.
58. A plate separator is a best-practice method for removing oil from water. Treated water from the plate separator will have an oil concentration of no more than 20 g/m<sup>3</sup>. This treated water will then be discharged into the ground via the soak pits that will form part of the stormwater disposal system (I will discuss this in more detail below when I address stormwater management).
59. The maximum rate of drainage from the bund will be within the effective operating range of the oil separator.
60. The oil/water mixture that is removed by the separator will be stored in a tank adjacent to the separator. This tank will be emptied when required by a waste oil contractor, for recycling off site.
61. All the above procedures will be set out in the Positive Contact documentation for the Te Mihi site.

*Acids and alkali*

62. Sulphuric acid (98% H<sub>2</sub>SO<sub>4</sub>) may be used at the Power Station for pH control of the geothermal brine prior to reinjection. About 40,000 litres will be on site at any one time, and usage rates would be about 3,000 L/day.
63. Sodium hydroxide (50% NaOH) may be used for pH control of the cooling water. About 10,000 litres will be kept on site at any one time, and usage rates would be about 370 L/day.

64. Both sulphuric acid and sodium hydroxide in their concentrated forms are extremely corrosive and can cause serious burns and permanent eye damage. They are highly toxic, and the fumes can be harmful if inhaled.
65. The acids and alkalis will be stored in welded steel vessels either indoors or under a roofed structure. For either option, the area around the vessel will be bunded to capture at least 110% of the volume of the stored fluid. This bunded area will be sealed with an impervious, chemically-resistant seal. There will be no gravity drainage provided from these bunded areas.
66. If any water collects within the bunded areas it will be pH tested. If the pH is between 6 and 8 it will be pumped out into the stormwater system that leads to the oil separator. If the pH is outside this range the water will be collected and disposed of by a hazardous waste contractor.
67. Because of the highly corrosive and toxic nature of these fluids, there will be very high design standards applied to the design and management of the storage and dosing facilities, to keep the risk of accidental discharges to the absolute minimum. This design will be carried out by specialists and in accordance with the provisions of the HSNO Act. The required management procedures will be addressed in the Positive Contact documentation prepared for the Te Mihi site.

#### *Diesel and other fuels*

68. No diesel or other motor spirits (e.g. petrol) will be stored at the Power Station for the refuelling of motor vehicles. Most refuelling of vehicles will occur at the BP Wairakei Service Station.
69. Diesel will be stored on site in tanks for the fire pumps and the emergency diesel generator. These tanks will only need to be refilled very infrequently (less than once a year). About 2000 litres will be stored at the site.
70. The diesel will be stored in tanks around the site, near to the items of plant for which the fuel is required. Bunding will be provided around these tanks to the same standards as for the items of plant that will hold mineral oils, as I have described previously.

#### *Biocides*

71. Biocides are substances that will be used to control biological growths in the cooling towers. The biocides that are currently being considered for the Te Mihi Power Station (and already in use at the Poihipi Road Power

Station) are sodium bromide and hypochlorite (household bleach). This system is analogous to that of using chlorine in an outdoor swimming pool to control algae build up.

72. Up to about 6,000 litres of concentrated biocides will be stored within the power station building. The main risk associated with the storage of these substances is any potential spillage of concentrated biocides to the environment. To address this issue, the storage area will be bunded with the ability to hold 110% of the full quantity of any spillage.
73. If acidified, sodium hypochlorite releases gaseous chlorine, which is highly toxic. To avoid this hazard, the design of the Power Station will ensure that there is no possibility of sulphuric acid or other acids being mixed with biocide solutions.
74. The primary concern for any releases of biocides to the environment is usually aquatic toxicity. The design of the Power Station and the management procedures set out in the Positive Contact documentation will ensure that discharge of concentrated biocide to waterways will not occur.
75. I have been informed by Contact Energy that the dosing of biocide into the cooling water will result in concentrations of biocides in the cooling tower water of less than 5 ppm, i.e. the concentrated biocide will be diluted about 200,000-fold by the cooling water.
76. The only potential route for exposure to the environment outside the cooling towers will be from the release of blowdown from the cooling towers. Blowdown will either be discharged into the condensate re-injection system, or irrigated onto farmland. The effects of this irrigation are addressed by Dr Stevenson and Dr Cameron. For the situation of re-injection, any residual components will be degraded to harmless levels long before there is any possibility of environmental exposure to ground water.

#### *Cooling tower sludges*

77. There will be a gradual build up of sludge at the base of the cooling towers. This sludge will contain contaminants including mercury and sulphides, which occur naturally in the geothermal steam. The sludge will be contained within the bunded concrete base of the towers, and there will be no opportunity for this material to escape into the environment.

78. There are two options available for the disposal of this sludge, either or both of which may be adopted once the Power Station is operational. The first option is reinjection of the sludge along with the separated geothermal water. This essentially returns this material to the source from where it came.
79. The second option is to dewater the sludge and dispose of it at an approved landfill. This process would be carried out by a specialised hazardous wastes contractor.

#### *Other hazardous substances*

80. A number of standard bottled gases such as oxygen, argon, acetylene, LPG and nitrogen may be used on site for welding, valve actuation and analytical instruments. Standard handling procedures for these bottles will be used, which will be documented in the Positive Contact system. Gas bottles will generally be stored in a workshop within the main turbine building, although some bottles not in use will be kept in a fenced storage compound, if required.
81. Small quantities (in the order of a few litres) of organic solvents, degreasers and paints will be kept in the workshop for maintenance purposes. Standard 'housekeeping' procedures will be used to avoid releases of these substances to the environment.
82. No herbicides or pesticides will be stored at the Power Station. Contractors will carry out the required application of agrichemicals, and bring on-site only sufficient quantities required for immediate use.

#### *Consent conditions*

83. To ensure that the environmental effects of hazardous substances stored, transported or used at the Power Station are no more than minor, a set of draft consent conditions have been drawn up for the land use consent sought from Taupo District Council. These draft conditions are presented in the evidence of Mr Daysh. I have been involved in the preparation of these draft conditions.

#### **Stormwater management**

84. Much of the Power Station site will be covered in grass. As the soils on the Te Mihi site are predominantly pumice, most rainfall will soak into the ground where it falls.

85. I define 'stormwater' here as rainwater that lands on roofs of buildings, roads, structures and hard stand areas which is then subsequently discharged to the environment.

*Avoidance of downstream flooding*

86. The Power Station will have in the order of 17,000 m<sup>2</sup> of impervious surfaces. These impervious surfaces will increase the volume of stormwater runoff from the footprint of the Power Station above pre-development levels.
87. Runoff from roads and other sealed surfaces will be discharged into soakpits and/or open swales, from which the stormwater will gradually soak away into the subsoil.
88. During heavy rainfall events, the volume and soakage capacity of these systems may be exceeded, and stormwater will overflow into purpose-formed overland flow paths.
89. During the detailed design of the Power Station, the storage/soakage capacity will be designed to ensure that there will be no significant increase in runoff from the site during heavy rainfall events over and above that which occurs at present (i.e. pre-development). This will ensure that there is no increase in downstream flood levels attributable to the Power Station.
90. Because there are large areas available at the site for stormwater storage and soakage facilities, I do not anticipate any difficulty in the design of a system to avoid increases in downstream flood levels.

*Stormwater quality and environmental effects on receiving waters*

91. As I have described earlier, hazardous substances will be managed in such a way as to avoid them entering the stormwater system. The relatively small volumes of treated water from the oil separator will be discharged to a soak pit, and will have an oil concentration of no more than 20 g/m<sup>3</sup>. Oil concentrations at this level will have a no more than minor effect on groundwater quality.

*Activity status under the Waikato Regional Plan*

92. Discharges of stormwater from the Power Station site into the ground and into surface waters is a permitted activity under the Waikato Regional Plan (WRP), provided that the discharges comply with the performance

standards in Sections 3.5.11.4 and 3.5.11.5 of the WRP. The key standards that are relevant to the Te Mihi situation are addressed as follows:

- the discharge does not originate from a catchment that includes a high risk facility as defined in the WRP;
  - the system will be designed to avoid increases to any downstream flooding;
  - the stormwater discharge will not contain any material which will cause the production of conspicuous oil or grease films, scums or foams, or floatable suspended materials in surface waters; and
  - stormwater will not contain concentrations of hazardous substances that would cause significant adverse effects on aquatic life or the suitability of the water for human consumption after treatment.
93. I conclude that the proposed discharge of stormwater at the Te Mihi site will meet the permitted activity requirements of the WRP.

*Stormwater management during construction*

94. On some sites, earthworks construction activities can result in erosion and sediment deposition into waterways if the activities are not well managed. The risk of this occurring at the Te Mihi construction site will be small, because the soils are free-draining pumice soils, so most rainfall will soak into the ground where it falls.
95. Nevertheless, the construction activities at Te Mihi will need to be managed in a way that avoids any risk of significant erosion or sediment-laden runoff. The contract documents for construction contracts will include requirements for contractors to follow best practice erosion and sediment control procedures, and to comply with the requirements of Environment Waikato's Erosion and Sediment Control Guidelines.
96. Furthermore, an Erosion and Sediment Control Plan will be prepared by a suitably experienced specialist in this field, to the satisfaction of Environment Waikato. Compliance with this Plan will be made a contract condition for the earthworks and drainage contractors. Measures that will be addressed in the Plan will include:
- minimising the area of the site that is stripped of vegetation and topsoil;

- temporary grassing of topsoil stockpiles (if these are to be stockpiled for periods of more than a few weeks);
  - use of silt fences etc as necessary, to slow surface runoff and trap sediment;
  - installation of cut-off drains as required to intercept stormwater runoff; and
  - construction of appropriately designed sediment ponds as necessary, to intercept and treat stormwater runoff from exposed areas.
97. If these measures are followed, the effects of stormwater runoff from the site during construction of the Power Station will be negligible.

### **Solid waste management**

98. There should be little solid waste generated at the Te Mihi site once it is operational. All wastes will be stored in covered waste receptacles and subsequently removed from the site by contractors and disposed of in a registered landfill. There will be very little putrescible wastes at the site, so there is no potential for odour from solid waste.
99. Large volumes of solid waste will be produced at the Te Mihi site during the construction of the Power Station, and during major maintenance operations. Contractors will be required to provide adequate storage for this waste material using skips or similar, and to empty these skips at an approved landfill on a regular basis.

### **Reinjection of condensate/blowdown water and separated geothermal water**

100. The main discharge into land that will be associated with the Power Station will be the reinjection of condensate/blowdown water and separated geothermal water. These discharges are either covered by existing resource consents held by Contact Energy, or have been addressed in the evidence of Dr Bromley and/or Professor O'Sullivan.

### **Irrigation of Steam Condensate and/or Cooling water Blowdown**

101. It is possible that a system will be implemented at the site for the irrigation of up to 6,500 tonnes per day of steam condensate and cooling water blowdown. The effects of this irrigation are addressed in the evidence of Craig Stevenson.

## **Dust management during construction**

102. The generation of dust during construction will be kept to a minimum by the following methods:
- the area of land that is stripped of vegetation at any one time will be kept to the minimum practical;
  - stripped areas will be sealed or replanted as soon as possible; and
  - during dry and/or windy conditions, dust generation will be minimised with use of a water cart.
103. These measures will be included within the Erosion and Sediment Control Plan for the project. Adherence to this Plan will be made one of the contract conditions for the earthworks contractors.

## **Summary of Conclusions**

104. Effects on the environment of sewage treatment and disposal at the Te Mihi Power Station will be no more than minor. Sewage will be treated to an appropriate standard before discharge into the ground. There will be no discharge of sewage to surface waters.
105. Contact Energy's Environmental Management System, including the 'Positive Contact' documentation system, will be expanded and updated to address environmental management at the Te Mihi site, particularly with respect to the management of hazardous substances.
106. All plant at the site containing hazardous substances will be bunded.
107. Rain falling into outdoor bunded areas will be drained to an oil separator. Treated water from the separator will be discharged into a soak pit.
108. Most stormwater will be discharged into soakpits. Contaminant concentrations in the stormwater will be low, and will cause negligible effects on groundwater.
109. The stormwater system will be designed with sufficient storage/soakage capacity to ensure that downstream water levels resulting from the Power Station do not exceed existing levels.

110. An Erosion and Sediment Control Plan will be prepared and implemented for the construction of the Power Station. This Plan will also address dust control during construction.

**D E Ray**

## **ATTACHMENT A**

### **Samples of Positive Contact documentation:**

CSI 03\_06\_1000: Environmental Management

CSI 09\_04\_1000: Hazardous Substances

LSI 03\_06\_2000\_geo: Geo [Geothermal] Environmental Management

09\_04\_3000\_wrk: WRK [Wairakei] Hazardous Substances: Site Plan & List of Hazardous Substances

09\_04\_3002\_GEO: Geo [Geothermal] Hazardous Substances Use



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DOCUMENT TYPE	CSI
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# ENVIRONMENTAL MANAGEMENT

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## 1 SCOPE

The purpose of this instruction is to define the procedures for managing environmental issues as they affect the Contact Energy sites, and the operation of plant.

The generation sites operate under a range of Resource Management Act (1991) authorisations. These include resource consents, existing use rights, and designation and Regional and District Plan rules for the:

- use of land, the coastal marine area, and the beds of lakes and rivers
- taking, use, damming or diverting water and heat or energy from water (or material surrounding any geothermal water)
- discharging of contaminants or water into water
- discharging of contaminants into or onto land, or into air

Section 17 of the Resource Management Act (1991) confers a general duty on every person *“to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of that person, whether or not the activity is in accordance with a rule in a plan, a resource consent, or has existing use rights”*.

Other legislation also confers environmental responsibilities upon the Contact Energy generation assets.

Contact Energy generation staff will utilise this CSI and Local Standing Instructions and the associated Procedures to help in complying with these responsibilities.

This Instruction also performs the function of the Environmental Management System Manual with respect to the standard ISO14001. The guiding principles are based on a cycle of PLAN-DO-CHECK-ACT and the expected outcome of this approach is continual improvement in environmental management.

The guiding principles are:

- Clear Focus on the environmental issues concerning Contact Energy
- Achieve effectiveness and efficiency in all areas of our business
- Provide a focus for regular review
- Continually improve environmental effects
- Operate within a consistent framework of standards and processes

The achievement of these principles is driven by the commitment to the following company environmental policy:

[Contact Energy Environmental Policy](#)

## 2 REFERENCES

1. Resource Management Act (1991)
2. ISO14001:2004
3. Regional Policy Statements (Proposed and Operative)
4. Regional Plans (Transitional, Proposed and Operative)
5. Other site specific environmental legislation
6. District Plans (Transitional, Proposed and Operative)
7. Reserves Act
8. CSI [Management Review & Auditing](#)

9. CSI [Emergency & Civil Defence](#)
10. CSI [Event Management](#).
11. Site specific LSI's
12. Site specific Procedures

### **3 WHO DOES WHAT**

#### **3.1 General Manager, Generation Operations**

- Conducts overall review of compliance with this CSI through the Management Review process
- Responsible for maintaining a master list of all consents held by Contact Energy relating to the generating sites
- Responsible for the storage of all original consent documents issued after 1992 in the fire proof safe at the Wellington office of Contact Energy
- Responsible for ensuring that appropriate resource consents are held for the generation sites.
- Responsible for the renewal of resource consents for the generation sites.
- Responsible for setting environmental objectives and KPI's for Generation Operations.

#### **3.2 Senior Environmental Advisor**

- Co-ordinate the development of the Company Environmental Policy
- Co-ordinate the annual review of the policy.
- Co-ordinate the review of the site registers of legal and other requirements annually to ensure the list is current and relevant to the sites and their environment.

#### **3.3 Generation Managers**

- Responsible for ensuring compliance with all legal environmental requirements.
- Assist with the overall review of compliance with this CSI through the Management Review process.
- Responsible for ensuring that resource consent monitoring and reporting requirements are met
- Responsible for developing, where appropriate, a site specific "Environmental Management" LSI and supporting documents for each generation site to ensure:
  - compliance within the scope of this CSI and Contact Energy's Environmental Policy.
  - compliance with the requirements of the Resource Management Act (1991).
  - mitigation measures relating to discharge of contaminants exist, and that the LSI is complied with. (See CSI [Emergency & Civil Defence](#).)
  - All Environmental related legislation is identified, and processes to ensure compliance are effective.
- Establishing site specific Environmental Objectives and Targets.

#### **3.4 Team Leaders**

- Responsible for ensuring that all generation staff members and contractors are familiar with this CSI.
- Responsible for ensuring compliance with local LSI's and Procedures.
- Responsible for the development of appropriate work procedures and ensure that staff are trained in their use.

- Responsible for ensuring that staff are trained in the principles of the Resource Management Act (1991), and the site specific consent conditions.
- Responsible for ensuring that instances of breach or potential breach of the Resource Management Act 1991 or resource consent conditions are identified and reported through the [Event Management System](#) (CSI 07-01-1000 [Event Management](#))
- Responsible for ensuring that potential environmental hazards are identified and reported through the [Event Management System](#) (CSI 07-01-1000 [Event Management](#))
- Review instances of breach or potential breach of the Resource Management Act 1991 and potential environmental hazards, and take action where appropriate
- Ensure contract documentation specifies the responsibilities of Contractors in regard for the requirements of this CSI and relevant LSI.

### **3.5 Environmental Focus Group for each Contact Energy Facility**

The Environmental Focus Group or assigned individuals will:

- Identify the activities, products or services that occur at that facility
- Identify the Environmental Aspects of these impacts
- Identify the Environmental Impacts these will have on the environment
- Evaluate the Environmental Aspects using the Aspects Rating Criteria
- Review the Environmental Aspects
- Re-evaluate the Significant Aspects
- Develop draft Objectives and Targets from these Significant Environmental Aspects or from non significant aspects where environmental improvements can be made.

### **3.6 All Employees**

- Every Contact Energy employee has a duty *“to avoid, remedy, or mitigate any adverse effect on the environment”*. This duty will be discharged through appropriate training, work practices and event reporting
- Instances of breach or potential breach of the Resource Management Act 1991 shall be identified and reported through the [Event Management System](#) (CSI 07-01-1000 [Event Management](#)). It is the responsibility of every generation employee to report such events
- All employees are required to comply with this CSI, and site specific Environmental Management LSI's and Procedures.
- Employees shall ensure that Contractors and other persons working at Contact Energy sites undertake such works in accordance with this CSI and relevant LSI.

## **4 WHAT MUST BE KNOWN**

Before undertaking activities that could potentially have adverse environmental affects, all staff members shall make themselves familiar with the principles of the Resource Management Act (1991), and the specific consents that relate to the site where the activity is to be carried out. They shall also make themselves familiar with the relevant CSIs, LSI's, and site specific Procedures that relate to the activity to be undertaken.

## **5 WHAT MUST BE DONE**

- Every Contact Energy generation staff member shall undertake activities in accordance with the relevant CSI's, LSI's, and site specific Procedures. They shall undertake those activities in a manner that shall avoid, remedy, or mitigate any adverse effect on the

environment. They shall be trained in the principles of the Resource Management Act (1991), comply with the requirements of the Act, and the consents specific to the site.

- Instances of breach or potential breach of the Resource Management Act (1991) shall be identified and reported through the [Event Management System](#) (CSI 07-01-1000 [Event Management](#)). It is the responsibility of every generation staff member to report such events.
- A site specific LSI shall be developed for each Contact Energy generation site where appropriate. The format and content of these site specific LSI's should consider but not necessarily include or be confined to the following:

#### **Section 1 Scope**

Includes:

- Brief description of the scope of the LSI, including the specific sites covered

#### **Section 2 References**

Includes:

- Relevant related documents including CSIs, site specific Procedures, resource consents, District plans etc.

#### **Section 3 Definitions**

Includes

- Definition of any abbreviations or idioms used in the text.

#### **Section 4 Who Does What**

Includes:

- Definition of who is responsible for the various activities covered by the LSI. It is preferable that their position title rather than their name identify those responsible.

#### **Section 5 What Must Be Known**

Includes:

- Any specific issues relating to the site, resource consents held, related documents, etc

#### **Section 6 What Must Be Done**

Includes:

- Administration, record keeping and general house keeping procedures
- Resource consent compliance monitoring requirements and procedures
- Resource consent reporting requirements
- Mitigation requirements relating to the discharge of contaminants
- Identification and Management process for environmental aspects.

## **6 ISO14001 SYSTEM REQUIREMENTS**

### **6.1 General Requirements**

That Contact Energy shall develop and maintain an Environmental Management System (EMS) for each of its generating sites that will fulfil the requirements defined in this section.

## **6.2 Environmental Policy**

Contact Energy's environmental policy is displayed on the [Contact Energy Public Website](#) and also contained within the companies environmental annual report.

Three key areas covered are:

- Commitment to comply with the relevant environmental legislation and regulations
- Prevention of pollution
- Commitment to continual improvement

### **Related Document Reference**

[Environmental Policy Development and Review](#) (03\_06\_3003)

## **6.3 Planning**

### **6.3.1 Environmental Aspects**

The [Environmental Aspect Identification and Significance](#) (03\_06\_3004) procedure identifies the environmental aspects and determines which have or can have the potential for significant environmental impacts.

Individual sites environmental aspects registers will be made available to the public on request.

### **Related Document References**

- [Asset Identification](#) (03\_03\_1000)
- [Environmental Management](#) (03\_06\_1000)
- [Contract Administration](#) (09\_02\_1000)

### **6.3.2 Legal and Other Requirements**

A fundamental goal of Contact Energy's Environmental Policy is to comply with environmental legislation and resource consents. Individual sites have procedures and records that define the processes used to identify the legal and other applicable requirements and ensure they are current and accessible.

### **Related Document References**

- [Hazard Management](#) (03\_08\_1000)
- [Hazardous Substances](#) (09\_04\_1000)
- [Event Management](#) (07\_01\_1000)
- [Environmental Management](#) (03\_06\_1000)
- [Compliance Manual](#)
- [Compliance Updates](#)
- [Positive Contact Management](#) (10\_05\_1000)

### **6.3.3 Objectives and Targets**

Environmental Objectives and Targets are established and documented. These are consistent with Contact Energy's Environmental Policy and are designed to minimise

environmental impacts. Regular reviews are carried out to facilitate continual improvement in environmental performance of the individual sites.

### **Related Document References**

- [Environmental Objectives and Targets Management](#) (03\_06\_3007)
- [Management Review & Auditing](#) (10\_03\_1000)
- [Work Control](#) (03\_04\_1000)
- [Asset Identification](#) (03\_03\_1000)

### **6.3.4 Environmental Management Programme(s)**

Contact has a number of processes in place for establishing and maintaining programmes for achieving its environmental objectives and targets. These programmes designate the responsibility for achieving objectives and targets and the means and time frame by which they are to be achieved. The processes designed and used to manage environmental programmes are:

- For environmental objectives with simple actions, the [Environmental Objectives and Targets form](#) is used.
- For process actions arising from customer feedback, staff, events, audits and exercises, the [Event Management System](#) and Process Improvement Actions database is used.
- Environmental objectives which require a more detailed management programme are managed within the processes outlined in the [Project Management and Modification Control](#) CSI.

The status of the environmental programmes are reviewed at the monthly management meeting to ensure the action plan deadlines are consistently achieved.

### **Related Document References**

- [Work Control](#) (03\_04\_1000)
- [Maintenance Strategies](#) (03\_01\_1000)
- [Project Management and Modification Control](#) (03\_02\_1000)
- [Corrective & Preventative Action](#) (10\_02\_1000)
- [Management Review & Auditing](#) (10\_03\_1000)
- [Training & Development](#) (13\_01\_1000)
- [Purchasing](#) (09\_01\_1000)
- [Hazardous Substances](#) (09\_04\_1000)
- [Environmental Management](#) 03\_06\_1000

## **6.4 Implementation and Operation**

### **6.4.1 Structure and Responsibility**

Roles and responsibilities for implementation, maintenance and reporting on the performance of the EMS are defined in the various components of the EMS. The EMS elements within Section 3 of this manual reference the documents which outline the roles and responsibilities.

## 6.4.2 Training, Awareness and Competence

Training needs are identified for personnel whose work may create a significant impact upon the environment. These personnel receive the appropriate training.

Generation sites maintain procedures to ensure their employees and contract staff are aware of:

- The importance of conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- The significant environmental effects, actual or potential, of their work activities and the benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy, procedures and with the requirements of the EMS, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures.

### Related Document Reference

[Training & Development](#) (13\_01\_1000)

## 6.4.3 Communication

The Positive Contact document management system is readily accessible to all staff through the Intranet.

Contact has developed read access ability to all staff for the following environmental management related systems and processes:

- [Event Reports and Investigations](#)
- [Audit reports and annual audit plan](#)
- [Process Improvements Actions](#)
- [Compliance Manual](#)
- [Compliance Updates](#)
- Environmental Objectives and Targets
- Company goals
- Management Review Minutes

Regular meetings are held where performance against quality objectives and KPI's are communicated to staff.

Contact Energy's annual environmental report, which includes the policy, is available to the public by hardcopy report or from the company's web site at [www.mycontact.co.nz](http://www.mycontact.co.nz). The report outlines the generation sites significant environmental aspects and the company's environmental performance.

The generating sites manage complaints received from interested parties and the public through the [Event Management System](#). Generation sites have procedures for receiving, documenting and responding to relevant communication from external interested parties.

### Related Document References

- [Work Control](#) (03\_04\_1000)
- [Equipment limitation Notice](#) (05\_07\_1000)

- [Operational Information Storage](#) (05\_08\_1000)
- [Event Management](#) (07\_01\_1000)
- [Record Management](#) (10\_01\_1000)
- [Corrective & Preventative Action](#) (10\_02\_1000)
- [The Log](#) (05\_03\_1000)

#### **6.4.4 Environmental Management System Documentation**

The core elements of the environmental management system, their interaction and relationship to related documents are defined within this manual.

##### **Related Document References**

- [Positive Contact System Manual](#) (00\_00\_1000)
- [Positive Contact Management](#) (10\_05\_1000)

#### **6.4.5 Document Control**

The Positive Contact system to manage documents (SMD) is based on Contact's standard desktop with an Intranet front end. It permits the electronic creation, modification, review and archiving of documents. Key word searches of all Issued documents is available and all documents can be searched by plant code and file reference. Users can browse for Draft, Issued or Archived documents by business process. Issuing and archiving of documents, and updating of document information is controlled by the Site Management System Co-ordinators.

##### **Related Document References**

- [Record Management](#) (10\_01\_1000)
- [Positive Contact Management](#) (10\_05\_1000)
- [Drawings Document Management](#) (10\_06\_1000)
- [Contract Drawings Documentation](#) (10\_07\_1000)

#### **6.4.6 Operational Control**

Operations and activities that are associated with the identified significant environmental aspects have been identified. Refer [Environmental Aspect Identification & Significance](#) Documented procedures cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets. Operating criteria are stipulated in the procedures.

Documented procedures are also in place to control the identifiable significant environmental aspects of goods and services used by the organisation. Where necessary the relevant procedures and requirements are communicated to suppliers and contractors.

##### **Related Document References**

- [Maintenance Strategies CSI](#) (03\_01\_1000)
- [Positive Contact Management](#) (10\_05\_1000)
- [Positive Contact System Manual](#) (00\_00\_1000)
- [Work Control CSI](#) (03\_04\_1000)
- [Environmental Management CSI](#) (03\_06\_1000)

- [Pressure Equipment & Cranes Management](#) (03\_07\_1000)
- [Hazard Management CSI](#) (03\_08\_1000)
- [Compliance Testing of Equipment](#) (03\_09\_1000)
- [Project Management and Modification Control](#) (03\_02\_1000)
- Operational and maintenance procedures
- [Permit System CSI](#) (05\_01\_1000)
- [Plant Outage Planning CSI](#) (05\_02\_1000)
- [The Log CSI](#) (05\_03\_1000)
- [Trading and Dispatch CSI](#) (05\_04\_1000)
- [Dispatch Revenue CSI](#) (05\_06\_1000)
- [Equipment Limitation Notice CSI](#) (05\_07\_1000)
- [Operational Information Storage CSI](#) (05\_08\_1000)
- [Event Management CSI](#) (07\_01\_1000)
- [Employer Licence CSI](#) (12\_01\_1000)
- [HSE Management System](#) (12\_03\_1000)
- [Compliance Manual](#)
- [Compliance Updates](#)
- [Training & Development](#) (13\_01\_1000)
- [Contract Administration](#) (09\_02\_1000)
- [Purchasing](#) (09\_01\_1000)
- [Storage, Handling & Supply](#) (09\_03\_1000)
- [Hazardous Substances](#) (09\_04\_1000)

#### **6.4.7 Emergency Preparedness and Response**

Procedures have been established to identify potential for and response to accidents and emergency situations, and for preventing and mitigating the environmental impacts that may be associated with them. These are regularly reviewed and revised where necessary. A review is undertaken after the occurrence of accidents or emergency situations.

Generation sites periodically tests such procedures where practicable.

#### **Related Document References**

- [Emergency & Civil Defence](#) (12\_02\_1000)
- [Environmental Management](#) (03\_06\_1000)
- [Event Management CSI](#) (07\_01\_1000)
- [Corrective and Preventative Action](#) (10\_02\_1000)
- [Project Management and Modification Control](#) (03\_02\_1000)
- [Contract Administration](#) (09\_02\_1000)
- [Training & Development](#) (13\_01\_1000)
- [Storage, Handling & Supply](#) (09\_03\_1000)

### **6.5 Checking and Corrective Action**

#### **6.5.1 Monitoring and Measurements**

Documented procedures are in place to monitor and measure, on a regular basis, the key characteristics of our operations and activities that can have a significant impact on the environment. This includes the recording of information:

- To track performance
- On relevant operational controls
- On conformance with the generating site's environmental objectives and targets

Monitoring equipment is calibrated and maintained and records of this process is retained according to Contact Energy's procedures.

Internal auditing is programmed to evaluate compliance with relevant environmental legislation and regulations.

#### **Related Document References**

- [Operational Information Storage](#) (05\_08\_1000)
- [The Log](#) (05\_03\_1000)
- [Management Review and Auditing](#) (10\_03\_1000)
- [Event Management](#) (07\_01\_1000)
- [Record Management](#) (10\_01\_1000)
- [Equipment Limitation Notice](#) (05\_07\_1000)
- [Test Equipment & Calibration](#) (03\_05\_1000)
- [Compliance Testing of Equipment](#) (03\_09\_1000)
- [Compliance Manual](#)
- [Compliance Updates](#)
- [Operational Key Performance Indicators](#) (10\_04\_1000)

#### **6.5.2 Evaluation of Compliance**

Generation sites have procedures for periodically evaluating compliance for both legal environmental requirements and other applicable requirements.

Records are kept and the results are considered during management reviews.

#### **Related Document References**

- [Management Review and Auditing](#) (10\_03\_1000)

#### **6.5.3 Non-conformance and Corrective and Preventative action**

Procedures have been established for defining responsibility and authority for handling, investigating non-conformance, taking action to mitigate any effects caused and for initiating and completing corrective and preventative action.

#### **Related Document Reference**

- [Event Management](#) (07\_01\_1000)
- [Corrective and Preventative Action](#) (10\_02\_1000)
- [Work Control](#) (03\_04\_1000)
- [Positive Contact Management](#) (10\_05\_1000)

#### 6.5.4 Records

Procedures are established for the identification, maintenance, and disposition of environmental records. These records include training records and the results of audits and reviews.

##### Related Document References

- [Record Management](#) (10\_01\_1000)
- [Drawings Document Management](#) (10\_06\_1000)
- [Positive Contact Management](#) (10\_05\_1000)
- [Management Review & Auditing](#) (10\_03\_1000)
- [Operational Information Storage](#) (05\_08\_1000)
- [The Log](#) (05\_02\_1000)

#### 6.5.5 Environmental Management System Audit

The CSI [Management Review & Auditing](#) requires that audits are carried out to confirm compliance with this CSI and the ISO14001 standard.

##### Related Document References

- [Management Review and Auditing](#) (10\_03\_1000)
- [Positive Contact Management](#) (10\_05\_1000)
- [Corrective and Preventative Action](#) (10\_02\_1000)
- [Record Management](#) (10\_01\_1000)

#### 6.5.6 Management Review

Periodic reviews of the Environmental Management System are required to assess its ongoing suitability and effectiveness in achieving continuous environmental improvement.

The Generation Operations Management Team regularly reviews the environmental management system, to ensure its continuing suitability, adequacy, and effectiveness.

The management review addresses the possible need for changes to policy, objectives, and other elements of the Environmental Management System, in the light of environmental system audit results, changing circumstances and the commitment to continual improvement.

##### Related Document References

- [Management Review and Auditing](#) (10\_03\_1000)
- [Record Management](#) (10\_01\_1000)
- [Positive Contact Management](#) (10\_05\_1000)

Ref	CSI Description	Relevant ISO 14001:2004 Clauses
	<b>Manage Assets</b>	
03_01_1000	Maintenance Strategies	4.3.4
03_02_1000	Project Management and Modification Control	4.3.4, 4.4.1, 4.4.7
03_03_1000	Asset Identification	4.3.1, 4.3.3
03_04_1000	Work Control	4.3.3, 4.3.4, 4.4.3, 4.5.1, 4.5.2
03_05_1000	Test Equipment & Calibration	4.5.1
03_08_1000	Hazard Management	4.3.2, 4.4.1, 4.4.6
03_09_1000	Compliance Testing of Equipment	4.5.1
	<b>Trade and Dispatch</b>	
05_01_1000	Permit System	4.4.6
05_02_1000	Plant Outage Planning	4.4.6
05_03_1000	The Log	4.4.3, 4.4.5, 4.5.1, 4.5.3
05_07_1000	Equipment Limitation Notice	4.4.3, 4.5.1
05_08_1000	Operational Information Storage	4.4.3, 4.4.5, 4.5.1, 4.5.3
	<b>Provide Legal Services</b>	
07_01_1000	Event Management	4.3.2, 4.4.1, 4.4.3, 4.4.5, 4.4.7, 4.5.1, 4.5.2
	<b>Manage Procurement</b>	
09_01_1000	Purchasing	4.3.4, 4.4.6
09_02_1000	Contract Administration	4.3.1, 4.4.1, 4.4.7
09_03_1000	Storage, Handling & Supply	4.4.6, 4.4.7
09_04_1000	Hazardous Substances	4.3.2, 4.3.4, 4.4.6
	<b>Manage Information</b>	
10_01_1000	Record Management	4.4.1, 4.4.3, 4.4.5, 4.5.1, 4.5.3, 4.5.4, 4.6
10_02_1000	Corrective and Preventative Action	4.3.4, 4.4.3, 4.4.7, 4.5.2, 4.5.4
10_03_1000	Management Review & Auditing	4.4.1, 4.4.5, 4.5.1, 4.5.3, 4.5.4, 4.6, 4.5.5
10_04_1000	Operational Key Performance Indicators	4.5.1
10_05_1000	Positive Contact Management	4.3.2, 4.4.1, 4.4.4, 4.4.5, 4.4.6, 4.5.2, 4.5.3, 4.5.4, 4.6
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	<b>Manage Facilities/Administration</b>	
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12_03_1000	Workplace Health & Safety	4.4.1, 4.4.6
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13_01_1000	Training & Development	4.3.4, 4.4.1, 4.4.2, 4.4.6, 4.4.7
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# HAZARDOUS SUBSTANCES

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## 1 SCOPE

This document describes procedures for control of hazardous substances used by Contact Energy staff and contractors. These controls are designed to protect the environment & health & safety of people & communities by preventing or managing the adverse effects of hazardous substances.

## 2 DEFINITIONS

A **hazardous substance** is any substance, or product containing a substance, to be used or produced in a workplace that is known or suspected to cause harm to people or the environment. Under the HSNO Act a substance is deemed hazardous if it exceeds the regulatory threshold for one or more of the following properties:

- Explosiveness
- Flammability
- Ability to oxidise
- Corrosiveness
- Toxicity
- Ecotoxicity

Further information regarding what is a hazardous substance can be found in the following documents:

- Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001
- Toxic Substances Regulations 1983
- The Resource Management Act 1991
- Regional and District Plans
- Workplace Exposure Standards publications.  
<http://www.osh.govt.nz/order/catalogue/pdf/wes2002.pdf>

### SDS – Safety Data Sheet

ERMANZ – Environmental Risk Management Authority New Zealand

## 3 REFERENCES

### ***3.1 Acts, Regulations, Standards and Codes of practice:***

- Health and Safety in Employment Act 1992, Regulations 1995, and Amendments Act 2002.
- Resource Management Act (1991).
- Fire Safety and Evacuation of Buildings Regulations 2006.
- Hazardous Substances and New Organisms Act 1996, Regulations 2001, and guidance notes.
- NZS 5433:2007 “Transport of Hazardous Substances on Land”
- Approved Code of Practice for the Management of Substances Hazardous to Health in the Place of Work (July 1997) (the MOSHH Code).
- Working Safely with Hazardous Substances – Advice for Employees.
- AS/NZS 1596:2002 The storage and handling of LP Gas.
- AS 1940:1993 The storage and handling of flammable & combustible liquids

- AS 4326:1995 The storage & handling of Oxidising Agents
- AS/NZS 4452:1997 The storage and handling of Toxic Substances
- AS 3780:1994 The storage and handling of corrosive substances
- NZS 8409:1999 Approved Code of Practice for the management of agrichemicals
- AS/NZS 3833: 2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers.
- Signage for premises storing Hazardous Substances & Dangerous Goods 2004 Approved Codes of Practice Under HSNO Act 1996 produced by NZCIC which incorporates Signage, Safety Data Sheets and Labeling
- Guide on Sources of Ignition where Dangerous Goods are Present published by Explosives and Dangerous Goods Occupational Safety and Health Service Department of Labour 1986

### 3.1.1 Legal Implications for Breaching the HSNO Act – What must be known

All persons operating under the HSNO Act and HSNO CSI must be made aware of the financial implications for failing to comply with ERMENZ:

\$500,000 in the case of an individual per breach, and \$50,000 per day there after for continuing contravention, and

\$10 million per breach for a company and three times any commercial gain made per contravention or 10% of the company's annual turnover if commercial gain from the contravention(s) cannot be determined.

These do not void any civil liabilities which may result from the act of contravention.

### 3.2 Positive Contact

- [Compliance Manual – Compliance Summaries](#)
- [Positive Contact Manual](#) (00\_00\_1000)
- [Purchasing CSI](#) (09\_01\_1000)
- [Contract Administration CSI](#) (09\_02\_1000)
- [Environmental Management CSI](#) (03\_06\_1000)
- [Event Management CSI](#) (07\_01\_1000)
- [Storage, Handling and Supply CSI](#) (09\_03\_1000)
- [Training & Development CSI](#) (13\_01\_1000)
- [Emergency & Civil Defence](#) (12\_02\_1000)
- [HSE Management System CSI](#) (12\_03\_1000)
- [Security](#) (11\_01\_1000)
- [Project Management & Modification Control CSI](#) (03\_02\_1000)

## 4 WHO DOES WHAT

### 4.1 Team Leaders/Managers

- Duties as referred to under the [HSE Management System CSI](#) (12\_03\_1000) plus:
- Ensure that appropriate team members are trained and certified as “Approved Handlers” (if applicable) where hazardous substances are stored in quantities above “trigger levels” stipulated in HSNO Regulations.

- Ensure there are procedures for dealing with emergencies that may arise in the use of hazardous substances and that employees are competent in their use.

#### **4.2 All Team Members & Contractors**

- Duties as referred to under the [HSE Management System CSI](#) (12\_03\_1000).

#### **4.3 Person in Charge**

(Person in control where Hazardous Substances are present)

- The Generation Site Manager will be designated as the person ultimately in charge and responsible for ensuring the hazardous substances under their control are correctly managed and the environment and health and safety of people are not adversely affected. The specific requirements are detailed throughout the hazardous substances regulations. The person in charge must ensure persons handling chemicals maintain specified controls are in place and standard operating procedures are being followed, for example
  - Hazardous substance locations are established
  - A Location Test Certificate is obtained where needed
  - Hazardous atmosphere zones are established and sources of ignition are managed
  - Incompatible substances are segregated
  - Approved Handlers are appointed for the substances they handle
  - Where necessary Test Certificates are obtained for Stationary Container or Storage systems
- Must ensure reviews take place yearly to ensure all site certificates or licenses required for the use & storage of hazardous substances are current and displayed in a prominent position.
- Must ensure that the storage of hazardous substances on site meet all regulatory requirements e.g. Site signage, tank/vessel storage, security, "Hazardous Atmosphere Zones", segregation requirements are met, secondary containment
- Must ensure that all hazardous information, handling/emergency management/disposal procedures are up to date & available to staff at all times
- Must ensure staff receive the necessary training & are provided with the necessary equipment to handle hazardous substances on site.
- Must ensure any other regulatory requirement that applies is carried out e.g. Tracked substances are managed, extra qualifications for handlers are obtained, chemical registers are updated, changes to regulations are implemented as required.
- Must be available to assist in the event of an emergency involving a significant hazardous substance spill
- The person in charge for each site is identified in the relevant site management system manual 00\_00\_2000\_xxx

#### **4.4 Approved Handlers**

- An approved handler is a person who is competent and certified to handle certain hazardous substances. To become an Approved Handler you must meet the requirements of the Hazardous Substances and New Organisms (Personnel Qualifications) Regulations 2001.
- An approved handler must make sure certain hazardous substances are handled safely and that they do not cause harm to people, nor damage to the environment.
- Approved Handlers provide guidance and support to other people who are not Approved Handlers that may be handling hazardous substances.
- Approved handlers are certified by an ERMENZ approved Test Certifier
- An Approved Handler is required if Hazardous Substance volumes exceed the limits as set out in Appendix 2.

### **5 WHAT MUST BE KNOWN AND DONE**

#### **5.1 Identification (SDS, Labeling & Signage)**

- Sites with Hazardous Substances must comply with the regulatory requirements e.g. in New Zealand Hazardous Substances (Identification) Regulations 2001. Key points are as follows:
  - Where hazardous substances are located on site, a register of such substances must be established & maintained along with a site plan that indicates the location of where hazardous substances are held and if a Hazardous Atmospheric Zone exists. The person responsible for maintaining the register and site location map is defined in the relevant site management system manual. (00\_00\_2000\_xxx) The register needs to include the following information:
    - Labeling information as per below
    - The quantity held on site
    - Location on site if more than one location exists for storing Hazardous substances

##### **5.1.1 Safety Data Sheets (SDS)**

- An SDS must be obtainable for all substances used on site within 10 minutes.
  - Each SDS must provide:
    - the hazardous components of the product;
    - the health effects of the hazardous substances and first aid instructions;
    - precautions to follow when using the product;
    - Safe handling, storage and disposal information.
    - Emergency response information
- All new substances introduced to site must be accompanied by an SDS for the chemical regardless of quantity.
- SDS's for hazardous substances must be kept up to date. These should be reviewed at intervals not exceeding 2 years.
- All SDS must reference HSNO Act 1996 by the 1<sup>st</sup> July 2008.

### 5.1.2 Labeling

All containers of hazardous substances used or handled on site must be labeled in compliance with HSNO Regulations / Dangerous Goods Act. Labels shall provide the name of the substance and one or more of the following:

- UN number
  - CAS number
  - Haz-Chem number
  - Dangerous Goods classification diamond/pictogram
  - Hazardous Substance Class & subclasses (if applicable)
- 
- If a container that does not have a label or is improperly labeled is found, action should be taken to correctly label the container. If contents are unknown, the container should be marked "Caution do not use unknown substance" and forwarded to the appropriate person for identification and suitable disposal if required.
  - All suppliers of chemicals for use on Contact Energy sites will be required to supply an SDS for all new chemical deliveries according to ERMENZ guidance notes. No new substance delivery can be accepted without this documentation being provided, or where there has been a substance supplier change.
  - Regular inspections are to be performed to check that chemicals are correctly labeled by suppliers.

### 5.1.3 Site Signage

- Where hazardous substances are located or stored permanently on site signage must meet or exceed the code of practice Signage for storing Hazardous Substances and Dangerous Goods issued by the NZ Chemical Industry Council Inc. 2004.
- In New Zealand a site will require signage if the quantity of a Hazardous Substance exceeds a certain amount. As a guide see Appendix 5 Hazardous substances signage (NZ only)
  - Key points include
    - As an absolute minimum a sign at the entrance should indicate who to contact in an emergency with a contact phone number.
    - Requirements from the local fire service need to be considered when carrying out signage of the site.

## 5.2 Transport, Packaging & Disposal

- Sites with Hazardous Substances must comply with the regulatory requirements e.g. in New Zealand the NZS 5433:2007 "Transport of Hazardous Substances on Land", the Storage, Handling & Supply CSI, Hazardous Substances (Disposal) Regulations 2001 and Hazardous Substances (Packaging) Regulations 2001. Key points are as follows:
  - Under most situations Contact Energy takes delivery of hazardous substances in packages supplied from others. It cannot be assumed that chemicals will arrive on site in a compliant form and regular checks are to be undertaken to ensure suppliers are packaging goods in a fit and safe state for storage and use on site, this includes the state of the container and labeling on the container.

- When hazardous substances are transferred into other containers on site the following requirements must be adhered to:
  - The container into which the hazardous substance has been transferred must be compatible with that substance. E.g. must be the correct packing group number
  - The contents must be clearly labeled to identify the substance as per labeling above.
- All hazardous substances being transported from site must comply with the required regulations. Each site may develop their own procedure to ensure compliance to these requirements is being met.
- Hazardous Substances and empty containers that have held hazardous substances must be disposed of in accordance to information as specified in the SDS for that substance.
- Only licensed disposal contractors will be permitted to transport or dispose of hazardous substances or wastes from site.

### **5.3 Emergency Management**

- Sites storing & using Hazardous Substances must comply with the Hazardous Substances (Emergency Management) Regulations 2001. Key points are as follows:
  - Where hazardous substances are located on site there is a requirement to establish emergency management plans or procedures. The extent of the plan will be dependent on the risk the hazardous substance concerned exerts on the environment & people. Methods for containment, clean up & disposal must be established. Staff must be competent to carry out these plans in an emergency.

### **5.4 Storage of Hazardous Substances**

- Sites with Hazardous Substances must comply with the regulatory requirements e.g. in New Zealand - Hazardous Substances and New Organisms (Personnel Qualifications) Regulations 2001, Hazardous Substances (Tracking) Regulations 2001, Hazardous Substances (Controls 1-9), Hazardous Substances (Bulk storage tanks for Liquid Hazardous Substances) Regulations 2001 and Hazardous Substances (Compressed Gases) Regulations 2001. Key points are as follows:
- Hazardous Substances need to be stored in accordance with local or ERMENZ guidance notes and regulations.
  - Sites may require a Location Certificate to be obtained.
  - Sites may require team members to have Approved Handlers certificates, team members who are approved handlers must be tested by a registered ERMENZ Test Certifier
  - Correct segregation must be employed at all times and displayed in storage areas.
  - Tanks need to be designed and installed to meet the necessary requirements for the Hazardous Substance they will contain.
  - Tanks containing hazardous substances over a certain level require level gauges that indicate when the tank is full
  - Secondary containment will be applied to all substances in storage according to regulatory requirements and standards.
  - No extraneous items are to be placed in the secondary containment area, to prevent a reduction in the total pooling potential capacity, and cross reactivity.
  - Secondary containment systems must be engineered of a compatible material to the substance being contained.

- The correct environmental conditions need to be established and maintained for the type of Hazardous Substance being stored e.g. temperature, humidity, ignition sources. If the substance requires a hazardous atmosphere zone to be maintained then these controls will need to be implemented & this area will need to be identified on the site map.
- Correct signage must be established and installed in accordance with the ERMENZ guidance notes.
- Ventilation and building construction materials must be fit for purpose
- Safety and protective equipment must be provided and used with appropriate training by certified handlers, eg full face shields, aprons, BA units, emergency alarms, safety showers or fire extinguishers, smoke detectors
- Tanks containing hazardous substances above the threshold levels must have current certification see Appendix 3.
- Access to storage areas may need to be controlled e.g. for tracked substances and substances that require approved handlers to be present.
- Records of usage rates for some substances may need to be established e.g. tracked substances
- If there is a requirement to certify a tank or process vessel then keeping a separate file for the vessel would assist in certification. Information to include in the file would be:
  - Tank Drawing
  - Tank Manufacturer & design information
  - Inspections carried out on the vessel
  - Material type & compatibility with hazardous substance info.
  - Maintenance & or modifications carried out on the vessel
- Where hazardous substances are located on site all team members or contractors must receive an understanding of their hazardous nature & be made aware of the dangers they impose. This is generally communicated through the site induction process.
- Bulk storage of hazardous substances in tanks require inspections on regular intervals to ensure equipment is in satisfactory order. Some tanks may require certificates under certain circumstances. See Appendix 3
- Sites storing certain hazardous substances in certain quantities may be required to obtain a premises license or Location certificate for those substances. See Appendix 1
- Qualifications & Certificates: Certified Approved Handlers must be reassessed for competence (in-house) at intervals no greater than two years and recertified by an ERMENZ approved Test Certifier at intervals no greater than five years.

### ***5.5 Site Review and Inspections***

- A review of the Hazardous Substances contained on site must be carried out at frequencies as indicated in the table below by a competent person trained or experienced in the knowledge of hazardous substances.

Description	Review Frequency
<u>Site Certificates</u> <ul style="list-style-type: none"> <li>• Location are current</li> <li>• Approved Handlers are current (New Staff)</li> <li>• Tank Certificates are current</li> </ul>	<ul style="list-style-type: none"> <li>• Yearly</li> </ul>
<u>Site Inspections</u> <ul style="list-style-type: none"> <li>• Hazardous Substance storage areas are tidy &amp; appropriate</li> <li>• Vessels &amp; equipment containing Hazardous Substances are inspected</li> </ul>	<ul style="list-style-type: none"> <li>• Yearly</li> <li>• Every 5 years</li> </ul>
<u>Administrative</u> <ul style="list-style-type: none"> <li>• SDS sheets are current &amp; relevant</li> <li>• Site Signage checked for condition &amp; relevancy</li> <li>• Hazardous Atmospheric zones adequate</li> <li>• Site Register is current</li> <li>• Site plan map is current</li> <li>• Protective handling equipment is available, in good condition &amp; relevant for job</li> <li>• Handling, Emergency &amp; disposal Procedures are up to date, available &amp; relevant</li> <li>• Emergency information is up to date, available &amp; relevant</li> <li>• Hazardous Substances are segregated correctly</li> <li>• Staff training in Hazardous Substances is being carried out &amp; is relevant</li> <li>• All excess chemicals surplus to requirements are disposed of</li> </ul>	<ul style="list-style-type: none"> <li>• Every 2 years</li> </ul>

### 5.6 Introducing a new Hazardous Substances to site

- Before any potentially hazardous substance can be purchased or brought onto site, the person responsible for the hazardous substance must ensure there is not a less, non-hazardous alternative available. It is strongly recommended that advice be sought before introducing a new hazardous substance from staff with knowledge & understanding of hazardous substances.
- At the time of requesting a new substance to site either by placing a requisition or other means, the person responsible for the hazardous substance must:
  - Ensure SDS is held in location of substance in hardcopy format
  - ensure that the minimum quantity only is obtained
  - ensure they complete the [hazardous substance evaluation check sheet](#) (09\_04\_5000) prior to the substance arriving
  - ensure that all controls identified as applicable for this substance are implemented or being implemented prior to the substances arrival.

- When the hazardous substance is received on site, the Team Member responsible for the hazardous substance must ensure that it is stored correctly and that all controls identified in the [hazardous substance evaluation check sheet](#) are completed.
- Where appropriate, on completion of work using the hazardous substance, the Team Member responsible for purchasing the hazardous substance must ensure that all containers, residue, excess quantities remaining and rags are correctly disposed of and the SDS database & site registers are updated if required.

## 6 RECORDING, REPORTING & COMMUNICATION

- Completed substance evaluation forms are to be filed in the appropriate site filing system.
- New substances introduced to site must be added to the appropriate registers & databases
- SDS's for new and existing substances must be updated & filed appropriately.
- Some hazardous substances require tracking under certain regulations. If this is the case then a tracking register will need to be established and kept up to date for that substance. Substances that require tracking are identified in Appendix 4
- A review of the Hazardous Substances held on site needs to be carried out as per section 5.5 above. Records of these reviews must be filed.
- Managers, Team Members and Contractors must be informed when new substances have been introduced to site that may introduce a significant new hazard and compromise the health and safety of employees.
- Records of training carried out for employees with regards to hazardous substances must be filed.
- If there is a requirement to inform the Local regulatory authority and or emergency services of a new substance introduced to site then records of this communication must be filed.
- 

### 6.1 *Trigger Level*

Total volume of substance must not exceed those volumes outlined in appendices 1. Seek advice from an ERMENZ approved test certifier where uncertainty exists in a situation. Certifier approved handlers will hold the contact details for these on site.

Any chemistry contractors bring on to Contact sites may add to the aggregate volume or add significant new chemistry to levels may also trigger additional requirements for Location Certification, Tank Certification or Approved Handler. This must be assessed during the 24 hour approval phase to their being allowed to bring such chemistry on site. It is the responsibility of the contract manager and an appropriate authority receiver to ensure compliance is maintained at all times.

## APPENDIX 1 HAZARDOUS SUBSTANCES THAT REQUIRE SITE LOCATION CERTIFICATES (NZ ONLY)

Refer to table 4 of Schedule 3, table 1 & 2 Schedule 4 and table 1 Schedule 5 (Classes 1-5 Controls) Regulations 2001

This table was last updated: 12 March 2008

Hazard Classification	Quantities
<u>Explosives</u>	
1.1 – 1.4	Not Applicable to Contact Energy Sites
<u>Flammable Gases</u>	
2.1.1A & 2.1.1B	>100kg (or 100m <sup>3</sup> where a permanent gas)
2.1.2A	>3000L (aggregate water capacity)
<u>Flammable Liquids</u>	
3.1A	>20L
3.1B	>100L (if containers > 5L) >50L (open containers)
3.1C	>250L (in containers up to & including 5 L) >500L (in containers > 5L) >250l (open containers) >1500L (in containers up to & including 5L) >1L
3.2A, 3.2B & 3.2C	
<u>Flammable Solids</u>	
4.1.1A	>1kg
4.1.1B	>100kg
4.1.2A & 4.1.2B	>1kg
4.1.2C & 4.1.2D	>25kg
4.1.2E, 4.1.2F & 4.1.2G	>50kg
4.1.3A, 4.1.3B & 4.1.3C	>1kg
4.2A	>1kg
4.2B & 4.2C	>25kg
4.3A	>1kg
4.3B	>25kg
4.3C	>50kg
<u>Oxidisers</u>	
5.1.1A	>5kg or L (where used) >50kg or L (where kept closed at all times)
5.1.1B	>50kg or L (where used) >500kg or L (where kept closed at all times)
5.1.1C	>100kg or L (where used) >1000kg or L (where kept closed at all times)
5.1.2A	>50kg or m <sup>3</sup> (where used) >100kg (where a non-permanent gas) >200m <sup>3</sup> (where a permanent gas)
5.2A	Any quantity
5.2B	>1kg
5.2C & 5.2D	>10kg
5.2E & 5.2F	>25kg

**Location Certificates are not required for substances of class 6, 8 or 9**

## 7 APPENDIX 2 HAZARDOUS SUBSTANCES THAT REQUIRE APPROVED HANDLER CERTIFICATES (NZ ONLY)

Refer to table 2 of Schedule 3, table 3 of Schedule 4 and table 2 of schedule 5 Hazardous Substances (Classes 1-5 Controls) Regulations 2001

Refer to Schedule 1 Hazardous Substances (Classes 6,8 and 9 Controls) Regulations 2001

This table was last updated: 12 March 2008

<b>Hazard Classification</b>	<b>Quantities</b>
<u>Explosives</u>	
All Class 1 substances	Not Applicable to Contact Energy Sites
<u>Flammable Gases</u>	
2.1.1A	>100kg (not permanent gas) >100m <sup>3</sup> (permanent gases)
2.1.2A	>3000L (aggregated water capacity)
<u>Flammable Liquids</u>	
3.1A	Any amount
3.1B	>250L (in containers > 5L) >500L (in containers up to & including 5 L)
3.2A	Any amount
3.2B	>100L
<u>Flammable Solids</u>	
4.1.1A	>100kg
4.1.2A & 4.1.2B	any amount
4.1.2C & 4.1.2D	>25kg
4.1.2E & 4.1.2F	>50kg
4.1.3A	Any amount
4.13B	>100kg
4.2A	Any amount
4.2B	>100kg
4.3A	Any amount
4.3B	>100kg
<u>Oxidisers</u>	
5.1.1A	Any amount
5.1.1B	>500kg or 500L
5.1.1C	>1000kg or 1000L
5.1.2A	> 250kg or 200m <sup>3</sup>
5.2A or 5.2B	Any amount
5.2C, 5.2D, 5.2E or 5.2F	>10kg or 10L
<u>Toxics</u>	
6.1A, 6.1B & 6.1C	Any quantity
6.7A	>10kg or 10L
<u>Corrosives</u>	
8.2A	Any quantity
<u>Ecotoxics</u>	
9.1A, 9.2A, 9.3A & 9.4A	Any quantity

## **8 APPENDIX 3 STATIONARY CONTAINER SYSTEMS TEST CERTIFICATE REQUIREMENTS (NZ ONLY)**

Please note: The regulations & controls for Stationary Container systems are outlined in the ERMA New Zealand Hazardous Substances (Transfer of Dangerous Goods and Scheduled Toxic Substances) Notice 2004.

This table was last updated: 03 March 2008

Stationary Container Test Certificates are required for:

- All below ground storage tanks or process containers with a capacity of more than 250 litres that contain a hazardous substance of any classification
- All above ground storage tanks with a capacity of more than:
  - 2,500 litres which contain or are intended to be contain a substance of class 3.1A (petrol) or 3.1B e.g. acetone, isopropanol or
  - 5,000 litres and contains or is intended to contain a hazardous substance of any other classification (e.g. diesel, toxic, corrosive or exotic substances
  - 500 litres water capacity containing a hazardous gas such as LPG, oxygen, chlorine
- Tanks connected to a burner or a stationary internal combustion engine, which have a capacity of more than:
  - 50 litres containing a class 3.1A, B or C hazardous supplying an internal combustion engine
  - 500 litres containing a class 3.1D substance supplying an internal combustion engine (including diesel)
  - 60 litres containing a class 3.1 substance supplying a burner.
- A stationary container system that includes a direct fired vaporiser.
- All above ground process containers:
  - Over 250 litres in water capacity that contain a hazardous gas.
  - Over 1000 litres water capacity that contains a hazardous liquid.(Process containers which are constructed of fire resistance material, which contain class 2.1.1, 3.1A, 3.1B or 3.1C hazardous substances and which are required to comply with the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways – PECPR) regulations are excluded).

## 9 APPENDIX 4 HAZARDOUS SUBSTANCES THAT REQUIRE TRACKING (NZ ONLY)

Refer to Schedule 1 Hazardous Substances (Tracking) Regulations 2001  
This table was last updated: 12 March 2008

Hazard Classification	Quantities
<u>Explosives</u> All Class 1 substances	Not Applicable to Contact Energy Sites
<u>Flammable Liquids</u> 3.1A 3.2A	Any quantity Any quantity
<u>Flammable Solids</u> 4.1.2A, 4.1.2B 4.1.3A 4.2A 4.3A	Any quantity Any quantity Any quantity Any quantity
<u>Oxidisers</u> 5.1.1A 5.2A & 5.2B	Any quantity Any quantity
<u>Toxics</u> 6.1A, 6.1B & 6.1C	Any quantity
<u>Ecotoxics</u> 9.1A, 9.2A, 9.3A & 9.4A	Any quantity

**Corrosives are not considered trackable substances**

## 10 APPENDIX 5 HAZARDOUS SUBSTANCES THAT REQUIRE SIGNAGE (NZ ONLY)

Refer to Schedule 3 Hazardous Substances (Identification) Regulations 2001 – Amendment 2004

This table was last updated: 12 March 2008

Hazard Classification	Quantities
<u>Explosives</u>	
1.1 – 1.4	Not Applicable to Contact Energy Sites
<u>Flammable Gases</u>	
2.1.1A	> 100m <sup>3</sup> (permanent gas)
	> 250kg (Not permanent gas)
2.1.1B	> 200m <sup>3</sup> (permanent gas)
	> 500kg (Not permanent gas)
2.1.2A	> 3000L (aggregate water capacity)
<u>Flammable Liquids</u>	
3.1A & 3.2A	> 50L or kg
3.1B & 3.2B	> 250L or kg
3.1C & 3.2C	> 1000L or kg
3.1D	> 10000L
<u>Flammable Solids</u>	
4.1.1A	> 250kg
4.1.1B	> 1000kg
4.1.2A & 4.1.2B	> 50kg or L
4.1.2C & 4.1.2D	> 250kg or L
4.1.2E, 4.1.2F & 4.1.2G	>1000kg or L
4.1.3A, 4.2A & 4.3A	> 50kg or L
4.1.3B, 4.2B & 4.3B	> 250kg or L
4.1.3C, 4.2C & 4.3C	>1000kg or L
<u>Oxidisers</u>	
5.1.1A	> 50kg or L
5.1.1B	> 500kg or L
5.1.1C	> 1000kg or L
5.1.2A	> 250kg (Not permanent gas)
	> 500m <sup>3</sup> (permanent gas)
5.2A & 5.2B	1kg or L
5.2C, 5.2D, 5.2E & 5.2F	10kg or L
<u>Toxics</u>	
6.1A	> 2.5m <sup>3</sup> (permanent gas)
	> 5kg (Not permanent gas)
	> 50kg or L
6.1B	> 2.5m <sup>3</sup> (permanent gas)
	> 5kg (Not permanent gas)
	> 250kg or L

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6.1C	> 2.5m <sup>3</sup> (permanent gas) > 5kg (Not permanent gas)
6.1D	>1000kg or L > 10000kg or L
<u>Corrosive</u>	
8.1A	> 1000L or kg
8.2A	> 2.5m <sup>3</sup> (permanent gas) > 5kg (Not permanent gas) > 50kg or L
8.2B	> 25m <sup>3</sup> (permanent gas) > 50kg (Not permanent gas) > 250kg or L
8.2C & 8.3A	> 1000kg or L
<u>Ecotoxic</u>	
9.1A	> 100kg or L
9.1B & 9.1C	> 1000kg or L
9.1D	> 10000kg or L
9.2A, 9.3A, 9.4A	> 100kg or L
9.2B, 9.3B, 9.4B	> 1000kg or L
9.2C, 9.4C	> 1000kg or L
9.3C	> 10000kg or L
9.2D	> 10000kg or L



LOCATION	Gen Ops Geothermal
DOCUMENT TYPE	LSI
REFERENCE	03_06_2000_geo
STATUS	Issued
VERSION NO.	12
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# GEO ENVIRONMENTAL MANAGEMENT

1	SCOPE .....	2
2	WHO DOES WHAT .....	2
3	WHAT MUST BE KNOWN.....	3
4	WHAT MUST BE DONE .....	3
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## 1 SCOPE

The Contact Energy Geothermal Team manage the Wairakei, Poihipi Road and Ohaaki Power Stations and associated geothermal steamfields including the Tauhara steamfield.

This Local Standing Instruction (LSI) has been prepared to assist staff recognise and manage environmental issues at these sites.

The sites operate under a range of Resource Management Act (1991) consents for the use of land, for the take, discharge and use of water, and for the discharge of contaminants to land, water and air. The primary purpose of the Environmental Management LSI is to assist Contact staff to find the appropriate documents and procedures associated with Environmental Management and requirements to comply with these resource consents. It also fulfils the function of the Environmental Management System Manual. The LSI has also been prepared to provide councils with confidence that resource consent conditions are being managed and monitored effectively and the company is undertaking best practice site management.

In addition, Section 17 of the Resource Management Act 1991 confers a general duty on every person *“to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of that person, whether or not the activity is in accordance with a rule in a plan, a resource consent, or has existing use rights”*, and the Contact Geothermal Team will utilise this Local Standing Instruction and the associated Procedures to help meet this duty.

## 2 WHO DOES WHAT

The Generation Manager and Team Leaders have responsibilities and authorities for certain aspects of Environmental Management. This includes the budgeting for and implementation of ISO14001 Targets and Objectives (Ref: [CSI 03\\_06\\_1000 Environmental Management](#)).

The Generation Manager and Team Leaders conduct:

- Annual reviews of Environmental Management Targets and Objectives
- Regular site housekeeping inspections initiated through the Maintenance Management System.

Environmental or consent compliance tasks that are covered by this LSI are shared responsibilities within the respective operational and maintenance teams.

Environmental auditing is provided for in the Management Review and Auditing [CSI 10\\_03\\_1000](#). The scope and audit type (internal or external) is determined by the Annual Audit Plan process under CSI [10\\_03\\_1000](#). The Geothermal Environmental Adviser is responsible for organising annual Telarc audits.

Contract and Project managers need to be aware of any resource consent conditions which may need to be complied with. A database of all consents and associated conditions is to be found in [G:\Accesswk\Resource consents](#).

The Geothermal Environmental Adviser is responsible for continual management of the [Register of Geothermal Aspects](#) (ISO 14001 4.3.1) used for setting priorities and hence targets for management review.

### 3 WHAT MUST BE KNOWN

Requirements within this LSI shall comply with best practice site management principles. Procedures have been developed for critical activities where incorrect work methods could result in:

- Harm
- Environmental damage
- Commercial loss

Environmental management guidelines and Procedures are outlined below in the following tables and cover six core areas:

1. Hazardous Substances Use
2. Oil Containment and Spill Response
3. Solid Waste Disposal
4. Geothermal Water Discharges
5. Site Maintenance Activities
6. Drilling Activities

### 4 WHAT MUST BE DONE

1. Hazardous substances use	Controlled Procedure	Requirements
For issues related to environmental effects (ie not OSH) a hazardous substance is one which, in the event of a spill, could result in significant contamination of soil, ground water or surface waters. As at December 2003 a Hazardous Substances Management Plan has been implemented to comply with the Hazardous Substances and New Organisms Act (1996) and the transfer of substances in April 2004.		
Laboratory chemicals	Yes	Refer to <a href="#">Hazardous Substance Use</a>
Herbicides and pesticides	Yes	Refer to <a href="#">Hazardous Substance Use</a>
Gas (bottles and tanks)	Yes	Refer to <a href="#">Hazardous Substance Use</a>
Radio-active materials	Yes	Refer to <a href="#">Hazardous Substance Use</a>
Biocides/calcite antiscalants	Yes	Refer to <a href="#">Hazardous Substance Use</a>
Acid and alkali	Yes	Refer to <a href="#">Hazardous Substance Use</a>

2. Oil containment and spill response	Controlled Procedure	Requirements
Storage and handling	Yes	Refer to <a href="#">Use of Fuels and Oils</a>
Containment and disposal	Yes	Refer to <a href="#">Use of Fuels and Oils</a>
Oil spills	Yes	Refer to <a href="#">Emergency and Civil Defence LSI</a>

3. Solid waste	Controlled Procedure	Requirements
General waste	No	General waste is collected and stored at identified on-site locations within transportable bins to await disposal at approved landfills by waste management contractors.
Scrap metals	No	Scrap metals are stored at designated scrap metal areas to await disposal by authorised scrap metal merchants.  Team Leaders ensure that scrap metal at the designated sites do not exceed 10 m <sup>3</sup> .
Recyclable materials	No	Where and when practicable materials identified for recycling are sorted and disposed through authorised recycling agents.
Asbestos insulation	Yes	Refer to the <a href="#">Asbestos Materials Control Procedure</a>
Geothermal deposition	Yes	Refer to the <a href="#">Geothermal Deposition Disposal Procedure</a>
Vegetation waste	No	Vegetation waste is categorised and disposed of at designated on site locations or left to decompose in situ.
Hazardous waste containers	Yes	Refer to the <a href="#">Hazardous Substance Use</a>
Cooling tower sludge	Yes	Refer to the <a href="#">Geothermal Deposition Disposal Procedure</a>

4. Geothermal water discharges	Controlled Procedure	Requirements
Discharge of steam & water mix from silencers	No	Design, maintenance and operation of silencers minimise discharges to land.
Steam condensate	No	<p>Cooling tower condensate at Ohaaki and Poihipi Road is injected into the ground away from the productive part of the geothermal reservoir.</p> <p>Pipeline condensate is to be directed to soak-holes.</p>
Separated geothermal water	No	<p>At Wairakei and Ohaaki separated geothermal water is to be injected into the ground through injection wells positioned away from the productive part of the geothermal reservoir.</p> <p>Separated geothermal water discharges to the Waikato River at both Ohaaki and Wairakei must comply with resource consent conditions.</p> <p>Separated geothermal water will be discharged to geothermal features only to comply with specific consent conditions which require it.</p>
Vertical discharges from wells	No	<p>All discharges from well testing are to comply with District Plan rules.</p> <p>Noise from the site meets the requirements of the relevant District Plan.</p>

5. Site maintenance activities	Controlled Procedure	Requirements
Buildings / visual appearance	No	<p>Visual appearance and general upkeep of buildings is important for the image of Contact as a part of the environment and community.</p> <p>Maintenance of buildings is the responsibility of the Team Member responsible for building maintenance.</p> <p>Buildings shall be maintained on a five-year rolling programme.</p>

5. Site maintenance activities	Procedure (Controlled)	Requirements
Noxious weeds	No	<p>Control of noxious weeds is a requirement under the Biosecurity Act 1993 and the Regional Pest Management Strategy</p> <p>Noxious weed control is the responsibility of the Team Member responsible for grounds and building maintenance.</p> <p>Noxious weeds shall be controlled by spraying, chopping or removal.</p> <p>Noxious weed control shall be co-ordinated with neighbours and local and regional authorities as appropriate.</p>
Vegetation control	No	<p>Control of vegetation is required for maintenance of access routes, clearance to structures and operational facilities, for safety and for the general appearance of the site. Control of vegetation is the responsibility of the Team Member responsible for grounds and building maintenance.</p>
Pipelines & other structures	No	<p>Pipelines and other ancillary structures form a part of the visual landscape of Contact Energy's sites. Maintenance and screening (visual enhancement) of these structures is a part of maintaining the visual amenity of the geothermal sites.</p> <p>Redundant plant is to be removed and the sites restored.</p> <p>A screen planting programme has been implemented at Wairakei.</p> <p>Pipelines and other structures are maintained in good condition with consideration to visual amenity.</p>

5. Site maintenance activities	Procedure (Controlled)	Requirements
Fencing/security	No	<p>Fencing is required around the site and within the site for security and safety reasons.</p> <p>Maintenance of fencing is the responsibility of the Team Member responsible for grounds and building maintenance.</p> <p>Fences shall be inspected every 6 months.</p>
Site excavation/road & track construction/maintenance	No	<p>Site roads are maintained and managed ensuring stormwater run-off is directed through silt traps.</p> <p>Slot drains are to be used to minimise land erosion.</p> <p>Where roads cross active geothermal areas and where steam vents appear through road surfaces, these areas may be vented to roadsides to prevent pressure build up.</p> <p>Any road works or other excavation required outside existing road alignments or cleared areas requires an excavation certificate in order to ensure site services are not disturbed.</p> <p>If archeological remains are discovered work is to cease immediately. Ngati Tahu, the Historic Places Trust and the WRC are to be informed and an appropriate contingency plan formed before works recommence</p>

6. Drilling activities	Procedure (Controlled)	Requirements
Oil/lubricants/hydraulic fluids/diesel	Yes	Refer to the <a href="#">Use of Fuels and Oils</a>
Drilling muds, caustic soda and cement	Yes	Refer to the <a href="#">Drilling Substances Procedure</a>
Disposal of hazardous materials	Yes	Refer to the <a href="#">Hazardous Substances Use</a>
Acid handling	Yes	Refer to the <a href="#">Hazardous Substances Use</a>
Contaminated water	No	Water (ie either drilling water or geothermal water) contaminated with acid, caustic soda or any organic or inorganic compound approved for use will be directed to the drilling pond.
Sewage	No	Where permanent facilities are unavailable toilet facilities are provided by "portaloos" at each work site location. Sewage is disposed of off site at an approved sewage discharge location.
Noise	No	Noise from the site is to meet the requirements of the relevant District Plan.

## 5 REFERENCE DOCUMENTS (LOCATION)

- Resource Management Act 1991 (Government Website)
- Waikato Regional Policy and Plan
- Taupo District Plan
- Rotorua District
- Wairakei, Ohaaki, Poihipi and Tauhara Resource Consents



CONTACT ENERGY LIMITED

LOCATION: Wairakei

STATUS: Issued

# WRK HAZARDOUS SUBSTANCES SITE PLAN & LIST OF HAZARDOUS SUBSTANCES

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5	ASSOCIATED DOCUMENTS FOR SITE SPECIFIC CHEMICAL LISTINGS	4

Printed copies of this document are uncontrolled unless contained in an authorised site manual.

**CONTACT ENERGY LIMITED**

LOCATION: Wairakei

STATUS: Issued

**1 PREAMBLE**

The following tables document the hazardous substances which were transferred in April 2004 to fall under controls required under the Hazardous Substances and New Organisms Act 1996.

**2 WHAT MUST BE KNOWN**

**CATEGORY**

**INFORMATION**

Hazard I.D. Title:	Wairakei Station Hazards.
Personnel Skill Requirements:	Competencies in Chemical Handling
Applicable Plant Codes:	W
Special Safety Requirements:	Chemical handling protective safety equipment and clothing
Equipment Requirements:	Chemical Handling Equipment
Document Requirements and References:	ChemWatch Database
Environmental Requirements:	Spill Handling Equipment on hand

**3 RELATED INFORMATION**

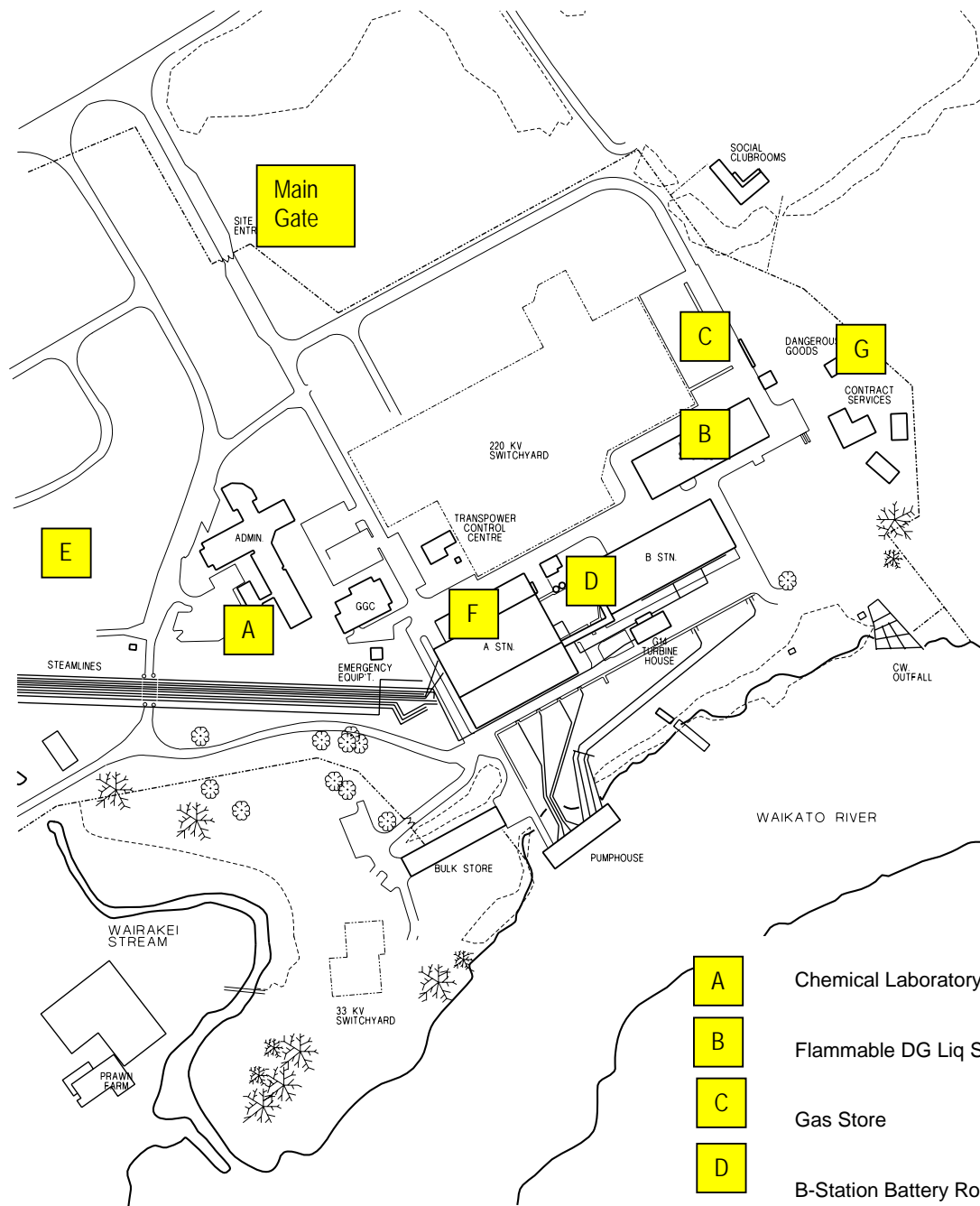
Plant History Ref(s):	W
Drawing Ref:	Wairakei Station Systems Drawing Folder
Manuals Ref:	Manufacturers Manuals
Related Check Sheet:	

**CONTACT ENERGY LIMITED**

LOCATION: Wairakei

STATUS: Issued

**4 WAIRAKEI SITE PLAN**



- A** Chemical Laboratory
- B** Flammable DG Liq Store
- C** Gas Store
- D** B-Station Battery Room
- E** Binary Plant
- F** A-station Battery Room
- G** Dangerous Good

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**CONTACT ENERGY LIMITED**

LOCATION: Wairakei

STATUS: Issued

## **5 ASSOCIATED DOCUMENTS FOR SITE SPECIFIC CHEMICAL LISTING**

All chemicals stored on site are listed in the Chemgold data base <http://max.chemwatch.net/cwnz/> and are entered during the purchasing CSI compliance requirements.

Other documents relevant to this document that must be referred to are;

09\_04\_3002\_geo Geo Hazardous Substance Use

[http://intranet/c\\_docs/issued/geothermal/procedures/09\\_04\\_3002\\_geo\\_geo\\_hazardous\\_substances\\_use.doc](http://intranet/c_docs/issued/geothermal/procedures/09_04_3002_geo_geo_hazardous_substances_use.doc)

03\_01\_2000\_geo Geo Hazardous Atmosphere Zone Compliance

[http://intranet/c\\_docs/issued/geothermal/standing\\_instructions/03\\_01\\_2000\\_geo\\_geo\\_hazardous\\_atmosphere\\_zone\\_compliance.doc](http://intranet/c_docs/issued/geothermal/standing_instructions/03_01_2000_geo_geo_hazardous_atmosphere_zone_compliance.doc)

09\_04\_1000 Hazardous Substances CSI

[http://intranet/c\\_docs/issued/corporate/standing\\_instructions/09\\_04\\_1000\\_hazardous\\_substances.doc](http://intranet/c_docs/issued/corporate/standing_instructions/09_04_1000_hazardous_substances.doc)

09\_01\_1000 Purchasing

[http://intranet/c\\_docs/issued/corporate/standing\\_instructions/09\\_01\\_1000\\_purchasing.doc](http://intranet/c_docs/issued/corporate/standing_instructions/09_01_1000_purchasing.doc)



# GEO HAZARDOUS SUBSTANCES USE

1	SCOPE .....	2
2	WHAT MUST BE KNOWN.....	2
3	RELATED INFORMATION .....	3
4	PROCEDURE.....	4
4.1	Requirements.....	4

## 1 SCOPE

This procedure complies with the requirements of CSI [09\\_04\\_1000](#). It covers the purchase, storage, use and disposal of products and their containers which have been purchased in quantities above HSNO Regulation "trigger volumes" or such that, in the event of a spill there could be significant contamination of soil, ground water or surface waters. In particular the procedure covers the following classes of hazardous substance:

1. Class 2 – Flammable Gases
2. Class 3 - Flammable Liquids
3. Class 4 - Flammable Solids
4. Class 5 – Oxidising Substances
5. Class 6 – Toxic Substances
6. Class 8 - Corrosive Substances
7. Class 9 – Ecotoxic Substances

These substances include, but are not restricted to those substances covered under the Hazardous Substances and New Organisms Act (1996), The Toxic Substances Regulation (1983) and Workplace Exposure Standards Publication.

Staff should refer to the HSNO Implementation Plan to be found in G:Public\Projects\Hazardous Substance Management for more detailed information on what HSNO controls apply to particular substances.

Hazardous Substance Site Plans together with hazardous substance registers (single component toxic substances transferred to HSNO on 1 April 2004 only) and associated controls can be found in the following documents:

Hazardous Atmosphere Zone Compliance [03\\_01\\_2000\\_geo](#)  
(Electrical and hazardous substances within hazardous atmosphere zones)

Hazardous Substance Use [09\\_04\\_3002\\_geo](#)

Wairakei Hazardous Substances Site Plan: [09\\_04\\_3000\\_wrk](#)

Ohaaki Hazardous Substances Site Plan: [09\\_04\\_3000\\_oki](#)

Poihipi Road Hazardous Substances Site Plan: [09\\_04\\_3000\\_ppi](#)

## 2 WHAT MUST BE KNOWN

### CATEGORY

### INFORMATION

Hazard I.D. No.:

Hazard I.D. Title:

Personnel Skill Requirements:

Applicable Plant Codes:

GUADMSAF

Special Safety Requirements:

**CATEGORY**

**INFORMATION**

Equipment Requirements:

Document Requirements and References:

Environmental Requirements:

**3 RELATED INFORMATION**

Plant History Ref(s):	GUADMSAF
Drawing Ref:	
Manuals Ref:	
Related Check Sheet:	

## 4 PROCEDURE

### 4.1 Requirements

WHAT MUST BE DONE	WHAT MUST BE KNOWN
<p><b>PURCHASE</b></p> <p>A Safety Data Sheet (SDS) shall be acquired from the supplier. If no SDS is available, an alternative supplier or an alternative product must be found. The <b>Storemen</b> are responsible for maintaining the SDS database relevant to the operations of the Wairakei, Poihipi Rd and Ohaaki power stations. The <b>Laboratory Manager</b> is responsible for maintaining the SDS database for the Wairakei lab. The revision date of current versions of SDS's are to be entered into the HSNO registers (G:\Public\Projects\Hazardous Substance Management) of each site as a means of controlling the SDS and ensuring that all required SDS's are available. Hard copies of relevant site SDS's i.e. substances held on the particular site are to be located in the following locations:</p> <ol style="list-style-type: none"> <li>1) Poihipi Rd Control Room</li> <li>2) Ohaaki Control Room</li> <li>3) Wairakei Emergency Control Room</li> <li>4) Wairakei Stores</li> <li>5) Poihipi Stores</li> </ol> <p>A Mozaic procedure has been set to initiate periodic review of the SDS Databases</p>	<p>Prior to <u>purchase</u>, the following are to be assessed:</p> <ul style="list-style-type: none"> <li>• Environmental effects likely to result from a spill and mitigation procedures.</li> <li>• Health effects likely to result from normal use <u>and</u> misuse and appropriate remedies.</li> <li>• Whether "tracking" is required.</li> <li>• Whether an Approved Handler is required to take control of the substance.</li> <li>• Whether a Hazardous Atmosphere Zone determination is required for the site at which the substance will be stored or used.</li> <li>• Storage requirements and whether the substance needs to be stored at a site with a Location Certificate.</li> <li>• What emergency management issues arise.</li> <li>• Identification of specific signage required.</li> <li>• Disposal requirements.</li> </ul>
<p><b>PACKAGING AND IDENTIFICATION</b></p>	<p>All hazardous substances purchased and distributed on site shall be clearly labeled, including appropriate UN or CAS No's, and precautionary information.</p> <p>Specific HSNO identification and packaging controls will be required on substances purchased after March 2006.</p>

WHAT MUST BE DONE	WHAT MUST BE KNOWN
<p><b>USE</b></p> <p>Instructions detailed in the relevant SDS are to be strictly followed.</p>	<p>The location of SDS's are shown in Chemgold. If an SDS is not available for the product please request one from Stores.</p>
<p><b>DISPOSAL</b></p> <p>Empty containers and/or excess products are to be disposed of as follows:</p> <ul style="list-style-type: none"> <li>• Where returnable containers are used, the container shall be stored in the same location as full containers and any residue product shall be returned to the supplier along with the container.</li> <li>• Where disposable containers are used, residue product should be triple rinsed if possible into the normal receiving fluid. If this is not possible containers shall be stored in the same location as full containers and disposal shall be via the chemical waste disposal contractor within one week of emptying. Triple rinsing when performed will allow the container to be crushed for disposal.</li> </ul>	<p>In general 200 litre containers or smaller are not returnable.</p> <p>1000 litre containers are usually able to be returned to the supplier for reuse. If unsure the supplier should be contacted.</p> <p>No used container may be used for other storage of other chemicals.</p> <p>All used chemical containers must be disposed of according to SDS or according to the company Hazardous substances CSI if no such instructions exist in the provided SDS.</p>
<p><b>TRACKING REQUIREMENTS</b></p> <p>Maintaining records of tracked substances</p>	<p>Tracking entails maintaining records of a substance over its lifetime. Refer to Hazardous Substance (Tracking) Regs (2001) for details.</p> <p>Class 3.1A Flammable liquids require tracking from December 2004. Currently (May 2004) tracking is required for Isopentane and some laboratory chemicals.</p>

WHAT MUST BE DONE	WHAT MUST BE KNOWN
<p><b>EMERGENCY MANAGEMENT</b></p> <p>HSNO controls apply from 31 March 2005.</p>	<p>SDS's should be:</p> <ul style="list-style-type: none"> <li>• Immediately available at the site where hazardous substances are being used or stored within 10 minutes of request.</li> <li>• Used to provide essential information to emergency services.</li> </ul>
<p><b>PERSONNEL QUALIFICATIONS</b></p> <p>Certification to be maintained for appropriate staff as Approved Handlers</p> <p>Contract supervisors must ensure that contractors are aware of their HSNO obligations</p>	<p>Approved handlers must personally supervise all handling of the follow substances:</p> <ul style="list-style-type: none"> <li>• Hydrogen – Poihipi Road gas store and powerhouse.</li> <li>• Isopentane – Wairakei Binary Plant site.</li> <li>• Sulphuric acid – station battery rooms.</li> <li>• Numerous – Wairakei Chemical Laboratory.</li> <li>• Acids – drilling sites.</li> <li>• Approved Handlers refer appendix A (last updated May 2008):</li> </ul>
<p><b>HAZARDOUS SUBSTANCE LOCATIONS</b></p> <p>Certification to be maintained for specific locations where some hazardous substances are kept in quantities greater than those specified in the HSNO Regulations. The Laboratory Manager is responsible for maintaining location certificates.</p>	<p>At May 2004 the following sites require Location Certificates:</p> <ul style="list-style-type: none"> <li>• Poihipi Road gas store and powerhouse</li> <li>• Wairakei Binary Plant site.</li> </ul>

WHAT MUST BE DONE	WHAT MUST BE KNOWN
<p><b>HAZARDOUS ATMOSPHERE ZONES</b></p> <p>Hazardous Atmosphere Zone determinations are required for sites where some hazardous substances are kept in quantities greater than those specified in the HSNO Regulations</p> <p>These zones need to comply with:            AS/NZS 2430.3 or            AS 2430.1 and NZS 6101.1 1988 or            a code of practice approved by ERMA            eg AS/NZS 2381.1 1999</p>	<p>At May 2004 the following sites required Hazardous Atmosphere Zone determinations to have been carried out and implemented:</p> <ul style="list-style-type: none"> <li>• Poihipi Road gas store and powerhouse</li> <li>• Wairakei Binary Plant site</li> <li>• Flammable gas stores Wairakei</li> </ul> <p>Note: these standards were used for design purposes.</p>
<p><b>LABORATORY CHEMICALS</b></p> <ul style="list-style-type: none"> <li>• Use and storage of chemicals is an integral part of laboratory operations. Management and control of chemicals in the laboratory is the responsibility of the laboratory manager.</li> </ul>	<ul style="list-style-type: none"> <li>• An understanding of good laboratory practice.</li> <li>• Which chemicals are incompatible (form toxic products) when mixed.</li> <li>• Safety Data Sheets must be available within 10 minutes of request for all hazardous substances</li> <li>• Hazardous Substances Regulations.</li> </ul>
<p><b>GAS</b></p> <p>Gas, such as acetylene, oxygen, SF6, nitrogen, is used for various operations and maintenance activities on the site, both by staff and contractors.</p> <ul style="list-style-type: none"> <li>• Gas stored on site shall be in containers provided by the gas supplier only.</li> <li>• Quantities in stock shall be restricted to less than HSNO trigger volumes</li> </ul>	<ul style="list-style-type: none"> <li>• HSNO (Compressed Gases) Regulations 2004 needed to be complied with by 1 October 2004</li> <li>• Hazardous Substances (Classes 1 – 5 controls) Regulations 2001</li> </ul>



**Other hazardous substances held on geothermal sites but not yet transferred to the HSNO regime are listed below. General controls detailed on individual SDS apply.**

WHAT MUST BE DONE	WHAT MUST BE KNOWN
<p><b>BIOCIDES AND BIODISPERSANTS</b></p> <ul style="list-style-type: none"> <li>• Biocides and biodispersant chemicals shall be stored in the designated storage areas.</li> <li>• The storage areas shall be fully contained within secondary containment. Any product recovered following a spill should be disposed of into the cooling tower pond.</li> <li>• Handling and use shall be in accordance with the SDS and fully compliant with the Hazardous Substances and New Organisms Act (1996).</li> </ul>	<p>The requirements of the SDS.</p>
<p><b>HERBICIDES AND PESTICIDES</b></p> <ul style="list-style-type: none"> <li>• Herbicides and pesticides may be used on site from time to time. Use and control of herbicide and pesticides is the responsibility of the Team Member responsible for the building and ground maintenance.</li> <li>• Herbicides and pesticides will not be stored on Contact Energy Geothermal Sites without 24 hour permission being obtained prior to the required event and the permission of the HS Coordinator or HSNO Compliance person for the specific task required.</li> <li>• All work involving herbicides and pesticides shall comply with the requirements of the Health and Safety in Employment Act 1992 and accordant Regulations 1995.</li> <li>• Herbicides and pesticides shall only be applied by an approved operator and handler (if required where thresholds are exceeded)</li> </ul>	<p>The requirements of the SDS</p> <p>Approved Chemicals for use (refer to Environment Waikato)</p> <p>Approved Handlers required for applying certain herbicides and pesticides.</p> <ul style="list-style-type: none"> <li>• Hazardous Substances and New Organisms (personnel qualifications) Regulations 2001</li> </ul> <p>Guidelines for the safe handling of chemicals in the workplace DOL NZ.</p>

WHAT MUST BE DONE	WHAT MUST BE KNOWN
<p><b>RADIO-ACTIVE MATERIALS</b></p> <ul style="list-style-type: none"><li>• Small quantities of radioactive materials are used for geothermal reservoir management purposes.</li><li>• Radioactive materials delivered to site are the responsibility of the Senior Reservoir Engineer.</li><li>• All testing must be carried out under the supervision of National Radiation Laboratory licence holders.</li></ul>	<ul style="list-style-type: none"><li>• Storage and transportation regulations.</li><li>• Isolation requirements and storage of class 7 materials and substances.</li></ul>

**CONTACT ENERGY LIMITED**  
**LOCATION: Gen Ops Geothermal**  
**STATUS: Issued**

Names		Classes
Mark	Cheviot	2, 3
Barry	Dyer	2, 3
Wayne	Gulliver	2, 3
Raymond	Johns	2, 3
Peter	Johnson	2, 3
David	Morrow	2, 3
Tim	Poulter	2, 3
Cyril	Rundle	2, 3
Ken	Sutcliffe	2, 3
Warren	Tillson	2, 3
Shayne	Waugh	2, 3
Ruth	Smith	5
Tony	Mullinger	2, 3, 6, 8, 9
Owen	Peake	1, 2, 3

Classes

- 1 – Explosives
- 2- Gases, inert, flammables, 2.1 included.
- 3 - Flammable liquids
- 4 – Flammable solids
- 5 – Oxidizers
- 6 – Toxics
- 8 – Corrosives
- 9 - Ecotoxics