

8 September 2017



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Dear Sir/Madam

Notice of Decision Resource Consent Review

Record Number(s): CRC180721 (to replace CRC)
Applicant Name: Meridian Energy Limited, Christchurch
Activity Description: to use water up to a maximum rate of 650 cubic metres per second at or about map reference NZMS 260 140:060-101 (Waitaki Power Station) for the purpose of Power Generation.

Decision: Granted

Decision

The decision of Environment Canterbury is to change your consent , pursuant to sections 128, 132, 104 and 108, and subject to Part 2 of the Resource Management Act 1991, to the terms and conditions specified in the attached resource consent document(s). The reasons for the decision are:

- a) Any adverse effects on the environment as a result of the changes to the conditions are minor; and
- b) The recommended conditions ensure the consent is consistent with Plan Change 3 to the Waitaki Plan.

Commencement of consent changes

The changes to your resource consent take effect from the date of this letter advising you of the decision. If you object to or appeal this decision, the commencement date will then be the date on which the decision on the objection or appeal is determined.

Your rights of objection and appeal

- **Objection to Decision**
If you do not agree with the decision of the consent authority, you may object to the whole or any part in accordance with Section 357A(1)(g) of the Resource Management Act 1991 (RMA). Notice of any objection must be in writing and lodged with Environment Canterbury **within 15 working days** of receipt of this decision in accordance with Section 357C(1) of the RMA.
- **Right to Appeal**
You may appeal the decision of the consent authority to the Environment Court in accordance with section 120 of the RMA. The notice of appeal must be lodged with the Court within 15 working days of receipt of this decision, at PO Box 2069,

Christchurch. A copy of the appeal should also be forwarded to Environment Canterbury within the same timeframe.

If you are in any doubt about the correct procedures, you should seek legal advice.

Further information about your consent

A report has been prepared, with officer recommendations, to provide information to the decision makers. If you require a copy of the report please contact our Customer Services section. You can find online information about your consent document at www.ecan.govt.nz/yourconsent.pdf.

Queries

For all queries please contact Customer Services Section quoting your CRC number noted above.

Thank you for helping us make Canterbury a great place to live

Yours sincerely

A handwritten signature in blue ink, consisting of a stylized 'X' or 'K' shape with a long horizontal stroke extending to the right.

Consents Planning Section

RESOURCE CONSENT CRC180721

Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO:	Meridian Energy Limited, Christchurch
A WATER PERMIT (S14):	to use water up to a maximum rate of 650 cubic metres per second at or about map reference NZMS 260 I40:060-101 (Waitaki Power Station) for the purpose of Power Generation.
COMMENCEMENT DATE:	08 September 2017
EXPIRY DATE:	30 April 2025
LOCATION:	Waitaki Power Station, Lake Waitaki

SUBJECT TO THE FOLLOWING CONDITIONS:

- 0 This right is subject to the Conditions 1,2,4,5,6,8,21,22 as per attached schedule
- 1 The Grantee shall exercise this right in conjunction with all other rights which the Grantee holds in connection with the generation of electricity within the Waitaki River system, in such a manner as to minimise, as far as practicable, any adverse effects of the exercise of the rights on the Waitaki River system.
- 2 The Grantee shall measure and record the lake water levels, related to mean sea level (Lyttelton datum), at a frequency not less than every 60 minutes, to the satisfaction of the Water resources Manager, Canterbury Regional Council, and the records supplied to the Council annually.
- 4 The Grantee shall erect and maintain signs warning of the danger of the fluctuations in the river/lake level at points of public access to the river/lake between Fishermans Bend and Waitaki Dam, to the satisfaction of the Water Resources Manager, Canterbury Regional Council.
- 5
 - a. The consent holder shall ensure that the following dam safety reviews of the Waitaki Dam are undertaken, and shall be carried out as a minimum in accordance with the New Zealand Society of Large Dam's Dam Safety Guidelines, dated November 2000, or subsequent editions.
 - i. A Comprehensive Safety Review, to be carried out five yearly, by independent, appropriately qualified personnel.
 - ii. A Civil Review, to be carried out annually.
 - b. Reports detailing the findings of each review shall be provided to Canterbury Regional Council as detailed below. The reports shall include comment on any specific issues pertaining to the hydraulic safety of the structure.
 - i. A report detailing the findings of each Comprehensive Safety Review shall be provided to Canterbury Regional Council within two months of the completion of each review.
 - ii. A report detailing the findings of each Civil Review shall be provided to Canterbury Regional Council by 30 September each year for the review ended 30 June in the same year.

- 6 The Grantee shall exercise this right, in relation to the Design Flood Level, Maximum Control Level, Minimum Control Level and Extreme Minimum Control Level, in accordance with the provisions contained in "Waitaki Power Stations, Appendix A, Extracts of Waitaki Operating Rules (9 November 1990) as modified by an order pursuant to section 122 of the Electricity Industry Act 2010" (attached).
- 8 The Grantee shall manage and operate spill flows in accordance with the provisions contained in "Waitaki Power Stations, Appendix A, Extracts of Waitaki Operating Rules (9 November 1990) as modified by an order pursuant to section 122 of the Electricity Industry Act 2010" (attached).
- 21 The Grantee shall design, install (prior to 1 May 1996), operate and maintain a native fish pass on the following Dams: Benmore, Aviemore and Waitaki (at or about Map References; H39:894-232, I40:002-134 and I40:060-101) to the satisfaction of the Water Resources Manager, Canterbury Regional Council, following consultation with the Ngai Tahu Maori Trust Board.
- 22 Before midnight on 31 August 2017, the Grantee shall maintain a flow of at least 120 cubic metres per second in the Waitaki River as measured immediately below the Waitaki Dam (at or about Map Reference I40:060-101), PROVIDED HOWEVER that lower flows shall be maintained whenever considered necessary for emergency public safety purposes, and requested by the Water Resources Manager, Canterbury Regional Council.
- 22.1 On or after midnight on 31 August 2017, except as provided for in Conditions 22.2 and 22.3, the Grantee shall maintain the flows in the Waitaki River, calculated as the mean flow over a 24-hour period from midnight-to-midnight New Zealand Standard Time, of being at least:
- a. 150 cubic metres per second; plus
 - b. The Flows for Activities as set out in Table 1 below:

Table 1: Flows for Activities

Month	Cubic metres per second
October to March	40
April and September	22
May and August	12
June and July	8

(together "the flows")

- 22.2
- a. Upon certification by the Canterbury Regional Council of an Alternative Flow Proposal, the Grantee may reduce the flows required by Condition 22.1(b) to those flows necessary to meet the Actual Requirements of Activities, as defined in (c) below.
 - b. Certification of an Alternative Flow Proposal in (a) shall be given provided the following conditions are met:
 - i. the Alternative Flow Proposal is submitted to the Canterbury Regional Council - Attention Regional Leader – Compliance Monitoring; and
 - ii. the Alternative Flow Proposal includes a monthly profile of the flows necessary to meet the Actual Requirements of Activities for the period that is specified, not being more than 12 months; and
 - iii. the Alternative Flow Proposal has been calculated and prepared in consultation with the Waitaki Irrigators Collective Limited (WIC) (including any successor to WIC) and any affected consent holder who is not a member of WIC, and evidence of this consultation is submitted to the Canterbury Regional Council
 - c. For the purpose of this condition, Actual Requirements of Activities means:
 - i. the instantaneous rates of take authorised by water permits that are within the Allocation Limit set out in Rule 2, Table 3B, row xvii (c) and are subject to a cessation flow determined in accordance with Rule 2, Table 3A, Rows 8 and 9 of the Waitaki Catchment Water Allocation Regional Plan (As certified as true and correct on 25 August 2016 and reproduced below); less
 - ii. the instantaneous rates of take authorised by such water permits in (c)(i) above where for the period such permits will not be given effect to; less
 - iii. any instantaneous rates of take for such water permits in (c)(i) above where for the period the take will not occur in full or in part (if known).

Rule 2, Table 3B, row xvii

<u>Water bodies</u>	<u>Environmental Flow regimes</u>
xvii. Lower Waitaki River	c. An allocation limit of 79 m ³ /s, not counting any flows abstracted from the Lower Waitaki River above Black Point that are returned to the Lower Waitaki River above Black Point; plus an allocation of 10 m ³ /s reserved for enhancing mahinga kai and Te Rūnanga o Arowhenua, Te Rūnanga o Waihao and Te Rūnanga o Moeraki have been consulted plus an allocation of 1 m ³ /s reserved for augmentation flows for Wainono Lagoon.

Rule 2, Table 3A, Rows 8 and 9

Row	Reserved Water:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
8	Default Cessation Flow (m ³ /s) for water abstracted that does not have a cessation flow set by Rows 4 and 6	164	164	164	156	155	155	155	155	156	164	164	164
9	Adjusted Cessation Flow (m ³ /s) if some or all of the reserved water is consented to be taken or diverted	Adjusted Cessation Flow equals the Default Cessation Flow less the sum of the rate of reserved water (m ³ /s) consented to be taken from Row 1, Row 2 and Row 3 up to a maximum of 11 m ³ /s.											

22.3

- a. Upon approval of the 'calculated natural inflows' method as set out in b) below, when the calculated natural catchment inflows above the Waitaki Dam for the rolling preceding 7 day period are less than the flows required by Condition 22.1, the flows in Condition 22.1 may be reduced by the consent holder to the equivalent flows of the calculated natural inflows above the Waitaki Dam.
- b. The calculated natural inflows above the Waitaki Dam are:
 - i. The combined natural catchment inflows above the Waitaki Dam derived from available information using a method that is certified as appropriate by a qualified and experienced hydrologist; and
 - ii. The certified method has been submitted to and approved by the Chief Executive of the Canterbury Regional Council as complying with i) above.
- c. At a minimum, the Grantee shall give within the 24-hour midnight-to-midnight New Zealand Standard Time period immediate prior to reducing flows notice of the intention to exercise a) above to the Canterbury Regional Council; Attention Regional Leader – Compliance Monitoring.

- 22.4 On or after midnight on 31 August 2017, the Grantee shall pass flows into the Lower Waitaki River of at least 450 cubic metres per second for a duration of not less than 24-hours 7 times per calendar year of which no fewer than 2 must be in the period 1 February to 31 March.
- 22.5 On or after midnight on 31 August 2017, the flows required by Conditions 22.1, 22.2, 22.3 and 22.4 shall be measured at the Kurow recorder (Water level recording site number 71104).

Annexure B Waitaki Power Stations Appendix A Extracts of Waitaki Operating Rules (9 November 1990) As modified by an order pursuant to Section 122 of the Electricity Industry Act 2010

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6.2 Operating Procedure

~~The normal minimum flow is 120 m³/s (20MW).~~

~~With the agreement of the Manager, Operations and Rural Services, Canterbury Regional Council, an extreme minimum flow of 90 m³/s (15 MW) is permitted.~~

...

Issued at Christchurch on 08 September 2017

Canterbury Regional Council

Annexure B

Waitaki Power Stations

Appendix A

Extracts of Waitaki Operating Rules

(9 November 1990)

**As modified by an order pursuant to section 122 of the
Electricity Industry Act 2010**

Appendix A

Extracts from Scheme Operating Instructions

Explanation:

1. This appendix contains extracts from operating instructions for hydraulic structures that form parts of hydro-electricity generating stations in the Waitaki Catchment. These extracts have been prepared to list the external hydraulic conditions associated with these structures. Omitted portions refer to the implementation of those conditions and descriptive material, or parts of the scheme that are managed by another generator.
2. Levels unless otherwise stated are in terms of Mean Sea Level Lyttleton.
3. Flows are in m³/s. One m³/s is equal to one cumec.



Contents

Explanation

Map

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- 2. Lake Ohau**
- 3. Lake Ruataniwha and Ohau B and C Power Stations**
- 4. Benmore Power Station**
- 5. Aviemore Power Station**
- 6. Waitaki Power Station**

1. Lake Pukaki and Pukaki Canal, and Ohau A

Lake Pukaki Spillway

The following is an extract from "Lake Pukaki Spillway, Operating Instruction No. 25, Amendment B February 1981".

1.1. Levels

Design Flood Level	534.10 m
Maximum Control Level (MCL) – September – April	532.00 m
Maximum Control Level – May – August	532.50 m
Minimum Control Level	518.20 m
Extreme Minimum Control Level	518.00 m

- 1.2. The design flood discharge is 2200 m³/s with a level of 534.1 m. The nominal capacity of the spillway is 3400 m³/s with the gates fully open and a lake level of 534.1 m. The estimated 1:1000 year flood discharge is 2000 m³/s.
- 1.3. The initial spillway discharge shall be 35 m³/s and shall not be increased for at least 4 hours. The second shall be 70 m³/s and shall not be increased for at least 2 hours.
- 1.4. For lake levels above MCL the total discharge from Lake Pukaki (Spillway plus canal flows) shall not be less than the value given in the table below.

Height Above MCL (m)	Total Discharge (m ³ /s)
0.1	70
0.2	140
0.3	200
0.4	270
0.5	340
0.6	420
0.7	500
0.8	580
0.9	660

1.0	750
1.1	840
1.2	930
1.3	1020
1.4	1120
1.5	1220
1.6	1320
1.7	1420
1.8	1520
1.9	1610
2.0	1700

- 1.5 If the lake level rises more than 2.0 metres above MCL the gates should be opened in steps of 250 m³/s for each rise of 0.1 m until the lake level begins to fall.
- 1.6 On a falling lake the scheduled discharge shall be progressively reduced only if the estimated inflow is lower than the next scheduled discharge.

Pukaki Canal Spillway

- 1.7 The Pukaki Canal spillway is provided to prevent catastrophic canal failure. Operating rules are designed around this feature. The canal spillway is not for routine use. It is there in the case of emergency only and is used on a last resort basis.

2. Lake Ohau

The following is an extract from "Flood Operating Instructions Ohau A, B, C Power Stations and associated canals and spillways dated 11 May 1988".

2.1. Levels:

Two sets of levels are provided for. The levels not in brackets apply to the following situation:

- (a) Without extended weir and/or control gate or provision for environmental and irrigation releases to the Ohau River.

The levels in brackets apply to:

- (b) An extended weir and/or with a control gate and provision for environmental and irrigation releases.

Lake Ohau design flood level (1000 year return period flood) 522.90 m. [524.15 m] The design flood inflow commencing at 519.75 m [520.25 m] would raise the lake to 522.9 m, [524.15m] and assumes a canal discharge of 170 m³/s. (Review of Waitaki Hydrology, MWD, 1980).

Lake Ohau current operating range:

Design Flood Level	522.90 m [524.15 m]
Maximum Control Level (MCL)	519.75 m [520.25 m]
Minimum Control Level	519.75 m [519.75 m]
Extreme Minimum Control Level	519.45 m [519.45 m]

Lake Ohau Spillweir has a sill level of 520.0 m. [520.4 m]

- 2.2 Operation of Lake Ohau below Minimum Control Level is seen as anticipatory drawdown on rising inflows or forecasts of significant rainfall in the catchment.
- 2.3 When Lake Ohau level is above 519.75 m [520.25 m] the Ohau Canal inlet must be operated to discharge 170-200 m³/s to limit flood levels in the lake. The discharge will require the use of machine bypass facilities if the requisite flows cannot be passed through generating plant.

When Lake Ohau rises above 520.0 m [520.4 m] Ohau Canal shall be set to 200 m³/s.

- 2.4 Total flow in any part of the Ohau River shall, where possible, be limited to 560 m³/s (including all of Lake Ohau Spill weir flow, Lake Ruataniwha spill flow and Ohau C canal (Labyrinth Weir) spill flow).
- 2.4.1 When Lake Ohau level exceeds 521.0 m [521.65 m] then the flow at Ohau A Power Station shall be reduced to maintain inflows into Lake Ruataniwha at or below 1000 m³/s by progressive lowering of Pukaki Canal Inlet gates until they are shut. The flows shall be revised at least once every half hour (i.e., it is preferable to spill directly from Lake Pukaki and endeavour to keep flows in Ohau River below 560 m³/s). As flows in the lower river decrease to below 560 m³/s, flows through Pukaki Canal Inlet gates may recommence.
- 2.4.2 It may be necessary to use the available machine bypass valves to reduce risk of spillflow to the Ohau River above Ohau C Power Station thereby preventing the river flow exceeding 560 m³/s, i.e., the canals are to be used as flood channels in preference to the river.

3. Lake Ruataniwha and Ohau B and C Power Stations

The following is an extract from "Flood operating Instructions Ohau A, B, C Power Stations and associated canals and spillways".

3.1 Lake Ruataniwha

Design Flood Level	460.00 m
Maximum Control Level (MCL)	458.80 m
Minimum Control Level	458.50 m
Extreme Minimum Control Level	458.00 m

3.2 Spill from Lake Ruataniwha spillweir will commence when Lake Ruataniwha level rises above 459.0 m and inflow exceeds the Ohau B canal flow.

3.3 If level of Lake Ruataniwha reaches or exceeds 460.0 m the gates are to be manned and opened according to the following table:

Lake Level (m)	Approx Flow (m ³ /s)
460.0-460.1	1100
460.1-460.2	1200
460.2-460.3	1300
460.3-460.4	1400
460.4-460.5	1500
460.5-460.6	1600
460.6-460.7	1700

The required gate opening shall be reset at 15 minute intervals.

34.4 Labyrinth spillweir allows excess water in the Ohau C canal to spill into the lower Ohau river. It requires no control since it is a passive structure.

3.5 If Lake Ruataniwha spillway gates are opened when lake level is below 459.0 m the initial discharge shall not exceed 20 m³/s. The initial discharge shall not be exceeded for at least 3 hours. The second discharge shall not exceed 45 m³/s and shall not be increased for at least 2 hours. While lake level remains below 459.0 m further increases in discharge shall ensure that:

(a) Maximum Increase in flow at each gate change shall be 20 m³/s and

(b) There shall be at least one hour between gate changes.

- 3.6 Pukaki Canal inflows shall normally be regulated to make up the difference between Ohau A Power Station flow and the Ohau canal flow, which may on occasion be zero.
- 3.7 The mechanical gate stops shall be set to limit the maximum possible inflow to not more than 100 m³/s more than the maximum possible discharge through Ohau A power station (i.e. up to 660 m³/s maximum possible).

The position of the mechanical gate stops shall be reviewed at least daily (and at least once each eight hour shift, when Lake Pukaki is rising rapidly).

Note 1 An overlap between ranges is permitted to give some flexibility in following the table (4.3). However, the position of the gate stop **must** be altered before the lake level moves 0.1 metres outside the nominated lake level range. (Either with a rising or a falling lake level). The lake levels at the changing points are to be alarmed as a reminder.

4. Benmore Power Station

The following is an extract from "Benmore Power Station Operating Instruction No. 203, Amendment E: February 1981 Spillway and Spillway Channel".

4.1 Levels

Design Flood Level	362.60 m
Maximum Control Level (MCL)	361.45 m
Minimum Control Level	360.50 m
Extreme Minimum Control Level	355.25 m

4.2 The design flood for the spillway is 3400 m³/s and this can be passed with the lake at 362.30 m and all four spillway gates fully open. The nominal capacity of the spillway is 5100 m³/s with the four spillway gates and two dewatering sluice gates fully opened and the lake at 362.60 m (design flood level).

4.3 When the lake reaches Maximum Control Level (MCL) 361.45 m (0.05 metres above maximum operating level) discharge is approximately 600 m³/s through spillway and turbines combined.

4.4 For lake levels above 361.45m, the total discharge from the power station (turbine plus spillway discharge) shall not be less than the value given in the table. If required discharges at intermediate levels may be interpolated.

Lake Level (m)	Spillway and Turbines Combined Discharge (m ³ /s)
361.50	850
361.55	1000
361.60	1175
361.65	1350
361.70	1525
	Maintain 1525 m ³ /s total discharge until lake level falls to 361.65 m or rises to 361.95 m
361.95	1700

362.00	1875
362.05	2050
362.10	2225
362.15	2400
362.20	2575
362.25	2750
362.30	2925
362.35	3100
362.40	3300

Above 362.40 m the total station outflow shall be raised to not less than the inflow and the lake shall not be permitted to rise above 362.60 m.

Note: For lake levels of 361.70 m and above if preferred, spillway discharges can be considered independently of powerhouse discharges. In this case the spillway discharges shall be 300 m³/s less than the combined discharges tabled above.

- 4.5 On a falling lake the scheduled discharge shall be progressively reduced only if the estimated inflow is lower than the next scheduled discharge.

5. Aviemore Power Station

The following is an extract from "Aviemore Power Station, Spillway Operating Instruction No. 203, Amendment C: February 1981".

- | | | |
|-----|-------------------------------|----------|
| 5.1 | Design Flood Level | 269.20 m |
| | Maximum Control Level (MCL) | 268.30 m |
| | Minimum Control Level | 267.70 m |
| | Extreme Minimum Control Level | 265.25 m |
- 5.2 The spillway design flood is 3400 m³/s which can be passed at lake level 269.20 m with all five gates opened 5.5 m. The nominal capacity of the spillway is 4500 m³/s with all five gates fully opened.
- 5.3 When the lake level fluctuates within the range 268.30 m to 268.75 m no water need be discharged over the spillway. However, the spillway may be operated within this range, to maintain down river flows or reduce their fluctuation.
- 5.4 When the combined discharge of Benmore turbines and spillway exceeds the Aviemore turbine discharge, and Aviemore lake has risen to 268.80 m, the total discharge shall be brought equal to inflow by increasing the discharge by 175 m³/s for every 25 mm rise in lake level as illustrated in the following table.

Lake Level (m)	Spillway and turbines combined discharge (m ³ /s)
268.800	850
268.825	1025
268.850	1200
268.875	1375
268.900	1550
268.925	1725
268.950	1900
268.975	2075

269.000	2250
269.025	2425
269.050	2600
269.075	2775
269.100	2950
269.125	3125
269.150	3300

Above 269.15 m the total station outflow shall be raised to not less than the inflow and the lake shall not be permitted to rise above 269.20 m.

- 5.5 On the falling lake the scheduled discharge shall be progressively reduced only if the estimated inflow is lower than the next scheduled discharge.

6. Waitaki Power Station

The following are the operating procedures for Waitaki Power Station (September 1990).

6.1 Levels

Design Flood Level	234.50 m
Maximum Control Level (MCL)	230.80 m
Minimum Operating Level	228.70 m
Extreme Minimum Operating Level	227.00 m
Dam Crest Level	230.82 m

6.2 Operating Procedure

~~The normal minimum flow is 120 m³/s (20 MW).~~

~~With the agreement of the Manager, Operations and Rural Services, Canterbury Regional Council, an extreme minimum flow of 90 m³/s (15 MW) is permitted.~~

When reducing flow downstream of Waitaki, for flows below 200 m³/s, the maximum change in any one hour should be limited to 10% of the previous hours flow.

When increasing the flow downstream of Waitaki, for flows less than 200 m³/s, the maximum change in any one hour should be limited to 30 m³/s (5 MW).

When it is apparent that water will be spilled over the weir, the station should be put on maximum load, with load changes not exceeding 5 MW per hour.

6.3 Flood Operation

During period of high inflows the station should be brought to maximum load at normal operating rate and at the same time available storage at Benmore and Aviemore used to buffer short duration floods.

During a major flood all alternative water bypassing methods should be put into full discharge. This includes the power station being put on full load, and both sluice gates being opened. This provision should be initiated on any flood exceeding 2 m head over the spillway (A level of 232.82 m).

Flood magnitudes will be notifiable from further up the river, but should contact be lost with these other stations, or the South Island Control Centre, then the procedures above should be followed.

6.4 **Earthquake**

In the case of an earthquake of felt intensity of VI or greater on the Modified Mercalli scale, best endeavours should be made to lower the lake to the minimum operating level of 228.70 m, and then generally held about this level until advice of normal operations is received.