

13 October 2017

Kristin Morris  
Snowy Water Licence Review  
Intergovernmental and Strategic Stakeholder Relations  
Department of Primary Industries Water  
Locked Bag 5123  
Parramatta NSW 2124

**By email:** [snowylicence.review@dpi.nsw.gov.au](mailto:snowylicence.review@dpi.nsw.gov.au)

Dear Ms Morris

**RE: Snowy Water Licence Review - Submission**

Snowy Hydro Limited is the Licensee for the Snowy Water Licence and welcomes the opportunity to make a submission to this 10 yearly review.

Accordingly, please find attached for your consideration, Snowy Hydro's submission in accordance with the terms of reference.

We note that, in the interests of full disclosure, the submission includes reference to the Blowering Air Space Deed, a commercial-in-confidence agreement between Snowy Hydro Limited and the Water Administration Ministerial Corporation. We suggest that, prior to this submission being made available to the public, the parties jointly consider any issues that may be associated with disclosing these details.

Should you have any queries, please do not hesitate to contact me.

Your sincerely



Andrew Nolan  
Manager Water and Environment

# SNOWY WATER LICENCE REVIEW

## SNOWY HYDRO LIMITED SUBMISSION

13 October 2017




## 1. Executive Summary

Snowy Hydro Limited (**Snowy Hydro**) is the Licensee for the Snowy Water Licence. This is the first complete review of the Snowy Water Licence since corporatisation on 28 June 2002. The review provides an opportunity to consider Snowy Hydro's performance in meeting the conditions of the Snowy Water Licence and to assess whether there are any anomalies or practical issues that need to be addressed.

In accordance with the terms of reference for the review, Snowy Hydro's submission focuses on three particular areas of the Snowy Water Licence, and notes the following:

1. Administrative obligations: Snowy Hydro has complied with all of its administrative obligations under the Snowy Water Licence.
2. Schedule 3, "Increased flow requirements": Snowy Hydro's view is that Schedule 3 is effective and adequate, particularly following the Snowy Water Licence five year review in 2009; and
3. Schedule 4, "Water release requirements": Snowy Hydro's view is that Schedule 4 is overall effective and adequate, but a number of provisions could be improved as follows:
  - a. Review the definition of Unused Spills and interaction with Wet Sequence Protection and Within Year Release Requirements;
  - b. Investigate alternative Relaxation Volume provisions; and
  - c. Implement minor definitional amendments to improve the way that the licence operates.

Overall, the Snowy Water Licence strikes the right balance between the competing demands of flexibility for short term energy generation and long term water security for downstream water licence holders and is fit for purpose. There are opportunities for improvement, and we have identified these, along with reform proposals, in the following submission.

A decorative blue curved line at the bottom of the page, resembling a stylized wave or a bridge arch.

## 2. Introduction

The *Snowy Hydro Corporatisation Act 1997* (NSW) (**Corporatisation Act**) entitles Snowy Hydro to the grant of the Snowy Water Licence by the Water Administration Ministerial Corporation (**Ministerial Corporation**), and confers certain rights and obligations on Snowy Hydro.

The Snowy Water Licence is the key operating instrument that enables the Snowy Mountains Scheme to continue to meet the dual purpose for which it was originally constructed: the diversion of waters from the east to the dry west to provide irrigation water to downstream users, *and* the generation of renewable hydro-electricity in times of peak demand into the national electricity market. To this end, the Snowy Water Licence entitles Snowy Hydro to:

- collect all water from the rivers, lakes and streams within the Snowy water catchment;
- divert that water;
- store that water;
- use that water to generate electricity, and for purposes that are incidental or related to the generation of electricity or to the management of that water; and
- release that water from storage.

The company takes its role as a custodian of Crown water resources seriously and all efforts are made to ensure that the competing demands of water and energy users are met without prejudice to our stakeholders.

This is the first '10 year' review of the Snowy Water Licence, as required under s25(2)(b) of the Corporatisation Act and Snowy Hydro is proud to report that it has complied with all of its obligations under the Snowy Water Licence.

In this submission we discuss the principal obligations and identify areas for improvement. To the extent this submission does not address particular provisions, Snowy Hydro submits that those provisions are working effectively and do not require reform. Proposed amendments to the Snowy Water Licence are summarised following a bold heading (**Proposal**) and a consolidated list is attached at Appendix A of this submission.





### 3. Administrative Obligations

The following sections assess and demonstrate Snowy Hydro's compliance with the administrative obligations imposed under the Snowy Water Licence.

#### **Clauses 4.3-4.4 - Annual Compliance Report**

Following the addition of Clauses 4.3 and 4.4 to the licence in 2010, Snowy Hydro has made Compliance Reports publically available on its website ([www.snowyhydro.com.au](http://www.snowyhydro.com.au)) outlining annual performance for each of the obligations listed in clause 4.4. Even prior to the inclusion of this requirement in the licence, Snowy Hydro sought to improve public knowledge of scheme operations as well as Snowy Hydro's rights and obligations by publishing a 'Water Operations Reference Report' following the 2007-2008 Water Year. Between 2008 and 2015, Snowy Hydro also printed and publicly distributed water and environment reports which contained the compliance results required by clause 4.4, as well as informative text to help members of the public better understand Snowy Hydro's operations and compliance outcomes.

The Compliance Reports present a summary of compliance with Snowy Hydro's release requirements under the Snowy Water Licence, based on each year's Annual Water Operating Plan (**AWOP**). These results have been independently audited each year based on ISO19011 with the AWOP as the principal reference. The audit process is a desktop review of Snowy Hydro's water accounting and operating databases, documented procedures and includes interviews with operational staff. A summary of compliance with Increased Flow Requirements since corporatisation for the Snowy River and Snowy Montane Rivers is presented, respectively, in Tables 1 and 2 of Appendix B. A summary of compliance with Water Release Requirements since corporatisation is presented in Table 3 of Appendix B.


#### **Clause 7 - Licensee's Water Rights**

Snowy Hydro operates in accordance with the rights granted to it by clause 7 to collect, divert, store, use and release water. These rights are fundamental to, and indeed underpin, the operation and viability of Snowy Hydro. For completeness, Snowy Hydro recommends that Tables 1 to 7 of Schedule Five of the licence (which are referred to in clause 7.2(2)), be updated with the most up-to-date licenced extractive user data. While clause 10.8 of the Snowy Water Licence permits the Ministerial Corporation to deem amendments to these tables, the licence review provides the ideal opportunity to bring the licence text up to date.

**Proposal:** Update tables 1 to 7 of Schedule 5 with the most up-to-date licenced extractive user data.

#### **Clause 8 - Annual Water Operating Plans**

AWOPs have been prepared each year as required by clause 8. Each AWOP has included all items set out in clause 8.3, and the timing of first and second drafts has been consistent with the requirements of the licence, or as otherwise varied by agreement with the Water Consultation and Liaison Committee (**WCLC**). There has been no reason to invoke the AWOP dispute resolution process of clauses 8.5 and 13. Snowy Hydro has been an active

A decorative blue wave graphic at the bottom of the page, consisting of a thick blue line that curves upwards and then downwards, resembling a stylized wave or a bridge.

participant in the WCLC meetings and has considered the advice of the WCLC in good faith when preparing each AWOP, as required by clause 8.6. The approval of each AWOP by the WCLC, and subsequent independent audit of Compliance Reports for clause 4.3, demonstrate irrefutably Snowy Hydro's compliance with all aspects of its release obligations under the Snowy Water Licence.





## 4. Schedule 3 - Increased Flow Requirements

This section of the submission analyses Snowy Hydro's compliance with the 'Increased Flow' regime contained in Schedule 3 of the Snowy Water Licence.

Schedule 3 was the subject of the first review of the licence on the fifth anniversary of corporatisation. A number of amendments were made as a result of that review and since that time, we believe, the Increased Flow arrangements have been working effectively. Below is a comprehensive summary of Snowy Hydro's compliance with the relevant Increased Flow requirements. This section of the submission is categorised according to the six parts that make up Schedule 3 to the Snowy Water Licence.

### **Part One: General Requirements with Respect to Increased Flows**

Snowy Hydro has complied with all relevant requirements of Part One of Schedule 3. As licensee, Snowy Hydro has worked constructively with the Ministerial Corporation to implement, manage and monitor all increased flow requirements.

### **Part Two: Snowy River Increased Flows Generally**


Snowy Hydro has complied with all relevant requirements of Part Two of Schedule 3. An outlet has been constructed at Jindabyne Dam that can and has enabled flow rates of up to 5GL/day to the Snowy River below Jindabyne Dam.

### **Part Three: Snowy River Increased Flows from Mowamba River and Cobbin Creek**

As at the Corporatisation Date, physical limitations of Jindabyne Dam resulted in that dam having a limited ability to release the Snowy River Increased Flows (SRIF) envisaged under the Snowy Water Inquiry Outcomes Implementation Deed. Accordingly, the Snowy Water Licence required: (1) the construction of new outlet works to facilitate those releases, to be completed by the third anniversary of the Corporatisation Date, or (2) if not completed by that date, that SRIF be stored in Jindabyne Dam until they were capable of being released from the Dam (clauses 6.1 & 6.3 of Schedule 3).

However, to allow the SRIF to commence as at the Corporatisation Date, diversions into Lake Jindabyne from both the Mowamba River and Cobbin Creek were temporarily suspended during the construction period, thus permitting unregulated flows from those streams into the Snowy River a short distance downstream of Jindabyne Dam. The water that would have flowed into Snowy Scheme storages but for this arrangement is known as the Mowamba Borrow (that water was 'borrowed' from water users to provide early environmental flows to the Snowy River. The Mowamba Borrow was repaid following an agreement in 2010 between Snowy Hydro and relevant governments, to provide additional water to repay the debt, as well as to provide compensation to Snowy Hydro for forgone generation).

Construction of the new outlet works at Jindabyne Dam was ultimately delayed beyond the third anniversary of the Corporatisation Date. Given this delay the provisions of clause 6.3 of Schedule 3 were triggered. Therefore, between June 2005 and 30 January 2006, SRIF were made from Mowamba River and Cobbin Creek (in accordance with clause 6.3(1)).

A decorative graphic at the bottom of the page consisting of a blue wave-like shape that tapers at both ends.



The Mowamba Aqueduct was returned to service on 30 January 2006 and from this date, SRIF were made from Jindabyne Dam. Accordingly, from 30 January 2006 all SRIF have been released from Jindabyne Dam in accordance with the Snowy Water Licence.

These clauses are now redundant and should be removed from the Snowy Water Licence. Snowy Hydro complied with all of the relevant requirements of Part Three of Schedule 3 during the period which they were operative.

**Proposal:** Remove Part Three of Schedule 3 of the Snowy Water Licence as these clauses are now redundant.

**Part Four: Snowy River Increased Flows Targeted from Jindabyne Dam**


Snowy Hydro has complied with all relevant requirements of Part Four of Schedule 3. Snowy Hydro has consistently used all reasonable endeavours to remain within the tolerances of the specified Annual, Monthly and Daily targets from Jindabyne Dam. Snowy Hydro has also successfully targeted and delivered Flushing Flows to the Snowy River below Jindabyne Dam in all years when directed to do so by the Ministerial Corporation. The annual targets set by the Ministerial Corporation, actual releases and variance to target for SRIF are presented in Table 1 of Appendix B of this submission.

**Part Five: Snowy Montane River Increased Flows Generally**

Snowy Hydro has complied with all relevant clauses of Part Five of Schedule 3. Snowy Hydro has worked collaboratively with the Ministerial Corporation to identify suitable release points (**Works**) and deliver increased flows to all of the five catchments listed in Table One of Schedule 3. The annual targets set by the Ministerial Corporation, actual releases and variance to target for the Snowy Montane River Increased Flows (**SMRIF**) are presented in Table 2 of Appendix B of this submission.

In identifying suitable Works from which to make releases, the Ministerial Corporation and Snowy Hydro have sought to maximise the degree to which Increased Flows will meet the objectives set out in clause 18. In each instance, Snowy Hydro has assessed the inflows and engineering of each of the Works within each catchment and recommended to the WCLC how and where modifications should be made. All modifications have been made in compliance with clause 19.

SMRIF have all been delivered at a time and volume in compliance with clauses 21 and 22. As identified in clause 22.2, Table One was developed prior to the date of the Snowy Water Licence and as such the timelines for targeted volumes reflected an expectation of the Snowy River Annual Allocation that was not met. This outcome was dependent on the joint government enterprise "Water for Rivers" and was beyond the control of Snowy Hydro. In accordance with clause 21, SMRIF are directly proportional to SRIF from Jindabyne Dam. Now that the Snowy River Apportioned Entitlement exceeds 142 GL, annual targets are capped at 150 GWh of forgone generation. This target for the Montane Rivers is achieved in a year when the allocation to the SRIF program is 212 GL.





Each year, on or prior to 13 February, Snowy Hydro has been directed by the Ministerial Corporation as to the volume of foregone generation to be targeted for the Montane River Increased Flows and the volume that is to be apportioned to each of the five catchments. Snowy Hydro has complied with each of those directions.

With regard to Montane releases from structures other than Tantangara, clause 5.2 of the Snowy Water Licence specifies that the requirement to release a particular volume from a Work or to achieve a particular flow of water is a requirement for Snowy Hydro to use its best endeavours to release that volume by reference to average annual inflows into the Works, the operational characteristics of the Works and where relevant, by reference to simulated streamflow data for the applicable Work.

This has the practical effect that releases from these structures are made and accounted for based on long term historical or modelled data on a largely 'set and forget' basis. i.e. structures are turned out or modified to achieve an average flow across years rather than measuring releases and adjusting SMRIF targets annually based on over or under releases from the previous year. This approach is the most practical for the Montane catchments (with the exception of the Murrumbidgee) as the Works located in these catchments have little or no storage capability and receive highly variable inflows that cannot be managed or stored. By allowing releases to the Murrumbidgee River from Tantangara Dam to absorb the annual variation in apportionments, variable annual flows can also be targeted from this structure.

The use of aqueduct intake structures at or near the head of each of the catchments is an approach that was recommended by the Expert Panel in their Environmental Flow Assessment of the Montane Rivers. In their assessment, it was noted that by turning out a diversion structure in the reach immediately downstream of a dam, the water yield from the tributary may be used to set the channel size of the main river. They noted that the use of water from aqueduct(s) below an impoundment would be preferable to providing water from a dam as it would:

- provide longitudinal continuity and distribution of sand, organic matter and biota;
- avoid water quality problems associated with dam releases (e.g. very low temperatures and low dissolved oxygen);
- provide daily variability to the tributary and the main river without the need to manipulate releases to provide this variability (Bevitt, et al., 2009<sup>1</sup>).

Achieving the exact targets listed in Table One for each of the catchments is not practical due to the nature of each of the Works available for making releases in each of the catchments. The actual volume targeted in each of the catchments is dependent primarily on the available Works from which to target releases. For example, 18.9GL is currently apportioned to the Snowy River Gungarlin catchment instead of the listed apportionment of 29GL. The annual apportionment of 18.9GL represents the long term average diversion of the two Works that have been selected to make releases from, i.e. Diggers Creek Intake on Diggers Creek and Bar Ridge Intake on Tolbar Creek. These two creeks are the closest

---

<sup>1</sup> Bevitt, R. et al., 2009. Expert panel environmental flow assessment of various rivers affected by the Snowy Mountains Scheme, Sydney, NSW: NSW Department of Water and Energy.

regulated tributaries to Island Bend Dam and their total turnout enables all of the benefits listed above to be realised.

The implemented release points, release volumes and associated foregone energy when annual allocations meet the 150 GWh cap are presented in the following table.

Catchment	GWh Conversion	Release Point/s	Annual Target when SRIF is 212GL	
			GWhr	GL
Murrumbidgee River	1.94	Tantangara Dam	69.4*	35.8
Goodradigbee River	1.94	Goodradigbee Main Diversion Structure	23.3	12.0
Geehi River	1.85	Middle Creek Intake and; Strezlecki Creek Intake	42.0	22.7
Snowy River Gungarlin	0.71	Diggers Creek Intake and; Bar Ridge Intake (on Tolbar Creek)	13.4	18.9
Snowy River Perisher/Rams Flat	0.57	Falls Creek Aqueduct – All Intakes	1.9	3.4
<b>Total</b>			150	

\*Note: When the SMRIF annual apportionment is less than 150GWh, the volume apportioned to the Murrumbidgee River will be reduced. The Goodradigbee Main Diversion Structure can also be reconfigured to target a reduced apportionment. All other release points are too small to be adjusted on an annual basis.

### **Part Six: Snowy Montane Rivers Increased flows Targeted from Tantangara Dam**

The nature of the infrastructure at Tantangara Dam allows for the accurate targeting of releases on a daily, monthly and annual time scale. In contrast to the other catchments, as specified in Part Six of Schedule 3, releases from Tantangara Dam are required to be precisely targeted and released, with any shortfalls to be delivered or excesses deducted in the following year. Snowy Hydro has demonstrated full compliance with Part Six of Schedule 3. The annual targets set by the Ministerial Corporation, actual releases and variance to target for the SMRIF from Tantangara Dam are presented in Table 2 of Appendix B of this submission.



## 5. Schedule 4 - Water Release Requirements

This section of the submission analyses Snowy Hydro's compliance with the water release requirements contained in Schedule 4 to the Snowy Water Licence.

Snowy Hydro has complied with all water release requirements. Overall, the release requirements in Schedule 4 are working effectively, but there are a small number provisions which could be improved in order to better meet stakeholders' expectations. More complex issues, and opportunities for improvement are discussed in greater detail in the following section of this submission.

### **Clauses 2, 3, 4 & 5**


Operation of the Snowy Scheme revolves around the water available to each development and the preservation of catchment based sharing of inflows as set out in Clauses 2, 3 and 4 of Schedule 4. These principles were fundamental to the design of the Snowy Scheme and must continue to apply. The water accounting principles in Clause 5 of Schedule 4 are also appropriate for continued use.

### **Clauses 6 & 7**

Clauses 6 and 7 of Schedule 4 contain formulae for calculating the Relaxation Volume for the Snowy-Murray and Snowy-Tumut Developments respectively. The effect of the Relaxation Volume is to reduce the Required Annual Release (**RAR**) to a floor of 800GL on each Development where system inflows and storage volumes mean that full allocations will be achieved for downstream users.

The concept of 'relaxation' is that RAR should be able to be reduced in any year to the extent it is not required for States to announce a 100% allocation for all categories of water licences in the regulated Murray and Murrumbidgee river systems, with the volume of "relaxation" converted to Above Target Water. In other words, since the water is not needed for licence holders, it is retained in the Snowy Scheme. This has clear benefits for all water users, since it reduces the risk of downstream spill, as well as reducing evaporation losses. While the concept of relaxation is universally accepted and endorsed, the practical reality of the implementation of these clauses has meant that since corporatisation, there has been very little 'relaxation water' calculated early enough in the Water Year to materially change that year's water releases, even during the particularly wet conditions post the 'Millennium Drought'.

The determination of the trigger of the Relaxation Volume requires calculations of storages and allocation volumes under "Baseline Conditions" (ie, as at 2002). The volume of 'relaxation water' has been lower, and arrived later, under so-called Baseline Conditions than would have been the case using actual conditions for both Developments. Changes to government policy and industry practices mean that Baseline Conditions - those existing at corporatisation - no longer persist, and use of observed or historic information is less likely to be a reasonable proxy for Baseline Conditions.





Given the complexity of the implementation of relaxation provisions, a proposal to vary Clauses 6 and 7 is detailed separately below in Section 6(3) of this submission.

In addition, as a result of an administrative error during a variation to the Snowy Water Licence, incorrect drafting appears in clause 7.1 of Schedule 4. The intention of the Licensee and the Ministerial Corporation is that the reference therein to " $0 \leq RV \leq 262$ " should be a reference to " $0 \leq RV \leq 226$ ".

**Proposal:** Update text in Clause 7.1 of Schedule 4 from "262" to "226".

### **Clause 8**

Clause 8 of Schedule 4 gives effect to another fundamental principle of the Snowy Scheme. The Snowy Scheme was designed to be able to consistently deliver the RAR from each development through the design drought sequence of 1936 and 1946. In order to achieve this, the Snowy Scheme must start the design drought sequence with sufficient storage. This is known as the target storage principle. Clause 8 introduces the Dry Inflow Sequence Volume (**DISV**), which effectively reduces RAR to the extent that it cannot be met by inflows and remaining below target storage. This clause allows the Snowy Scheme to continue making releases, albeit at a lower volume, through a persistent sequence drier than the design drought.

The "Millennium Drought" which peaked in the Snowy Mountains in 2006 and 2007, saw persistent inflows drier than the design drought, which lead to DISV reductions to the RAR on the Snowy-Murray Development from 2006-2007 through to 2015-2016, with recovery in 2016-2017 and on the Snowy-Tumut Development from 2006-2007 through to 2009-2010, with recovery in 2010-2011. Amendments to the Snowy Water Licence were made through this period to improve the implementation of the DISV clauses and Snowy Hydro complied with all relevant obligations. In Snowy Hydro's view, clause 8 is now fit for purpose and no further variations are required.


### **Clause 9**

Clause 9 provides for Inter-Valley Transfers to be carried out in Snowy Hydro storages from the Murray Valley to the Murrumbidgee Valley or vice-versa for the benefit of downstream water users. Snowy Hydro has complied with Clause 9 when such requests have been made. No variations are proposed to this clause.

### **Clause 10**

Clause 10 details releases that may be called out by the Ministerial Corporation. Snowy Hydro has complied with this clause.

Clause 10.1 describes the volume of water that may be called out relative to the maximum Relaxation Volume and an actual release deficit relative to a fixed 900 GL figure that occurred in the previous Water Year. The current definition in the Snowy Water Licence does not take into account the Pre-Release Volume that was added to the Snowy Water Licence in the amendments that took effect on 4 October 2011.

A decorative graphic at the bottom of the page consisting of a smooth, light blue wave-like shape that tapers at both ends.

In 2013 the WCLC agreed to simplify the drafting of this clause to reflect these changes as follows:

*For the Snowy-Murray Development, if the maximum Relaxation Volume in a Water Year was greater than 162 GL, a volume of water that could be called out not later than 31 August in the following Water Year is the greater of:*

(1) Zero and

(2) Maximum Relaxation Volume – 162 GL – Discretionary ATW Release

*Where Discretionary ATW Release represents ATW release made entirely at SHL's discretion and is defined as ATW Release excluding ATW components in the RAR formula as well as Drought Release and Call Out of River Murray River Increased Flows.*

*For the Snowy-Tumut Development the same conditions apply with 162 GL substituted by 126 GL.*

Clause 10.4 of Schedule 4 describes the volume of water that can be called out for RMIF. In broad terms the arrangements under this provision are appropriate, however the definition of "Net Above Target Water" in clause 1.1(50) referenced in clause 10.4 is not satisfactory, and this has led to confusion in the operation of the RMIF provisions. See section 6(2) below in this submission, for further details.

**Proposal:**

- A. Amend Clause 10.1 of Schedule 4 in line with the new definition agreed by the WCLC.
  
- B. Include the definition "Discretionary ATW Release" agreed by the WCLC in Clause 1.1.


**Clause 11**

Clause 11 contains formulae for calculating the volume of water that must be released from each development from 1 December to 30 April in any water year that an Unused Spill occurs. Snowy Hydro has complied with these obligations, although outstanding implementation issues have been identified by the WCLC that must be resolved. The issues relate to the calculation of Unused Spill and other compensating release mechanisms. See Section 6(1) below in this submission, for further details.

**Clause 12**

Clause 12 sets out the formulae for determining the RAR from each development. Specifically, clauses 12.1 through 12.3 set out the RAR requirements, the provisions of clause 12.4 limit releases from Jounama Dam when Blowering Dam releases exceed the Tumut River Channel capacity and clause 12A sets out Tantangara riparian release requirements.

Actual release volumes compared to the annual RAR are displayed in Table 3 of Appendix B and show that Snowy Hydro has complied with Clauses 12.1 to 12.3.

A decorative blue arc graphic at the bottom of the page.



During times of Blowering spill when the Tumut River channel capacity is exceeded, Snowy Hydro works closely with the Ministerial Corporation and Water NSW to manage operations to safely pass flood waters. These conditions have occurred twice since corporatisation, in 2010 and 2016. During these periods, Snowy Hydro calculates the “Jounama Pre-SMA Releases”, the volume of water that would have passed through the Tumut River at Jounama Dam had the Snowy Scheme not been constructed. Snowy Hydro maintains daily records of actual releases from Jounama Dam compared with Jounama Pre-SMA Releases, ensuring that what is released to ease flood pressure in Snowy Scheme storages does not exacerbate flooding further down the Tumut/Murrumbidgee Rivers. These records are provided to the Ministerial Corporation and Water NSW daily throughout the flood events and no compliance issues with Clause 12.4 have been identified. Furthermore, we note that the *Review of water management during the 2010 flood events in the Tumut River and Murrumbidgee River* undertaken by the NSW Office of Water concluded that Snowy Hydro complied with all of its licence obligations during the 2010 floods.

There have, however, been issues raised relating to the accounting of releases from Blowering during times of flood that are discussed further below in Section 6(1) of this submission.

Riparian requirements for releases from Tantangara Dam set out in Clause 12A have been met. These obligations were maintained, even through the record breaking Millennium Drought.


### **Clause 13**

Clause 13 details flexibility and pre-release provisions relating to releasing more or less than the RAR in any one year. Compliance with this clause of the Snowy Water Licence has been routinely demonstrated.

As a result of an administrative error during a variation to the Snowy Water Licence, incorrect drafting appears in Clause 1.1(3). The intention of the Licensee and the Ministerial Corporation is that the reference therein to “Clause 13.1” should be a reference to “Clause 13.2”.

**Proposal:** Amend the definition at Clause 1.1(3) to reference “Clause 13.2” of Schedule 4, instead of “clause 13.1”.

Clauses 13.2 and 13.3 provide the Ministerial Corporation and Snowy Hydro with the ability to agree to release less than the RAR. Clauses 13.4 through to 13.6 provide Snowy Hydro with the ability to release a volume of water as a pre-release of the following year’s RAR, and describe the Wet Sequence Protection provisions to ensure that a pre-release does not prejudice downstream water users. Implementation issues relating to the interaction of Wet Sequence Protection provisions with Within Year Release Requirements and Unused Spill have been identified by the WCLC. See Section 6(1) of this submission, for further details.





A drafting error in the definition of the “Recovery Amount” used in the maximum pre-release volume calculation in Clause 13.4 and referenced in Clause 16.1 was identified and agreed by the WCLC in 2013. The definition in Clause 1.1(56) should be amended to the following:

“**Recovery Amount**” means, for each Development with respect to each Month in a Water Year, the volume (if any) by which the Dry Inflow Sequence Volume for that Development calculated as at the commencement of that Month under clause 8 of Schedule Four is less than the volume of the Dry Inflow Sequence Volume for that Development calculated as at the commencement of March in the previous Water Year under clause 8 of Schedule 4;

**Proposal:** Amend the definition at Clause 1.1(56) to the definition agreed by the WCLC.

#### **Clause 14**

Clause 14 imposes obligations on Snowy Hydro and the Ministerial Corporation to provide data to one another and establishes standards for how the data is collected, verified and shared. These obligations have been complied with and Snowy Hydro has not identified any need for change to clause 14.

#### **Clause 15**

Clause 15 imposes obligations on the Ministerial Corporation to develop, and to procure the Murray Darling Basin Authority to develop, analytical models to estimate storage volumes and diversions under Baseline Conditions in the Murrumbidgee and Murray Valleys respectively. Snowy Hydro does not propose any variation to these clauses, but notes that there have been issues in assessing ‘Baseline Conditions’. Refer to Section 6(3) of this submission for further details.

#### **Clause 16**

Clause 16 sets out water accounts that Snowy Hydro must maintain. These accounts are detailed in the AWOPs and the obligations in this clause have been complied with. When amendments were made to the Snowy Water Licence in 2011, there was an oversight in the sharing of the net evaporation losses from the Snowy Scheme. Under current arrangements, Net Evaporation is shared amongst the Snowy-Murray and Snowy-Tumut developments and Above Target Water (ATW)/ RAR accounts based on the actual volume of water in each of those physical storages and accounts. Following the same principles, the RMIF Account and the Snowy-Murray and Snowy-Tumut Drought Accounts should also be subject to a relative share of evaporation. As the volume of water held in the drought and RMIF accounts has increased, the proportion of evaporation that must logically be applied to these accounts has also increased. As such, these accounts are being unfairly supported by water in the Snowy Scheme designated for consumptive use downstream.

**Proposal:** Review how Net Evaporation is shared by all accounts.



## 6. Proposed variations to Schedule 4

This section analyses more complex issues in the operation of Schedule 4 and proposes reform solutions.

### 1. Unused Spills

An important element of the Snowy Water Licence which presents an opportunity for reform is the concept of 'Unused Spill' and, in particular, its interaction with other provisions of the Snowy Water Licence and the Blowering Air Space Deed.

Unused Spill is defined in clause 1.1(93) of the Snowy Water Licence. It can be broadly summarised as either a physical spill from Hume Dam or Blowering Dam, or a release from those dams to prevent their exceeding full storage levels under expected inflow conditions, where those releases are not used for downstream consumptive or environmental demands. However, critically, an Unused Spill does not include releases from Blowering Dam where those releases are made to target an airspace volume under the Blowering Airspace Deed. The importance of this qualification is explained further below.

There are two consequences under the Snowy Water Licence when an Unused Spill occurs:


#### i) **Within Year Release Requirements**

Under clause 11 of Schedule 4 to the Snowy Water Licence, between 1 December and 30 April each Water Year, Snowy Hydro must release from each development a volume of water equal to the sum of Unused Spills for that development, up to a maximum of approximately 20% of RAR on 1 November. This provision is designed to 'protect' against spills from downstream storages as a result of large Snowy Scheme releases early in the Water Year. In other words, where Snowy Hydro makes large 'early' releases causing an Unused Spill, this provision is intended to ensure a minimum volume is released between December and April.

#### ii) **Wet Sequence Protection**

Under Schedule 4 to the Snowy Water Licence, Snowy Hydro is permitted to pre-release a volume of water (up to a prescribed maximum) from a development in excess of the RAR for that Development, known as a 'Required Annual Release Pre-Release Volume' but usually referred to simply as a 'Flex' release. Flex releases are accounted as a pre-release of RAR for the relevant development for the subsequent Water Year (and not as a release of Above Target Water). This flexibility measure was one of the amendments adopted in the October 2011 variation to the Snowy Water Licence.

In order to ensure that each Flex release does not compromise the quantity of water available to downstream users, each such release is protected by the downstream wet sequence protection provisions in clauses 13.5 - 13.6 of Schedule 4. These clauses provide that, if there is Flex release which exceeds the volume which would be permitted under the previous 'DISV Flex' provisions, and an Unused Spill occurs

A decorative blue wave graphic at the bottom of the page, consisting of a smooth, curved line that tapers at both ends.



in the following Water Year, a volume of water will be added to the RAR from the relevant development in that Water Year (such volume being a “**Downstream Wet Sequence Protection Volume**”). These provisions are designed to preserve the integrity of the volume of releases from the Snowy Scheme in the event of an Unused Spill following a Flex Release. Snowy Hydro is required to release the Downstream Wet Sequence Protection Volume from Above Target Water in order to ‘make good’ an Unused Spill.


While these measures are designed to ‘compensate’ for water lost through an Unused Spill, it is important to bear in mind that Snowy Hydro does not own any water. All water comprising a compensation release already vests in the Crown; accordingly, the requirement to make such a release does not, in aggregate, increase the Crown’s water resources or restore water lost elsewhere in the system. These releases merely have the effect of forcing the release of a volume of water from the Snowy Scheme within a particular timeframe.

### **1) Blowering Air Space Management**

The Blowering Air Space Deed is an agreement between Snowy Hydro and the Ministerial Corporation. Under clause 6.1 of the Blowering Air Space Deed, Snowy Hydro may notify a ‘Required Airspace Provision’ it requires the Ministerial Corporation to target in Blowering Dam, as well as the volume of water Snowy Hydro is prepared to store in the Snowy-Tumut Development to make ‘Compensation Releases’. Under clause 6.2 of the Blowering Airspace Deed, the Ministerial Corporation must use best endeavours to target the Required Air Space Provision, but only up to the balance of the Pre-Release Compensation Account (being the volume of water held by Snowy Hydro for the purpose of making Compensation Releases).

The Blowering Air Space Deed must be viewed in the context of clause 12.4 of Schedule 4 to the Snowy Water Licence, which states that if Blowering Dam is spilling and the flow immediately downstream of Blowering Dam exceeds the operating channel capacity of the Tumut River, Snowy Hydro must not release water from Jounama Dam in a daily volume that exceeds natural inflows into Jounama Dam. The Blowering Airspace Deed represents a mechanism by which Snowy Hydro can manage the risk of this release restriction coming into effect. Without it, Snowy Hydro would be more likely to be exposed to the risk of attempting to release into an already full Blowering Dam, thereby causing an Unused Spill and, potentially, triggering clause 12.4 of Schedule 4. There is no corresponding restriction on releases from the Snowy-Murray Development.

The Tumut River channel capacities referenced in clause 43 of the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016 act to exacerbate the difficulties of airspace management at Blowering Reservoir. It has been demonstrated in both the 2010-2011 and 2016 flood events that the limits of 9 GL/ day at Oddy’s Bridge and 9.3 GL/ Day at Tumut township severely and unnecessarily hamper the ability of Water NSW to make pre-releases from Blowering Dam as required under the Blowering Air Space Deed. This issue is exacerbated by inflows from Goobragandra River, which can exceed the Tumut township channel capacity without any release from Blowering Dam. There is a line of logic that during these conditions, current arrangements increase the risk of major flooding by

A decorative blue wave graphic at the bottom of the page, consisting of a thick blue line that curves upwards and then downwards, resembling a stylized wave or a bridge arch.



forcing Blowering Reservoir to absorb inflows until control of the dam is lost. Release volumes in the order of 14 GL/ day were observed during the 2016 flood event and were shown to not impact or create significant risk to people or infrastructure. The ability to release beyond 9.3 GL/ day during times of heightened flood risk would substantially reduce the likelihood of more severe flooding.

**Proposal:** Review the appropriateness of the Tumut River channel capacities in Clause 43 of the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016 to improve flood management at Blowering Dam.

## 2) Reform of Unused Spill

The large inflows that occurred during the 2011 and 2017 Snowy Water Years exposed deficiencies in the current drafting of the definition of Unused Spill and its interaction with related provisions in the Snowy Water Licence and the Blowering Air Space Deed.

Currently, the calculation of Unused Spills takes no account of factors which may cause a spill in Blowering or Hume Dams other than inflows from the Snowy Scheme. In other words, it assumes that all spills must be caused by such inflows. Logically, the storage in, say, Hume Dam, and therefore the propensity for a spill to occur, is a function of not only inflows from the Snowy-Murray Development but also other inflows (both regulated and unregulated) into and the volume of releases from, Hume Dam. It is inequitable and makes no sense that Snowy Hydro should be deemed responsible, as is the case under the current water accounting arrangements, for all Unused Spills.

The current drafting of the definition of Unused Spill also takes no account of Snowy Hydro's minimum release obligations. In particular, Snowy Hydro has, through the Snowy Water Licence and Corporatisation Act<sup>2</sup>, a legal obligation to release the RAR from each development. As currently drafted, Snowy Hydro can be penalised by the Unused Spill arrangements for complying with this obligation. This deficiency should be rectified by excluding from Unused Spills releases of RAR where, at the time of the Unused Spill, cumulative releases of RAR do not exceed pro-rated releases of RAR.

Finally, the excision of Blowering Pre-Releases from Unused Spills from Blowering Dam has resulted in a difference in treatment of releases between the Snowy-Tumut Development and the Snowy-Murray Development.

In times when Snowy Hydro has nominated a Required Airspace Provision (and holds an equivalent volume of compensation releases) the Ministerial Corporation must target that level of airspace by making pre-releases from Blowering Dam. If the Blowering Airspace Deed did not exist, the Ministerial Corporation may have been required to release, in part or in full, equivalent pre-releases from Blowering Dam, and those pre-releases may have constituted an Unused Spill (with the consequences that arise from an Unused Spill). However, the effect of the requirement of the Ministerial Corporation to target a Required Airspace Provision by the making of pre-releases, and the carving out of those pre-releases

---

<sup>2</sup> See s34



from the definition of an Unused Spill, means that pre-releases under the Blowering Airspace Deed can displace pre-releases which may have constituted an Unused Spill.

We understand that the Ministerial Corporation accepts this displacement, but only to the extent that the volume of pre-releases equals the Pre-Release Compensation Account volume. Under this view, if the Ministerial Corporation must make pre-releases which exceed, on a cumulative basis, the Required Air Space Provision (which, for convenience, we refer to as “**Excess Blowering Pre-Releases**”), then, those Excess Blowering Pre-Releases should (under such an approach) be accounted as an Unused Spill.

Pre-releases from Blowering in order to target a Required Air Space Provision must, by definition, be compensated, through the Pre-Release Compensation Account, but, at present, any Excess Blowering Pre-Releases will neither be compensated through the Pre-Release Compensation account nor compensated through the Unused Spill provisions. This contrasts with pre-releases from Hume Dam, all of which are compensated through being accounted as an Unused Spill.

We understand the position of the Ministerial Corporation that such reform is necessary to ensure that it has the intended benefit of the Unused Spill provisions as they apply to the Snowy-Tumut development. An amendment to the current definition of Unused Spill would be required to give effect to this approach. Snowy Hydro generally supports this reform, but only on the basis that the other abovementioned deficiencies are addressed.


### **3) Proposed Changes to Unused Spill**

We summarise the proposed changes to the definition of Unused Spill below.

- i) ***Unused Spills should be reduced to the extent they have been caused or contributed to by changes to water management which have increased the height of Blowering/Hume Dam***

Since the Snowy Water Licence commenced in 2002, there have been two significant changes to water management that have increased the volume of water likely to be held in Blowering Dam at any point time, and which therefore may increase the likelihood of an Unused Spill. The definition of Unused Spill should be amended such that any increases in Blowering Dam arising from these changes should, to the extent they have contributed to an Unused Spill, be excluded from or carved out of the Unused Spill volume.

The changes are, firstly, an increase in the ability of general security entitlement holders to carryover water between seasons, from 15% to 30% (this change came into effect on 1 July 2008). Secondly, there has, since 2002, been a steady increase in environmental water - that is, water that is removed from allocation for consumptive use and returned to the environment. Such water is typically likely to be stored in Blowering Dam or Hume Dam for a longer period of time than water made available for irrigation. Accordingly, an increase in environmental water means that, at a given point in time, storage levels in Blowering Dam and Hume Dam are likely to be higher than would otherwise have been

A decorative blue wave graphic at the bottom of the page, consisting of a thick blue line that curves upwards and then downwards, resembling a stylized wave or a bridge arch.



the case. This change is therefore likely to have increased both the likelihood and extent of an Unused Spill, independent of any action taken by Snowy Hydro.

- ii) ***Unused Spills should not include releases of RAR where, at the time of the Unused Spill, cumulative releases of RAR do not exceed pro-rated releases of RAR***

An Unused Spill should:

- a) take account of other (non-Snowy Hydro) inflows into Blowering and Hume Dams; and
- b) only take account of releases of RAR from the Snowy-Murray and Snowy-Tumut Developments to the extent that actual cumulative releases at the time of the Unused Spill exceed the notional pro-rated cumulative release volume of RAR from that development. That is, Snowy Hydro should be not be penalised (through the application of the Unused Spill provisions) for carrying out its legal obligation to release RAR, so long as Snowy Hydro does not release an 'early' RAR volume (that is, greater than the notional pro-rated RAR release volume).

Formally, the current definition of Unused Spill would be adjusted by calculating the total inflows into Blowering and Hume Dams, and deducting from that total all non-Snowy Scheme releases and the notional pro-rated RAR volume for the development at the time of the spill.

- iii) ***On the Snowy-Tumut Development, Unused Spills should include Excess Blowering Pre-Releases***

To the extent that abovementioned reforms are implemented, Excess Blowering Pre-Releases should be accounted as an Unused Spill, for the reasons already described. Snowy Hydro's support for this amendment is conditional upon implementation of changes referenced in paragraphs a) and b) above.

- iv) ***Interaction of Unused Spill, Within Year Release Requirements and Wet Sequence Protection***

If changes to the definition of Unused Spills impact on the intent of Within Year Release Requirement and Wet Sequence Protection clauses, there may also be a need to review these sections of the Snowy Water Licence. Any opportunity to clarify or simplify the interaction of these clauses would be welcomed by Snowy Hydro.

**Proposal:** Review the definition of Unused Spills and the interaction with Wet Sequence Protection and Within Year Release Requirements with reference to the identified issues and principles.

## **2. River Murray Increased Flows**



Section 10.4 of Schedule 4 provides an option each Water Year for the Ministerial Corporation to call out RMIF, which are water savings that are kept within the Snowy Scheme for environmental flows in the Murray Valley. Although such water is stored within the Snowy Scheme, the water accounts for RMIF are maintained by the Murray-Darling Basin Authority under the Murray-Darling Basin Agreement.

The Ministerial Corporation is able to call out such water from the Snowy Scheme at any time at which “Net Above Target Water” (which is ATW less water held in the Drought Accounts) is above 800 GL. This call-out provision was introduced by the amendments which took effect on 4 October 2011. The rationale for this amendment was that, by facilitating more regular releases of RMIF, the Ministerial Corporation would be able to exercise greater control over RMIF.

However, since the RMIF call out arrangement was implemented, a deficiency in the definition of Net ATW has become apparent. The use of a Net ATW trigger was designed to ensure that encumbered or ‘tagged’ volumes of ATW held by Snowy Hydro were excluded from RMIF call outs. For that reason, Net ATW excludes water held in the drought accounts. However, the current definition of Net ATW does not exclude similarly tagged ATW water, being:

- i) SRIF;
- ii) releases of ATW under the call out provisions in clause 10.1 of Schedule 4 (which permits the Ministerial Corporation to call out ATW, subject to certain conditions, if in the previous Snowy Water Year the Relaxation Volume exceeds 162 GL or 126 GL in the Snowy-Murray and Snowy-Tumut Developments respectively); and
- iii) the volume of ATW held in the Snowy-Tumut Development in the Pre-Release Compensation Account for the purposes of the Blowering Air Space Deed.

The failure of Net ATW to recognise these tagged volumes is inconsistent and undermines its purpose, which was to allow a buffer of ATW for Snowy Hydro’s commercial operations. Indeed, in circumstance where a high volume, in aggregate, of tagged ATW persists, the use of the RMIF call out could significantly compromise Snowy Hydro’s ability to use ATW in the Snowy-Murray Development. This is not consistent with the concept of ATW, which by definition is intended to be ‘discretionary water’.

**Proposal:** The definition of Net ATW in Clause 1.1(50) should be amended to include all “tagged” ATW volumes to properly reflect the discretionary volume of water.

### 3. Relaxation Volume





The current approach to determining Relaxation Volumes is not achieving its intended outcomes, to the detriment of all water users. The complexity of this issue, and in particular the calculation of Baseline Conditions, does not present a simple answer and makes any solution difficult to achieve within the timeframe of the review. The complexity increases for the Snowy-Murray development given the number of stakeholders involved. It has also been observed that the Millennium Drought has significantly altered the estimates of minimum catchment Inflows and transmission losses, yet the Snowy Water Licence contains prescribed volumes with no provision to be amended.

We believe that Snowy Hydro, Water NSW and the Ministerial Corporation can and should work together to find a mutually advantageous outcome for the Snowy-Tumut development that could be trialed to demonstrate advantages over current arrangements that could eventually be implemented on the Snowy-Murray Development. This work does not need to be confined to the Snowy Water Licence review. The modelling of Baseline Conditions is not prescribed in the Snowy Water Licence, and so can be assessed and improved both within and beyond the formal review period.

**Proposal:**

- a) Investigate alternate relaxation provisions including alternates to existing baseline modelling.
- b) Allow for provisions in the Snowy Water Licence to update Tables 1 to 4 of Schedule 4 outside of the formal review processes to account for changes to estimates of catchment inflows and transmission losses following events such as the Millennium Drought.

#### **4. Maximum Probable Releases**

Under clause 8.3 of the Snowy Water Licence, each AWOP prepared by Snowy Hydro must include the “Maximum Probable Annual Water Release” (“**MPAWR**”) from each Development for the relevant Water Year to meet electricity requirements and/or to manage storage levels. This provision is intended to represent the maximum release volume Snowy Hydro could physically deliver without compromising on future RAR requirements.

The Snowy Water Licence does not currently define how the MPAWR should be calculated. This can give rise to uncertainty and potential disagreements in the AWOP process. This uncertainty was increased by the amendments to the Snowy Water Licence adopted in October 2011, in particular the introduction of Flex Releases (which, as mentioned, represent a pre-release of the following year’s RAR). In order to address this issue, the method for the calculation of MPAWR should be defined in the Snowy Water Licence.

We recommend that, for a Snowy Water Year, MPAWR should be defined as the sum of:

- i) the applicable RAR;



- ii) the available Flex Release volume; and
- iii) the volume of Net ATW (calculated as at the start of that Snowy Water Year) using the definition proposed above (see section 6(2), *River Murray Increased Flows*).

As can be seen, this definition encompasses the yearly mandated release volume (ie. RAR), as well as all 'discretionary water' - that is, ATW that is not otherwise encumbered or tagged for a specific purpose, such as water held in Drought Accounts. It is therefore a true measure of the maximum release volume from a Development in any given Water Year. Including this definition in the Snowy Water Licence will reduce uncertainty and ensure the MPAWR remains an accurate representation of maximum releases.

**Proposal:** Include the amended definition of Maximum Probable Annual Water Release in Clause 1.1 of the Snowy Water Licence.





## Appendices

### **Appendix A - Summary of proposed amendments**

- Update tables 1 to 7 of Schedule 5 with the most up-to-date licenced extractive user data.
- Remove Part Three of Schedule 3 of the Snowy Water Licence as these clauses are now redundant.
- Update text in Clause 7.1 of Schedule 4 from 262 to 226.
- Amend Clause 10.1 of schedule 4 in line with the new definition agreed by the WCLC.
- Include the definition “Discretionary ATW Release” agreed by the WCLC in Clause 1.1 of the licence.
- Amend the definition of Clause 1.1(3) to reference Clause 13.2 of Schedule 4.
- Amend the definition of Clause 1.1(56) to the definition agreed by the WCLC.
- Review how Net Evaporation is shared by all accounts.
- Review the appropriateness of the Tumut River channel capacities in Clause 43 of the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016 to improve flood management at Blowering Dam.
- Review the definition of Unused Spills and the interaction with Wet Sequence Protection and Within Year Release Requirements with reference to the identified issues and principles.
- The definition of Net ATW in Clause 1.1(50) should be amended to include all “tagged” ATW volumes to better reflect the discretionary volume of water.
- Investigate alternate relaxation provisions including alternates to existing baseline modelling.
- Allow for provisions in the Snowy Water Licence to update Tables 1 to 4 of Schedule 4 outside of the formal review processes to account for changes to estimates of catchment inflows and transmission losses following events such as the Millennium Drought.
- Include the amended definition of Maximum Probable Annual Water Release in Clause 1.1 of the licence.



## Appendix B - Annual compliance results

Water Year	Annual allocations						River Murray Increased Flows account			Snowy River increased Flows account			Indubyna Base Passing Flows account			Tantangara Base Passing Flows			Indubyna spill account					
	Snowy-Murray (GL)	Snowy-Tumut (GL)	Apportioned to Snowy River (GL)		River Increased Flows (GL)	Annual Indubyna BPF (GL)	Annual Tantangara BPF (GL)	Annual Tantangara Increased Flows (GWh)	Credit (GL)	Debit (GL)	Balance (GL)	SRIF Target Release (GL)	Actual (GL)	over/under (GL)	Ind BPF Target Release (GL)	Actual (GL)	over/under (GL)	Tant BPF Target Release (GL)	Actual (GL)	over/under (GL)	Credit (GL)	Debit (GL)	Balance (GL)	
			Apportioned to Murray River (GL)	Apportioned to Snowy River (GL)																				
2002-2003	0.0	0.0	0.0	0.0	0.0	9.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	10.5	1.5	2.0	4.8	2.8	0.0	0.0	0.0	
2003-2004	0.0	0.0	0.0	0.0	0.0	9.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.8	0.3	-0.8	3.5	4.3	0.0	0.0	0.0	
2004-2005	0.0	0.0	0.0	0.0	0.0	9.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	7.3	-1.5	-2.3	1.4	3.7	0.0	0.0	0.0	
2005-2006	45.6	11.4	38.0	19.0	38.0	9.0	2.0	26.7	19.0	0.0	19.0	30.0	39.8	19.8	10.5	10.5	0.0	-1.7	0.0	1.7	0.0	0.0	0.0	
2006-2007	31.3	31.3	41.8	20.9	38.0	9.0	2.0	28.8	20.9	38.0	1.9	28.2	38.7	0.8	9.0	9.0	0.0	0.3	3.4	3.1	0.0	0.0	0.0	
2007-2008	18.2	31.3	33.0	16.5	33.0	9.0	2.0	23.3	16.5	0.0	18.4	32.5	32.2	-0.3	9.0	9.0	0.0	-1.1	0.0	1.1	0.0	0.0	0.0	
2008-2009	18.2	39.7	38.8	19.2	38.0	9.0	2.0	28.9	19.3	0.0	31.7	38.3	38.7	0.4	9.0	9.0	0.0	0.9	6.7	4.8	0.0	0.0	0.0	
2009-2010	18.1	45.2	42.2	21.1	38.0	9.0	2.0	25.8	21.1	0.0	58.4	37.7	38.7	1.0	9.0	9.0	0.0	-0.8	3.2	5.9	0.0	0.0	0.0	
2010-2011	21.8	71.5	52.2	31.1	38.0	9.0	2.0	28.9	31.1	0.0	89.9	37.0	62.3	1.1	9.0	9.0	0.0	-3.5	0.1	4.0	0.0	0.0	0.0	
2010 Snowy R Dam	26.2	29.2	24.2		24.2							24.2												
2011-2012	101.1	120.8	151.9	70.0	151.9	9.0	2.0	107.5	70.0	0.0	199.9	180.8	149.9	-0.9	9.0	9.0	0.0	-2.0	0.0	2.0	8.0	0.0	8.0	
2012-2013	99.9	127.4	154.2	70.0	154.2	9.0	2.0	109.1	70.0	0.0	229.6	195.2	164.7	-0.9	9.0	9.0	0.0	0.0	2.8	2.9	0.0	0.0	8.0	
2013-2014	114.2	137.4	181.6	70.0	181.6	9.0	2.0	128.5	70.0	0.0	209.9	142.1	163.4	1.4	9.0	9.0	0.0	-0.9	0.1	1.0	0.0	0.0	8.0	
2014-2015	115.4	102.8	148.2	70.0	148.2	9.0	2.0	104.8	70.0	0.0	309.9	148.8	147.6	0.0	9.0	9.0	0.0	1.0	0.0	-1.0	0.0	0.0	8.0	
2015-2016	103.1	112.1	142.1	70.0	142.1	9.0	2.0	100.5	70.0	0.0	439.9	139.4	139.8	0.4	9.0	9.0	0.0	3.0	1.7	-1.3	0.0	-2.0	8.0	
2016-2017	84.7	102.1	124.6	62.3	124.6	9.0	2.0	88.1	62.3	0.0	502.2	122.2	124.7	2.5	9.0	9.0	0.0	3.3	5.0	1.6	0.0	-2.0	4.0	
2017-2018	118.1	163.9	212.0	70.0	212.0	9.0	2.0	150.0	70.0	0.0		207.5			9.0			0.4			0.0	-2.0	2.0	
TOTAL	912.1	1124.8	1294.6	810.2	1381.9	144.0	32.0	945.0	810.2	38.0			1143.3		138.0		31.6			8.0	-8.0			

Table 1 Snowy River Increased Flows

Water Year	Catchment	Murrumbidgee					Goodradgbee			Geelh			Snowy River Gungahlin			Snowy River Fersihen/Rams Flat			
		Tantangara Dam					Goodradgbee Main Diversion Structure			Middle Creek Intake and Shazlecki Creek Intake			Diggers Creek Intake and Bar Ridge Intake (on Tolbar Creek)			Fall Creek Aqueduct - All Intakes			
		SMRIF Target Generation Forgone (GWh)	SMRIF Ann Apportionment (GWh)	SMRIF Ann Apportionment (GL)	Adjusted Ann Target (GL)	Actual (GL)	over/under (GL)	SMRIF Ann Apportionment (GWh)	SMRIF Ann Apportionment (GL)	Actual (GL)	SMRIF Ann Apportionment (GWh)	SMRIF Ann Apportionment (GL)	Actual (GL)	SMRIF Ann Apportionment (GWh)	SMRIF Ann Apportionment (GL)	Actual (GL)	SMRIF Ann Apportionment (GWh)	SMRIF Ann Apportionment (GL)	Actual (GL)
2002-2003		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003-2004		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004-2005		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-2006		26.7	15.1	7.8		8.1	11.6	6.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006-2007		26.8	15.0	7.7		7.3	11.6	6.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007-2008		23.3	23.3	12.0		17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2008-2009		25.8	26.8	13.8		6.5	0.0	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2009-2010		26.8	3.5	1.8		4.3	23.3	12.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010-2011		26.9	24.9	12.9		12.9	1.9	1.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011-2012		107.5	94.2	43.4	42.3	44.7	23.3	12.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2012-2013		109.1	53.4	27.5	25.2	25.0	23.3	12.0	9.8	32.4	17.5	17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2013-2014		128.5	59.4	30.6	29.8	29.9	23.3	12.0	7.6	32.4	17.5	20.7	13.4	18.9	16.9	0.0	0.0	0.0	0.0
2014-2015		104.8	35.8	18.4	18.3	18.7	0.4	23.3	12.0	8.4	32.4	17.5	14.0	13.4	18.9	17.2	0.0	0.0	0.0
2015-2016		100.6	31.5	16.2	15.8	15.7	-0.1	23.3	12.0	7.4	32.4	17.5	10.1	13.4	18.9	13.8	0.0	0.0	0.0
2016-2017		88.1	19.1	9.9	10.0	9.9	0.0	13.5	7.0	5.1	42.0	22.7	36.2	13.4	18.9	24.7	0.0	0.0	0.0
2017-2018		150.0	69.4	35.8	35.8		23.3	12.0		42.0	22.7		13.4	18.9		1.9	3.4		

Table 2 Snowy Montane River Increased Flows

Water Year	Snowy-Murray				Snowy-Tumut				Did Snowy Hydro Comply With All Other Water Release Requirements?
	Required Annual Release (GL)	Accounted release			Required Annual Release (GL)	Accounted release			
		RAR (GL)	Pre-Release (GL)	ATW (GL)		RAR (GL)	Pre-Release (GL)	ATW (GL)	
2002-2003	1075	1075	138	0	1026	1026	157	0	Yes
2003-2004	973	973	16	25	1006	1006	130	179	Yes
2004-2005	997	997	0	110	736	736	1	0	Yes
2005-2006	1016	1016	100	38	995	995	385	173	Yes
2006-2007	837	837	217	0	507	507	188	103	Yes
2007-2008	595	595	132	0	447	447	137	0	Yes
2008-2009	816	816	72	0	450	450	138	0	Yes
2009-2010	1067	1067	16	0	588	588	12	0	Yes
2010-2011	1275	1275	222	0	891	891	0	0	Yes
2011-2012	477	477	293	0	601	601	55	0	Yes
2012-2013	549	549	240	377	983	983	200	74	Yes
2013-2014	822	822	168	0	689	689	200	151	Yes
2014-2015	760	760	2	0	623	623	0	0	Yes
2015-2016	733	733	198	0	1014	1014	130	0	Yes
2016-2017	926	926	529	22	900	900	175	0	Yes

Table 3 Water Release Requirements



