

# The requirement to reduce dam safety risks so far as is reasonably practicable – ‘SFAIRP’

## Purpose

To provide guidance on what a dam owner must do to demonstrate that dam safety risks have been appropriately assessed and reduced so far as is reasonably practicable (SFAIRP).

## Context

The *Dams Safety Regulation 2019* (the regulation) requires declared dam owners in New South Wales to develop and implement a dam safety management system. This sets out the policies and procedures for managing the safety of the dam across its life cycle. The dam safety management system must also include a risk management framework<sup>1</sup> to identify, analyse and evaluate treatments for the risks associated with all dam failure modes<sup>2</sup>.

At least once every five years<sup>3</sup>, a declared dam owner must use the framework to produce a risk report<sup>4</sup> on all foreseeable risks to the dam. The report lists the measures the dam owner will implement to reduce the dam’s risks SFAIRP, as part of the application of the risk management framework. The report also includes the calculation of risk ratings for the dam.

In formulating this guidance, Dams Safety NSW has taken account of, and in some cases adopted, global approaches in safety regulation to the meaning, application and use of SFAIRP. It is a well-established concept used in industries with high consequence, low probability safety risks such as major hazard facilities, nuclear safety operations and transport<sup>5</sup>. The SFAIRP approach is a deliberate outcome of the introduction of the Dams Safety Act 2015, which emphasises the application of risk management and the principles of cost benefit analysis in relation to dam safety.

It should be noted that reducing dam safety risks ‘As Low As Reasonably Practicable (ALARP)’ has been accepted dam safety practice in Australia for many years.

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<sup>1</sup> Regulation clause 14

<sup>2</sup> A dam failure mode refers to a specific way in which a dam can fail or lose its intended function

<sup>3</sup> Regulation clause 15

<sup>4</sup> For more information, refer to fact sheet ‘Dam Safety Facts - Risk reports for declared dams’  
<https://www.damsafety.nsw.gov.au/publications/dam-safety-facts-risk-reports-for-declared-dams>

<sup>5</sup> Some examples: <https://nraspricms01.blob.core.windows.net/assets/documents/Guideline/Guideline-Meaning-of-Duty-to-Ensure-Safety-SFAIRP-May-2021.pdf>;

<https://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976866.html>

<https://www.safework.nsw.gov.au/about-us/glossary/glossary-acordion/reasonably-practicable>

## Where is SFAIRP included in the regulation?

The regulatory risk management framework<sup>6</sup> requires a dam owner to employ a systematic evaluation and decision process<sup>7</sup> in which the results of risk analysis and other major considerations<sup>8</sup> influencing the safety of a dam are considered in making decisions relating to its safety.

The dam owner must ‘identify risk reduction measures to be implemented to eliminate or reduce dam safety risks but only in *SFAIRP*<sup>9</sup>’.

## What is a standard definition of SFAIRP?

To reduce a risk SFAIRP means a dam owner has taken every possible risk reduction measure unless the cost, time, or effort involved is grossly disproportionate to the potential harm prevented.

## What does SFAIRP require?

To reduce risks ‘SFAIRP’ means, for all identified risks, a dam owner needs to:

- determine the available practicable measures to address the risk (‘what can be done’); and
- test which measures to reduce the risk are reasonable, balancing the significance of the risk versus the effort required to reduce it.

## What is ‘reasonably practicable’? - relevant matters to consider

In the context of dam safety, ‘reasonably practicable’ means that which is, or was at a particular time, reasonably able to be done to eliminate, or minimise, a dam failure risk to public safety, the environment, health, social and infrastructure assets<sup>10</sup>.

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<sup>6</sup> Regulation clause 14

<sup>7</sup> Regulation clause 14 (5)

<sup>8</sup> For example, compliance with good practice

<sup>9</sup> Regulation clause 14 (6). The Regulation includes the words ‘...only in so far as is reasonably practicable...’, which is important because it sets a control on a dam owners’ expenditure on risk treatments

<sup>10</sup> From ‘Declared dams consequence category assessment and determination methodology for Dams Safety Act 2015’: [https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette\\_2022\\_2022-113.pdf](https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette_2022_2022-113.pdf)

When considering what is 'reasonably practicable' to eliminate or minimise a risk, a dam owner needs to take into account<sup>11</sup>:

1. the likelihood of the risk - the greater the likelihood, the greater significance this matter will play
2. the degree of harm that may result - the greater the degree of harm, the greater significance this matter will play
3. community concerns about the potential risks associated with the dam<sup>12</sup>
4. what the dam owner knows, or ought reasonably to know, about the risk, and the measures that can be taken to eliminate or minimise the risk<sup>13</sup>
5. the availability and suitability of the measures to eliminate or minimise the risk, including structural and non-structural measures<sup>14</sup>
6. whether a measure would cause a net increase in risk during implementation or introduce new risks following implementation<sup>15</sup>
7. after assessing the extent of the risk and the available measures for eliminating or minimising the risk, the cost associated with the available measures for eliminating or minimising the risk<sup>16</sup>

Dams Safety NSW also suggests dam owners consult with the community<sup>17</sup> about a declared dam's risks when evaluating dam risk treatment measures. This is particularly important for dams with a risk rating above the safety threshold. People affected by dams, especially those downstream, have a significant stake in their responsible management. Through effective engagement the community should be supported to express their concerns, share experiences, influence solutions and, most importantly, have access to timely and relevant information.

The test for what is reasonably practicable is an objective test. This means a dam owner would be judged by the standard of behaviour expected of a reasonable person (as a dam owner) in their position.

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<sup>11</sup> 1, 2, 5 and 7 of the matters to consider are included in clause 14 (7) of the Regulation

<sup>12</sup> Such as the community's degree of understanding of, and control over, the risk

<sup>13</sup> For example, consider what measures have been adopted by industry to manage the risks in contemporary dam design.

<sup>14</sup> Ways to reduce the risk should be regarded as being *available*, if the necessary equipment or physical means required to achieve it is available on the open market, or feasible to construct. Similarly, a work process (or change to a work process) to eliminate or control a risk should be regarded as being available if it is feasible to implement. A way to reduce a risk should be regarded as *suitable* if it is feasible to implement in the specific circumstance, it is effective in reducing the likelihood and/or degree of harm, it does not introduce new and higher risks, and it is a practical measure given the circumstances in which the risk exists.

<sup>15</sup> For example, construction of a risk reduction measure increases risk or introduces, or increases, new risks such as increased non-dam failure flood risk

<sup>16</sup> See clause 14 (7) of the regulation regarding the use of cost benefit analysis

<sup>17</sup> 'Community' is taken to be the diverse population of individuals and entities affected by a decision on a dam risk reduction measure. This would include those at risk from a dam failure, the wider community who may have to bear the cost of the risk reduction measure, and other people affected.

In summary, what could be done should be done unless it is reasonable and defensible in the circumstances for the dam owner to do something less.

As part of risk-informed decision making<sup>18</sup>, a dam owner needs to consider their SFAIRP responsibilities in the light of the civil liability provisions of NSW law. General principles will be applied by the state's courts when considering the reasonableness of actions taken, or not taken, by a responsible party to remediate identified risks<sup>19</sup>.

## The cost of available measures: cost-benefit analysis

Cost-benefit analysis is an important tool in determining whether a risk has been reduced so far as is reasonably practicable. This feature was a cornerstone reform in the new dam safety regime introduced in 2019 and the regulation<sup>20</sup> recommends the use of a cost benefit analysis in determining whether it is reasonably practicable to implement a risk reduction measure.

A cost benefit analysis assigns monetary values to all the costs and benefits associated with reducing a risk, allowing comparison in a common framework.

There are many cost benefit methods and varying levels of cost-benefit analysis complexity. A cost-benefit analysis should be tailored to the complexity and size of the dam and the extent of the identified risk reduction measures.

Dam owners may<sup>21</sup> refer to the guides published by the NSW Treasury when carrying out cost-benefit analyses: 'TPG23-08 NSW Government Guide to Cost-Benefit Analysis<sup>22</sup>' and 'Disaster Cost-Benefit Framework TPG23-17<sup>23</sup>'

When considering the costs associated with a proposed risk reduction measure, a dam owner should also consider:

- the more likely the risk is, and/or the greater the harm that may result from the risk, the less weight should be given to the cost of reducing the risk
- 'reasonably practicable' is to be determined objectively, not by reference to a dam owner's capacity to pay
- a dam owner cannot expose people to a lower level of protection because they are in a lesser financial position than another dam owner

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<sup>18</sup> Regulation clause 14 (5)

<sup>19</sup> See section 5B, Civil Liability Act 2002 (NSW)

<sup>20</sup> Regulation clause 14 (7)

<sup>21</sup> The guides are required to be used by NSW State entities

<sup>22</sup> [https://www.treasury.nsw.gov.au/sites/default/files/2023-04/tpg23-08\\_nsw-government-guide-to-cost-benefit-analysis\\_202304.pdf](https://www.treasury.nsw.gov.au/sites/default/files/2023-04/tpg23-08_nsw-government-guide-to-cost-benefit-analysis_202304.pdf)

<sup>23</sup> <https://www.treasury.nsw.gov.au/documents/tpg23-17-disaster-cost-benefit-framework>

- conversely, dam owners with higher capacity to pay should not incur unnecessary expenditure to reduce risks lower than can be justified.

## How does SFAIRP interface with individual and societal risk?

Dam owners must calculate individual and societal risk ratings for each dam. These risk ratings are to be included in a risk report<sup>24</sup>, where they are compared to the ‘safety threshold’ specified in the regulation.

The safety threshold is a benchmark for assessing the level of risk to public safety. A dam owner must promptly notify Dams Safety NSW if a dam’s risk rating exceeds the safety threshold. Dams Safety NSW monitors, in particular, dams with a risk rating above the safety threshold to ensure those dam owners take appropriate and timely dam risk reduction measures (including short term measures). Regardless of whether a dam’s risk rating is above or below the safety threshold, dam owners must reduce their dam’s risks SFAIRP.

## Must a dam owner reduce risk so the risk rating is below the safety threshold?

Reduction of the risks to achieve a risk rating below the safety threshold is not a requirement of the regulation if a dam owner can demonstrate a dam’s risks have been reduced SFAIRP.

Dams Safety NSW will assess the reasonableness of a dam owner’s proposed risk reduction measures when it reviews a dam owner’s SFAIRP declaration and risk report. In some cases, Dams Safety NSW may direct a dam owner to take necessary steps to address the risks within a specified time<sup>25</sup>.

## Dam owner’s declaration dam risks are reduced ‘SFAIRP’

Dams Safety NSW may request a dam owner to formally declare the identified risk reduction measures have reduced/will reduce their dam’s risks SFAIRP, using the *DSNSW declaration template*.

Dams Safety NSW is implementing the SFAIRP template declaration process in a phased, risk-based approach, based on a dam’s risk position. It is initially applicable to dams with a risk rating above the safety threshold.

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<sup>24</sup> Regulation clause 15

<sup>25</sup> Regulation clause 15 (5)

## SFAIRP declaration template

The template wording is included below for information.

I (we) declare I (we), as a part of the risk management framework associated with risk report dated xx/yy/zz), have committed to measures that I/we have determined will reduce xyz dam's risks so far as is reasonably practicable (SFAIRP) and I/we declare we have:

1. understood what is required to reduce risks SFAIRP and have carried out a process that includes all the relevant matters to consider listed in '*The requirement to reduce dam safety risks so far as is reasonably practicable* – 'SFAIRP' guidance note
2. established a comprehensive risk management framework for the declared dam
3. applied risk-informed decision making in evaluating the risks, including a cost benefit analysis of the risk reduction measures
4. prepared a written risk report on all foreseeable risks to the dam
5. engaged competent persons to sign off and review the risk calculations in the written risk report
6. identified, and committed to, interim and longer-term risk reduction measures (both structural and non-structural) needed to reduce risk so far as is reasonably practicable
7. the legal authority to make this declaration.

Signed: \_\_\_\_\_

General Manager (*for example*)

## Who should sign the SFAIRP declaration?

Who should sign a SFAIRP declaration depends on the corporate status of a declared dam owner.

The office holder(s) in the following table should sign the SFAIRP declaration (i.e. the office holders who have the legal authority to sign).

| Organisation type                 | Dam owner office holder                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local council                     | General Manager                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Company                           | <ul style="list-style-type: none"> <li>two directors, or</li> <li>a director and company secretary, or a sole director who is also the company secretary (if there is only one director)</li> </ul>                                                                                                                                                                                                                                            |
| Statutory state-owned corporation | Chief Executive Officer or Managing Director responsible for the day-to-day management of the operation of the corporation in accordance with the general policies and specific directions of its board.                                                                                                                                                                                                                                       |
| Statutory corporation             | <p>Corporation with two or more members:</p> <ul style="list-style-type: none"> <li>the president, chairperson or other principal officer of the corporation</li> </ul> <p>Sole corporation:</p> <ul style="list-style-type: none"> <li>the person by whom the constitution is constituted</li> </ul> <p>Corporation with no members:</p> <ul style="list-style-type: none"> <li>the person managing the affairs of the corporation</li> </ul> |
| Government Department             | Secretary                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Individual                        | Individual                                                                                                                                                                                                                                                                                                                                                                                                                                     |