



Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

Discussion Paper

Proposed amendments to the
Mining Rehabilitation Fund Regulations 2013
for the administration of
minerals in brine operations

July 2020

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1. Purpose of Discussion Paper

This Discussion Paper provides industry and the community an opportunity to respond to the Department of Mines, Industry Regulation and Safety's (DMIRS) recommendations to improve equity for emerging potash and salt minerals in brine (MIB) operations in Western Australia under the Mining Rehabilitation Fund (MRF) legislative and regulatory framework.

This Discussion Paper outlines DMIRS' review of the MRF categories and unit rates pertaining to MIB operations, providing recommendations including proposed regulatory amendments of prescribed categories and unit rates outlined in the Mining Rehabilitation Fund Regulations 2013 (the Regulations) with the goal of ensuring rehabilitation liability estimates and subsequent MRF levy contributions by MIB operators are no longer calculated inequitably high in comparison to conventional mining operations.

DMIRS encourages industry and community to provide comment and assist Government in forming a view over any implications associated with the proposed adjustments to MRF unit rates via amendments to the Regulations.

The implementation of any regulatory changes are not anticipated to come into effect until 1 July 2021, for the 2021–22 MRF reporting period.

2. Introduction

The harvesting of potash and other minerals derived from brine such as salt encompasses an emerging mining industry with unique operational features and scale that were not originally anticipated during establishment of the MRF framework including disturbance 'categories' and 'unit rates' involved in annual MRF levy calculations. These projects are typically located on salt lakes in central and remote northern regions of Western Australia, requiring mining tenure over expansive areas of land up to 10 to 20 times larger than large conventional mining operations.

The Western Australian State Government (the Government) has committed to supporting the development of the emerging potash and MIB industry in Western Australia. The Government is cognisant of benefits to the State from a local supply of high grade potash for the domestic agricultural industry and for high value potash exports to markets in Asia.

DMIRS has been in discussion with relevant MIB industry stakeholders (particularly potash and salt operators) and has been in the process of conducting information exchange with regard to the technical aspects of their proposed operations. Several potash and salt operations are in the process of completing pre/feasibility studies, while others are already under construction. Under the existing MRF framework, all MIB projects are currently liable for inequitably high MRF levy projections, potentially impacting the economic viability and final investment decision for these projects. The impetus for government is to confirm and communicate with industry to resolve category and unit rate equity matters and provide regulatory certainty for investments to proceed to support development of the emerging industry.

3. Mining Rehabilitation Fund unit rates for minerals in brine

The MRF is a pooled industry fund to which all Western Australian mining operators contribute. All tenement holders under Mining Act tenure, with the exception of tenements covered by State Agreement Acts, are required to report land disturbance data for the purpose of calculating an annual levy. The purpose of the MRF is for the State to secure adequate funds to cover abandoned mine site rehabilitation costs in post-closure circumstances where the tenement holder/operator has failed to meet rehabilitation obligations and the State has been unable to recover funds.

Principal contributions to the fund are made available for the rehabilitation of sites that have been participants in the MRF, while interest earned on the fund becomes available to be applied to 'legacy' mine sites that existed prior to the establishment of the MRF.

Levy calculation

The MRF is calculated in the same manner for every tenement in Western Australia, comprising a calculation designed to balance simplicity and equity by reflecting proportionality in terms of area size and infrastructure complexity that results in proportional levy contributions.

$$\text{Levy} = \text{Rehabilitation Liability Estimate} \times \text{Fund Contribution Rate (1\%)}$$

The Rehabilitation Liability Estimate (RLE) is calculated based on the area of land in that disturbance category multiplied by the category unit rate. No levy is payable if the RLE is \$50,000 or less. The information captured through the MRF is an additional benefit to the State and it is of value that the data captured is as accurate as possible without being administratively burdensome.

Proposed amendments to the Mining Rehabilitation Fund Regulations 2013

The existing unit category rates in the Regulations were established following a comprehensive data capture and analysis of mine site disturbance features and their rehabilitation costs. The MRF category rates were established in regulations such that they could be amended from time to time, as required, to account for such circumstances and emerging industries.

Data analysis

DMIRS has investigated the relevant disturbances by the MIB industry and considered an independent third-party review of respective rehabilitation obligations and costs to identify the most appropriate cost category and/or whether a new cost category needs to be introduced. DMIRS notes that category rates are linked to closure costs, however are intended to be a proxy for establishing a rate for levy calculation as opposed to being an accurate representation of closure costs.

DMIRS has undertaken the following analysis:

- Identifying disturbance areas for the purpose of the MRF reporting and independent costing of the scope of rehabilitation costs.
- Modelling of proposed unit rates against industry-provided disturbance proposals to identify the likely levy payments, and comparison, against current levy payers to provide an indication as whether these rates are relatively equitable.
- Where relevant, consideration of the potential use of these categories by existing ore extraction type mining activities.

Key features not represented in the MRF categories

While individual projects comprise differences in location and brine abstraction methods, it is apparent that MIB operations are broadly similar in their use of specific mining features that differ from conventional mining operations, by way of:

- Expansive networks of evaporation (concentrator and crystalliser) ponds;
- Halite (sodium chloride) stockpiles; and
- Brine abstraction trenches.

These operations also have typical mining infrastructure, bores, plant and machinery utilised in conventional mining operations.

Proposed unit rates

DMIRS acknowledges the reporting categories and unit rates prescribed in the Regulations do not fully provide equitable levy calculations for the emergent MIB industry. As such, **new amendments or new categories** to the unit rates to account for these disturbances are proposed below.

| Description of infrastructure or land | Unit rate per hectare of disturbance |
|--|--------------------------------------|
| Abstraction trenches constructed for the accumulation and transport of brine and associated embankments | \$30,000 per hectare |
| Off playa embankments and pond floors of brine ponds for the extraction of mineral salts via evaporation | \$25,000 per hectare |
| On playa embankments of brine ponds for the extraction of mineral salts via evaporation | \$25,000 per hectare |
| On playa halite and excess salt stockpiles | \$10,000 per hectare |

Other minerals derived from brine

Salt lakes formed by evaporation of surface or ground waters may, in some geological settings, concentrate a range of elements including boron, calcium, lithium, magnesium and uranium. In contrast to the high potential for commercial production of potash and salt, analysis conducted by Geoscience Australia indicates that Australian salt lakes have low potential to produce commercial lithium and other critical minerals via brine extraction methods. This is believed to be due to a combination of geological factors including: limited hydrogeological connectivity between leachable source rocks and salt lakes; generally-low relief of the Australian continent; and the overall very stable tectonic regime.

DMIRS recognises that there may well be operators that propose targeting the production of minerals through brine extraction methods. DMIRS has formed the view that any potential regulatory amendments to MRF categories and unit rates will not be available to broader operations outside of potash and salt operations, as they are considered likely to require processing of hazardous materials. As such, the standard evaporation pond 'Category A' unit rate of \$50,000 per hectare will be applicable for such brine operations, as their activities relate to waste disposal and carry a higher level of environmental risk.

4. Technical considerations for minerals in brine operations

Evaporation ponds

For MRF reporting purposes, an 'evaporation pond' is classified as a Category A feature, attracting a unit rate of \$50,000 per hectare, which translates to a levy of \$500 per hectare. [MRF Guidance](#) defines an evaporation pond as a "facility used for the storage of water or waste-water for the purpose of treatment by evaporation". These were the type of facilities considered when establishing the unit rate of \$50,000.

DMIRS considers an evaporation pond to be a stand-alone facility constructed for treating water rather than as part of a network designed to produce a harvestable mineral or product. It would characteristically contain material that owing to its chemical, physical and/or radioactive property, would be adverse to the environment in which it's located. For this reason, seepage into soil and groundwater is controlled by use of a liner made from HDPE (high-density polyethylene) or geotextile (polypropylene or polyester) or by clay-based liners. Soil and groundwater are monitored for contamination during operation and after closure.

Some commonalities exist between 'standard' evaporation ponds and those used for concentrating and harvesting salts in brine operations. This includes similar risks; construction methods (i.e. local material for embankments, and artificial liners); and sharing similar closure obligations (i.e. backfilling with embankment material, followed by re-profiling). However it is also apparent that for MIB projects, the size, location and the nature of the material being handled substantially affects the level and intensity of such risks and subsequently the level of attention required to manage them and, ultimately, close and rehabilitate the sites.

DMIRS' preliminary analysis of MIB operations based on discussions and information exchange with industry stakeholders confirms there are several types of evaporation pond design, operational and closure requirements for which simply extending the interpretation of the existing MRF categorisation of evaporation ponds would be insufficient to equitably account for the scope of differences in comparison to conventional mining operations.

As an example, calculations based on information provided by one MIB proposal for their evaporation ponds alone, would result in an annual MRF levy of \$5 million under the existing framework, making that company the top levy contributor to the MRF, 250 per cent larger than the next highest contributor.

DMIRS also clarifies that operators only need to report the disturbed area. DMIRS is aware that operators may construct embankments on natural surfaces to capture and extract resources. The process of rehabilitating these ponds is to remove and remediate the embankments only, while the surface of the salt lake remains in-situ and does not require rehabilitation. As such, only the area of the constructed embankments is required to be reported in these circumstances.

'On-playa' and 'off-playa' ponds

Potash production involves abstraction of brine from aquifers beneath salt lakes, meaning operators typically choose to situate their concentration and harvesting ponds on the lake's surface, or on-playa. Remaining production facilities are located away from the lake surface, or *off-playa*. Similarly, operations that extract halite from seawater situate their ponds on coastal salt-pans.

Concentrator and crystalliser ponds contain precipitated salts and hypersaline brine. The ponds do not contain potentially hazardous material, unlike a waste-water treatment pond. An on-playa location, therefore, has the advantage that it significantly reduces the impact of seepage into surrounding soil and groundwater, which is already hypersaline. The principal risk appears to be an increase in ponding after rainfall events due to the changes in the surface drainage. Embankments for on-playa ponds are constructed using local materials and/or natural landforms and often lined to prevent seepage between cells. However there is often no construction involved for the pond floors, which are directly on the lake surface and often unlined, other than with natural clays. For this reason, none of the currently-proposed on-playa ponds have closure obligations for the floors other than removal of residual salts.

On the other hand, operations that place all (or part) of their production ponds off-playa have constructed floors and embankments that are HDPE-lined to avoid seepage into soil and groundwater and have closure obligations that are essentially the same as 'standard' evaporation ponds. The primary difference between these ponds and Category A ponds lie in the nature of the risk that they pose to the surrounding environment. Although seepage of hypersaline material into soil and groundwater has a potentially higher impact than in an on-playa location, proximity to the lake is likely to mean that both soil and groundwater is still saline. They are therefore like sewage ponds and would have a lower environmental impact and less rehabilitation requirements than 'standard' Category A features.

Brine abstraction trenches

Potash producers abstract brine from aquifers that are located below inland salt lakes. These are narrow surface excavations (of any approved depth) that are made in the surface of salt-lakes or salt-pans for the purposes of abstracting brine (hypersaline groundwater) from sub-surface sources as part of operations for the recovery of mineral salts such as sulphate of potash and halite. These excavations are characterised by the retention of excavated material as embankments and for future use, during closure, as back-fill material. These embankments should be included when calculating the area occupied by the trenches.

The trenches are bunded by excavated material, which prevents flooding with surface-water and, on closure, would be used to backfill them. Despite their depth, the trenches do not seem to be 'mining voids' in the normal sense – that is, they are not excavations for the purpose of locating and extracting ore. They are channels that are allowed to fill with hypersaline groundwater, which is then either pumped to nearby ponds or travels to the ponds through connected feed channels. It is considered that in most cases on closure the operators would be required simply to push the adjacent bunds into the trench and then re-contour to restore natural drainage and landscape forms.

Halite and excess salt stockpiles

In most cases halite is not produced as a target product by potash producers. Halite precipitates in the first stage of the concentration process and is not processed to the grade required by salt producers. It is considered a waste product in most cases and stacked on-playa to dissolve back below the surface.

For off playa stockpiles the existing categories will determine the appropriate MRF unit rate, depending on height and potential for generating saline drainage.

5. Mining Rehabilitation Fund administration and statutory review

Interim: Adapting existing guidance to better define MIB activities and disturbance features within the existing MRF framework

DMIRS has been providing guidance to MIB operators as to how their interpretation of MRF categories and unit rates should retrofit to their particular disturbance types and rehabilitation obligations for the 2019-20 MRF reporting period.

In the absence of an appropriate category for the 2019-20 reporting period, as an interim measure, DMIRS has advised all MIB operators that have commenced construction in 2019-20 to report the Category C 'Other Cleared Land' category of \$18,000 per hectare for evaporation pond disturbance activities. The full description of this category is "Land, other than land under rehabilitation or rehabilitated land that is cleared of vegetation and is not otherwise described".

This interim recommendation only applies until specific amendments and appropriate categories are implemented in the Regulations. Once amendments are made to the Regulations to accommodate disturbance features specific to MIB operations, operators will be required to report in those appropriate categories.

It is important to note that this interim measure is not reflective of the final composition of new categories and unit rates that will be applied to MIB disturbance activities in the future, following implementation of the outcomes from DMIRS' review of MRF unit rates.

Long-term: Ten-year statutory review of the MRF

The *Mining Rehabilitation Fund Act 2012* requires a ten-year statutory review, providing the opportunity to analyse the overall function of the fund model at that time, including whether a cap on the principal fund amount is required; the length of payments into the fund; and refunds on relinquishment.

The statutory review process is required to run from November 2022 for the duration of 18 months, to be completed in May 2024. The current approach to legislative and regulatory reform to the MRF requires that any significant changes are to be comprehensively considered and addressed through this ten-year statutory review process.

DMIRS advises that any amendments aligned to the MIB industry would be supplementary to other government support initiatives to support the establishment of the industry in Western Australia.

It is possible that the broader mining industry may view specific MIB regulatory amendments occurring outside of the ten-year statutory review as an opportunity to advocate for other like reforms where they feel that unit rates are inequitable. DMIRS has always maintained that the ten year statutory review of the MRF is the sole, appropriate mechanism through which broader industry changes will be considered.

APPENDIX 1: Potash minerals in Western Australia

Potash is a premium fertiliser in the form of the element potassium. The use of potash is critical for agricultural activity, as it promotes plant health and growth, significantly increasing productivity and crop yields. Potash is classified as a 'critical mineral' due to its prominent economic and strategic significance, with about 90 per cent of global potash production utilised in agricultural fertiliser products.

Historically, Western Australia has depended heavily on fertiliser imports necessary for the agricultural industry. However a number of proposed Western Australian potash projects are either under construction or awaiting final investment decisions, having the potential to increase the State's self-sufficiency over the coming years. Western Australia accounts for nearly all (95 per cent) of Australia's total estimated potash resources, with the majority of these resources occurring in potash-bearing lake brines.

Western Australian potash project proposals and developments are aiming to produce sulphate of potash (SOP), a high-value strategic and geologically scarce specialty potash product utilised in 10 per cent of global potassium-based fertiliser production. SOP is considered superior to the lower-grade Muriate of Potash (MOP), which contains chloride that is harmful to specialty crops. SOP however is ideal for use on specialty crops that may generate up to ten times the revenue of commodity crops typically utilising MOP.

Western Australia is well poised to take advantage of the high value potash market environment, with high demand coming particularly from Asia. China alone accounts for more than 40 per cent of global demand for SOP. Furthermore, brine extraction methods proposed by Western Australian potash proponents are considered the lowest costing methods for SOP production.

Government of Western Australia

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8.30am – 4.30pm

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