

# MINE FLOOD MANAGEMENT

National Pump & Energy (NPE) provides a comprehensive range of professional flood management services ready to deploy at your side in the case of emergency.



OUR STRENGTH IS HAVING THE KNOWLEDGE AND EXPERIENCE TO DETERMINE EXACTLY WHAT'S REQUIRED FOR EVERY SITE AND SITUATION, BASED ON SAFETY, EFFICIENCY, SAVINGS, RELIABILITY, AVAILABILITY AND PERFORMANCE. FAST, EFFICIENT RESPONSE, WILL GET YOU BACK ON TRACK.



# DEWATERING

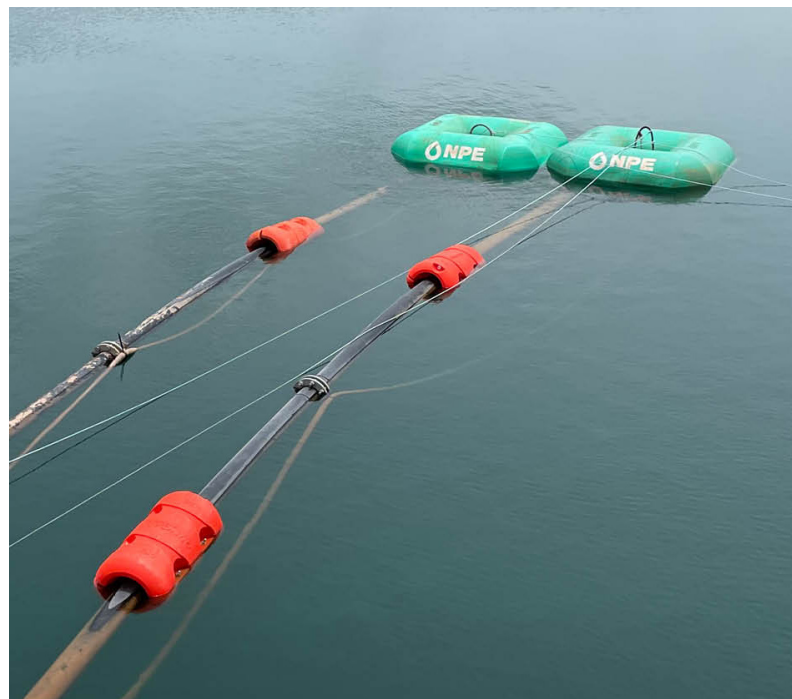
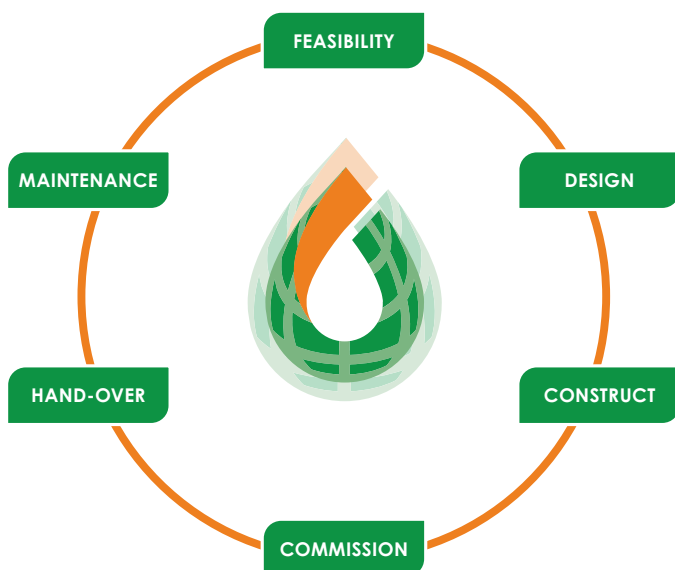
NPE HAS BUILT AUSTRALIA'S LARGEST DEDICATED TEAM OF PUMP PROFESSIONALS, SPECIALISING IN DEWATERING SOLUTIONS. WE BACK UP OUR EXPERTISE WITH THE LARGEST, SPECIALIST RANGE OF PUMPING EQUIPMENT IN THE COUNTRY.

Dewatering is a critical process in mining that involves significantly reducing groundwater levels when the mine extends beneath the water table. Nearly every mine site needs to consider dewatering at some point. Heavy rainfall, groundwater levels, and nearby bodies of water can cause severe flooding that can result in costly shutdowns.

Dewatering can be a resource-intensive and challenging process in some cases. It's crucial to evaluate the dewatering requirements for each mine. The kind of disruption that may occur depends on the mine's location, type, and access routes for logistics and transport. Mines in arid regions may be particularly susceptible to underestimating the danger, while underground mines face the risk of groundwater infiltrating the mine's workings.

Regardless of the geological setting, dewatering is critical to the mine's viability and may necessitate significant resources, management, proper planning, and risk assessment to avoid environmental issues and human injury or loss. Identifying and establishing an appropriate pump dewatering system are critical to maintaining mining operations.

The type of pump system developed for each mine is determined by its location and climate. With a sound system and backup, dewatering can keep the mine operating smoothly and prepare for future flood risks and concerns.



## Ensuring mine safety is our top priority!

Mining operations, whether open-pit or underground, face significant flooding risks that must be addressed. To prevent flooding, there are various strategies that can be employed. It is crucial to explore all potential flood scenarios before and during mining operations to avoid costly and possibly deadly incidents. A proactive approach is necessary to protect personnel, equipment, and the environment.

The constantly changing terrain of most mines requires a continuous reassessment of the flood risks and potential damage. Due to the remoteness of many mine sites and the lack of reliable historical rainfall and streamflow data, estimating flood risk is challenging. Flood safety in mining extends beyond the mine boundaries, affecting nearby cities, the environment, plant life, animals, and people. Exposure control is critical, as new minerals and toxins introduced through flooding could have far-reaching consequences.



## Mine Flooding Assessment

Assessment of flooding in mines is crucial since it poses a risk to underground and aboveground operations. The risks can arise from groundwater ingress or uncontrollable surface runoff, such as flash floods. In case of flooding, the pit walls can become unstable, leading to the collapse of the mine and loss of life and machinery.

Due to the large topographic footprint, mining activities usually interact significantly with the local drainage system. Creek and river diversions may be necessary during mine development. Flood risks in the surrounding areas may increase due to floodplain storage loss, resulting from flood mitigation measures for the mine. The potential consequences of a low-likelihood flood event can have catastrophic effects on the mining operations and the mine's viability. The floodwaters can become contaminated with minerals, salts, and suspended sediments,

making it impossible to pump out due to the contamination risk in the neighbouring environment, leading to the suspension of mine operations.

A reliable flood level estimate is essential in determining the right flood protection structures, such as levees and dams. Levees are often used to address the flooding risk, but their failure consequences during a flood are often not adequately addressed. Levees are also vulnerable to settlement on mine sites, increasing flood risks over time. Flooding can impact mine operations by causing erosion and poor road conditions, water buildup at working faces and mining areas, inadequate on-site storage, the inability to discharge accumulated runoff to surface water, damage to infrastructure, such as road, rail and conveyor systems, and catastrophic inundation from surrounding rivers due to levee failure. Each flooding impact will require different design standards, cost considerations, and failure modes.



Additional costs are incurred due to flooding compared to ground failure events, including damage to property apart from machinery. Proper drainage is crucial to avoiding the havoc caused by rain on a mine site. The flooded pits must be pumped out, mud removed, and levees rebuilt. In case of a long wall flood, an automated form of underground coal mining, the equipment cannot be moved, making it a particularly expensive event. Therefore, mining insurance companies assume that losses associated with flooding are higher than those due to ground failure.

Most mining operations use diesel-powered, self-priming, submersible slurry, and high-head capability drainage pumps for dewatering rainfall. Additional booster pumps are also used due to the height of the mining operation to overcome the vertical lift and pumping distance. These pumps are placed at multiple levels to help lift the water and debris from the bottom of the pit. Some mining operations utilise heavy-duty, self-priming pump systems with

high-power kilowatts (kW) mounted on the skids with pontoons. These pumps are dragged to the lowest point of the mine, where water is likely to accumulate during rainfall. When the rainwater accumulates, the self-priming pumps float on the water. Equipped with a float switch, the engine activates the pump once the system rises. When the water level lowers, the pumps automatically shut off. These pumps are required to pump water and large abrasive solids and debris that get washed in. Their high head capability enables them to pump up the steep inclines of the mine pit walls. The pump and its parts are made of rugged material to withstand the abrasive solids that get sucked into the pump along with the rainwater.

The complete process of dewatering starts and ends with a well-designed plan that results in a comprehensive program. Irrespective of the climate or location, mine dewatering is essential to every mining operation and includes planning, assessment, safety, and dewatering pumps.





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National Pump & Energy branch network is strategically positioned to service all parts of Australia. These hire branches are supported by a team of NPE representatives and field service crews so that every part of Australia has access to the best equipment and service, regardless of location.

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