

MOVING BEYOND TRANSITION
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ABSTRACT

New and innovative techniques and technologies for site assessment and remediation – Biological Leachate Remediation in NSW Northern Rivers

In February and March 2022, significant rainfall and flooding occurred over large parts of New South Wales and Southeast Queensland. Consequently, this impacted several landfills and their ability to effectively manage landfill leachate using established protocols and systems. An innovative R&D process developed by ENV Solutions, Biological Leachate Remediation (BLR) offers a comprehensive solution for end-to-end landfill leachate treatment. This breakthrough approach emerged in response to the Northern NSW flood events 2022. BLR combines established physical and biological polishing and disinfection water treatment stages into one novel solution. The BLR process uses algae grown within an existing leachate pond for nutrient removal and a special media to bind PFAS, hydrocarbons and heavy metals. While the BLR process was a temporary solution for an emergency, ENV has piqued the interest of landfill operators with issues similar to PFAS in leachate. BLR represents a pivotal innovation in tackling the substantial environmental and societal issues often tied to conventional leachate management methods. It is a testament to innovative thinking and robust engineering practices, offering a cost-effective and alternative industry approach for handling excessive landfill leachate treatment. Consequently, treatment pond conditions were then managed to facilitate the proliferation of an algal biomass (*Euglena*) within the pond. Over the course of a trial period, significant and exponential growth of the photoautotrophic biomass was found to remove BOD and Ammonia Nitrogen (NH₃-N) within the effluent. The treatment methodology undertaken during this trial is novel, ecologically sustainable and low CAPEX / OPEX. It has the potential to provide a new standard in leachate treatment especially relevant to remote landfills where reticulated wastewater treatment plants do not exist. Furthermore, this technology has proven that it can be mobilised rapidly and cost effectively to treat complex leachate to a discharge standard during extended periods of adverse weather.

Three key takeaways

1. The history of Biological Leachate Remediation development in response to the 2022 Northern NSW floods
2. Challenges associated with landfill leachate contamination
3. BLR process engineering concepts and application.

SPEAKER BIOGRAPHY

James Foster

James Foster is the CEO/Company Director of ENV Solutions, a company which he founded in 2014 in response to local clients needing a "solutions" focused environmental engineering consultant. James is a Principal Environmental Engineer with over 20 years' experience. Born and bred on the North Coast of NSW, James will provide a breadth of local knowledge of the region. ENV now employed approximately 43 environmental specialists and support staff across their Ballina, Coffs Harbour and Gold Coast offices.

Jana Assaf

Lana Assaf is a Principal Technical Environment Manager with ENV Solutions, with over 20 years' experience in environmental planning assessments and has been an Environment Lead on Federal, State and local government projects. She is a certified and registered Exemplar Global EMS Lead Auditor and a Certified Environmental Practitioner (CEnvP No. 1353).