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For Immediate Release

Axter Australia Undertakes Successful PFAS Test Regime with ADE Consultants

Axter Australia has undertaken a substantial testing program to establish the performance of Coletanche Bituminous Geomembranes as a barrier system for PFAS contaminated materials. Beginning in June of 2022, Axter engaged ADE Consultants in Melbourne, Victoria to enhance our understanding of Coletanche performance as a PFAS barrier. The effort was aimed at increasing the understanding of Coletanche performance beyond its well-established performance as a hydraulic barrier which prevents advection and migration of contaminated liquids.

The project aimed to investigate the following performance criteria:

1. Baseline: Does the geomembrane product inherently contain any native PFAS; are the manufacturing process and raw materials used to make the geomembrane likely to be associated with PFAS inclusion?

2. Leachability: Does the geomembrane product release PFAS when saturated; could PFAS leach from the product when in contact with fluids and impact water resources in dams, reservoirs, canals etc.?

3. Sorption: Can the geomembrane product restrict the movement of PFAS in solution; are PFAS compounds likely to sorb to the product surface, offering a degree or attenuation for impacted fluids?

4. Permeation: Can the geomembrane product be permeated by PFAS in solution; would PFAS contained in landfill leachate or other waste fluids be likely to breakthrough containment and barrier systems?

5. Durability: Is the geomembrane product damaged or degraded when in contact with fluids containing PFAS; are containment and barrier systems likely to be compromised due to PFAS contamination?

The results of the testing exceeded expectations giving greater confidence in the use of Coletanche in PFAS contaminated applications.

A portion of the Discussion and Recommendations from the report are included with this release. For a more detailed report please email info@axter.com.au.

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7 Discussion and Recommendations

7.1 Discussion

Given the results of the tests, and the five main propositions stated for the project aims and objectives, the following is currently concluded concerning the geomembrane product properties and performance:

1. ***Baseline:*** *Is the geomembrane product inherently associated with PFAS; are the manufacturing process and raw materials used to make the geomembrane likely to be associated with PFAS inclusion?*

   The geomembrane product does not appear to be associated with significant native concentrations of PFAS, given the results for those PFAS compounds analysed. While trace concentrations of PFBS, PFOA and PFOS were identified in one of three samples only, these were just were above method detection limits but below practical quantitation limits. These trace concentrations could be associated with limited cross-contamination during the geomembrane manufacturing process.

   It is noted that results for Test 2 (leachability) and Test 4 (control sample) support the assumption that the geomembrane product is not inherently associated with PFAS, and use of the product during construction projects is unlikely to introduce PFAS into the built environment.

2. ***Leachability****: Does the geomembrane product release PFAS when saturated; could PFAS leach from the product when in contact with fluids and impact water resources in dams, reservoirs, canals etc.?*

   The geomembrane product does not appear to leach PFAS when saturated, even over a longer duration in contact with water. No detectable concentrations were identified for the three samples and the 16 PFAS compounds analysed. The results suggest that the geomembrane product is suitable for its normal uses and importantly that it would be unlikely to contaminate water resources with PFAS, where used for storage purposes e.g., as a liner for dams and reservoirs.

3. ***Sorption:*** *Can the geomembrane product restrict the movement of PFAS in solution; are PFAS compounds likely to sorb to the product surface, thereby offering a degree or retardation for contaminated fluids?*

   The geomembrane product appears to have a degree of sorption potential for some PFAS compounds, likely due to its being a bituminous product (with PFAS possibly partitioning to other organic compounds). For example, at high initial test solutions of PFAS, up to a 44% reduction in concentrations was identified for PFOA, although the data also suggest that some oxidation and transformation of parent compounds may have occurred with the appearance of PFAS congeners that were not present in the material itself but “appeared” in the test solution. At typical concentrations for PFAS in water e.g., water in the natural environment, the product may provide an attenuation effect, which could be useful in protecting stored water resources. The test results also suggest that even at high PFAS solution concentrations, PFAS does not act as a solvent, and cause the leaching of PFAS from the geomembrane product.

4. ***Permeation:*** *Can the geomembrane product be permeated by PFAS in solution; would PFAS contained in landfill leachate or other waste fluids be likely to breakthrough containment and barrier systems?*

   The geomembrane product appears to prevent permeation of PFAS for those compounds analysed and noting the limited timeframe of the tests (63 days). With no indication of contaminant breakthrough, the results suggest the product is suitable for use in more aggressive environments or hazardous functions e.g., soil and liquid waste containment such as landfills and tailings ponds. There however remains the question of extended timeframes or elevated PFAS concentrations and potential contaminant breakthrough, and the possible diminishing performance levels of the geomembrane due to its degradation over time.

5. ***Durability**: Is the geomembrane product damaged or degraded when in contact with fluids containing PFAS; are containment and barrier systems likely to be compromised due to PFAS contamination?*

   Note that at the time of writing, results for Test 5 are pending and their discussion will be included in a revision to this report.

7.2 Recommendations

Given the findings of the bench tests (as discussed above), it may be prudent to undertake limited confirmatory tests to further evaluate the efficacy of the Coletanche® Geomembrane under extended timeframes, different environmental conditions and at higher concentrations of PFAS solution. This will provide a more comprehensive understanding of the properties and performance of the Coletanche® Geomembrane and help inform its optimal use by the waste, civil engineering, and mining sectors in different settings.