Upcycling the Ashes for Sustainable Management of Soil Contaminants

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Solid waste management has been a universal issue that contributes to concerns such as global warming and climate change. This has motivated governments and industries, including environmental remediation, to consider recycling wastes which not only reduces solid wastes but produces valuable products to pursue sustainable development. This presentation will discuss the use of recycled

waste for novel remediation materials in the area of soil stabilization/solidification (S/S).

S/S technologies have been widely employed to assist risk-based management and closure options for heavy metals and other organic contaminated sites. According to US Environmental Protection

Agency (EPA), S/S technologies have been the second most applied technology in their Superfund remediation sites. The most common approach for the S/S treatment involves incorporating inorganic cementitious and/or pozzolanic based reagents with contaminated soil to increase compressive strength and lower hydraulic conductivity & permeability, thereby minimizing migration and leaching of contaminants. However, this approach has effects such as greenhouse gases (GHGs) emissions, bulking, mass increase and re-vegetation/re-use restrictions.

In this presentation, mechanisms and advantages of an alternative soil S/S method which immobilizes leachable heavy metals and/or organic contaminants in soil by applying a formula utilizing pulp mill ash will be highlighted. Through a comparison to cement-based S/S technology, sustainable aspects of the pulp mill waste-based S/S technology will be discussed including evaluations of re-vegetation & reclamation capability and reduction estimates of GHGs emissions.

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Dr. Jongho Won, Ph.D., P.Eng. is a R&D Director at TRIUM Environmental Inc. He has over 15-year experience in research & development of environmental remediation technologies and numerous peer reviewed publications & presentations. Dr. Won received his Ph.D. degree in Environmental Engineering with a minor in Soil Science from North Carolina State University, USA. His research experience includes artificial intelligence (AI) based site characterization, bioremediation and biogeochemistry of soil contaminants, chemical and thermal remediation, fate and transport of contaminants in subsurface, monitored natural attenuation (MNA)/enhanced attenuation (EA) of soil contaminants, and water reuse through soil aquifer treatment.