

RECLAIMING COARSE TACONITE TAILINGS – IS IT ALL JUST BS? (BIOSOLIDS)¹

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Abstract. Establishing acceptable vegetation on the coarse fraction of taconite tailings has been a major problem for Minnesota's mining industry. Reclamation rules require that percent cover must equal 90% after three to five years (depending on slope and aspect), and vegetation must be self-sustaining after ten years. Despite repeated application of seed and fertilizer, less than 10% of the coarse tailings areas have met standards. Typical cover on coarse tailings, even after five years, has ranged from about 30 to 50%.

The addition of organic amendments, such as municipal solid waste compost, peat and yard waste compost, can significantly improve vegetative cover and additions of about 20 dry ton/acre have produced vegetation that has met reclamation standards. However, availability and cost of these amendments has limited their use. Biosolids, due to their high nitrogen content and concern for water quality impacts are applied at much lower rates. An application that supplies about 100 lbs N/acre improved vegetation, but a second application was required to meet standards.

This study was designed to determine if there was an optimum biosolids application that would produce vegetation that would meet reclamation standards without impacting water quality. In the spring of 2002, six two acre plots of coarse taconite tailings were treated with anaerobically digested biosolids that would supply 100, 200 and 400 lbs N/acre. Paper mill residue was added to two of the plots to tie up excess nitrogen. A series of small bins (each about 3 feet by 9 feet) were built to examine the water quality impacts associated with the use of these amendments.

After two years, percent cover on all of the amended bins was at least 2 times greater than the cover produced by standard mineland reclamation and all plots with biosolids application of at least 200N had cover in excess of 75%. Nitrate concentrations in all plots, except the control, periodically exceeded the nitrate standard of 10 mg/L. Adding paper mill residue reduced the nitrate concentrations by about 50%. Based on both vegetation and water quality, a biosolids application equivalent to 200 lbs N /acre appears to be an optimum rate.

Additional Key Words: copper, nickel, cobalt, zinc, surface flow wetlands

¹Paper was presented at the 2005 National Meeting of the American Society of Mining and Reclamation, June 19-23, 2005. Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502.

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