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ABSTRACT

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The present invention provides a reaction chamber cleaning apparatus comprising a chamber, a blade apparatus comprising at least one annular mounting member, at least four scraping blades attached peripherally about the annular mounting member, and a reciprocal movement unit for rotating said scraping blade(s) circumferentially back and forth along the interior surface of said chamber to scrape the interior surface of said chamber; said reaction chamber cleaning apparatus also comprising a vortex unit comprising a generally conical outer shell attached to and extending downwardly from the top plate top plate, and a liquid inlet arranged in relation to the outer shell to tangentially introduce liquid into the outer shell, thereby forming a laminar sheet of fluid on the inner surface of the outer shell; said vortex unit further comprising a baffle and a concentric chamber bounded by the outer surface of the baffle, the inner surface of the outer shell, and the bottom surface of the top plate. The invention also includes methods for using the reaction chamber for effluent abatement.