World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:14, No:06, 2020

Data Management System for Environmental Remediation

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Abstract : Environmental remediation projects deal with a wide spectrum of data, including data collected during site assessment, execution of remediation activities, and environmental monitoring. Therefore, an appropriate data management is required as a key factor for well-grounded decision making. The Environmental Data Management System (EDMS) was developed to address all necessary data management aspects, including efficient data handling and data interoperability, access to historical and current data, spatial and temporal analysis, 2D and 3D data visualization, mapping, and data sharing. The system focuses on support of well-grounded decision making in relation to required mitigation measures and assessment of remediation success. The EDMS is a combination of enterprise and desktop level data management and Geographic Information System (GIS) tools assembled to assist to environmental remediation, project planning, and evaluation, and environmental monitoring of mine sites. EDMS consists of seven main components: a Geodatabase that contains spatial database to store and query spatially distributed data; a GIS and Web GIS component that combines desktop and server-based GIS solutions; a Field Data Collection component that contains tools for field work; a Quality Assurance (QA)/Quality Control (QC) component that combines operational procedures for QA and measures for QC; Data Import and Export component that includes tools and templates to support project data flow; a Lab Data component that provides connection between EDMS and laboratory information management systems; and a Reporting component that includes server-based services for real-time report generation. The EDMS has been successfully implemented for the Project CLEANS (Clean-up of Abandoned Northern Mines). Project CLEANS is a multi-year, multimillion-dollar project aimed at assessing and reclaiming 37 uranium mine sites in northern Saskatchewan, Canada. The EDMS has effectively facilitated integrated decision-making for CLEANS project managers and transparency amongst stakeholders.

Keywords : data management, environmental remediation, geographic information system, GIS, decision making
Conference Title : ICERTA 2020 : International Conference on Environmental Remediation Technologies and Applications
Conference Location : Toronto, Canada
Conference Dates : June 18-19, 2020

Open Science Index, Environmental and Ecological Engineering Vol:14, No:06, 2020 publications.waset.org/abstracts/115840/pdf