

## Decision support systems to reduce contaminants and residues

<b>Short description (what need was solved)?</b>
<p>The aimed of this service was to analyze different remediation alternatives for the Zapadnoe tailings site, which contains a huge amount of uranium residues produced by Pridneprovsky Chemical Plant, a largest uranium processing enterprise. To do this, several potentially conflicting economic, radiological, social and environmental objectives must be simultaneously taken into account, such as the environmental impact due to contaminants discharged into surface waters that can impair the functioning of aquatic biota and the impact on groundwater bodies, the doses received by the population through external exposure, inhalation (concentration in the air) and ingestion (via drinking water, food), or the community satisfaction and the impact on neighborhoods or regions.</p>
<b>What service(s) provided?</b>
<p>The GMAA decision support systems (<a href="http://dia.fi.upm.es/dasg/">http://dia.fi.upm.es/dasg/</a>), based on the Decision Analysis methodology, was adapted to deal with this complex decision-making problem and additional functionalities were incorporated to a new version the software package, such as fuzzy inputs or Monte Carlo simulation techniques to derive a fuzzy ranking of remediation alternatives.</p>
<b>The relation with digitization</b>
<p>The service involved the construction of an objective hierarchy, in which all the relevant aspects to be considered were considered, the fuzzy evaluation of remediation alternatives against the different criteria and to quantify preferences, such as the weights representing the relative importance of criteria in the objective hierarchy. The adapted GMAA system was used to carry out the above tasks and to derive a fuzzy ranking of the remediation alternatives on the basis of Monte Carlos simulation techiques.</p>
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