

# Climate Change Resiliency Assessments of Two Coastal Sites in Colombia in Preparation for Resilient Remedy Selection

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**Background/Objectives.** Over the past 20 years, there has been an increasing trend towards the implementation of sustainable remediation practices at contaminated sites. However, over that same timeframe, increases in climate-related extreme events (e.g., increase in frequency of occurrence and intensity; high intensity short duration events etc.) have resulted in significant impacts to various remediation strategies including physical remediation infrastructure and containment systems. As a result, contaminated site managers need to reevaluate the way they look at their remediation obligations and associated risks to sustainable remediation based on growing concerns related to the impacts of climate variability. We present a process by which climate change impacts can be assessed at the local level, discussed with all stakeholders and incorporated into sustainable remediation practices with consideration to all stakeholders while still meeting remedial goals. The two sites are agricultural chemical plants in Barranquilla and Cartagena, Colombia undergoing investigation with remediation planned in the near future.

**Approach/Activities.** To address site-level risks from climate change, downscaled (regional-level) climate risk assessments focusing on extreme events can be effective. These efforts include an assessment of exposure to natural hazards; assessment of current and climate change extrapolated hazard vulnerabilities and developing GIS overlays to visually represent the potential differences; development of a risk matrix to identify short-term and long-term adaptation needs through a multi-criteria based cost benefit analysis; and design adaptation measures that can be integrated into the remedy selection process. The two Colombia sites require access and compilation of local weather and surface water meta-data to conduct the assessments.

**Results/Lessons Learned.** Obtaining the local weather and surface water meta-data has been challenging for both the Barranquilla and Cartagena Sites due to limited availability of historical weather data. Supplemental data was collected using pressure transducers placed in monitoring wells to measure water level changes associated with tidal, storm surge, flooding or drought conditions. The data are being used to quantify the potential impacts of natural hazards in baseline and climate change scenarios at the Sites and develop appropriate adaptation plans to build climate resiliency into sustainable remediation strategies for the entire project life cycle. Reviewing the Site climate hazard assessments will show that the earlier resilience to climate change and adaptive measures are incorporated into site remediation strategies the more impactful and cost effective while mitigating potential destruction and replacement of non-resilient remediation strategies.