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GEOHAZARD MANAGEMENT AND ASSESSMENT EXPERIENCES IN RIGHTS OF WAY

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ABSTRACT

CENIT, a midstream Company in Colombia (South America), crosses around 230 municipalities (representing almost a quarter of all municipalities in the Country), and a large part of them are located in the Andean Region that forms the most populated region of Colombia. Some of the most important cities, such as Bogotá and Medellín are there, where the delivery of refined products is part of an economic priority. Likewise, Colombian territory is recognized for its complex geological and geotechnical conditions, as well as the activity of triggering agents such as rainfall and earthquakes, aspects that generate a challenge for the geohazards management in the integrity of hydrocarbon transport systems. This aspects may be exacerbated due to occurrence of macroclimatic phenomena such as El Niño-La Niña Southern Oscillation (ENSO), such as the one that ocurred in 2010-2011, which was one of the most impactful in the recent history of Colombia.

Based on the above, CENIT has implemented a Geohazards Management Strategy that considers the integration of information from different disciplines, based on geotechnical susceptibility, the influence of triggering agents and the analysis of the characteristics of the infrastructure (pipeline vulnerability). For this, pipeline inspection analysis with intelligent tools applied to the identification of instability processes and artificial intelligence techniques for the identification of relationships between rainfall effect on the stability of rights of way (ROWs) through association rules with supervised algorithms to differentiate areas of interest based on the geohazards of hydrometeorological origin has been incorporated.

These preventive analyses are intertwined with inspection and verification strategies of integrity plans, which has made it possible to identify and manage geotechnical findings in a timely manner due to the materialization of instability processes, which could have represented a threat to the integrity of the pipelines.

Finally, some examples are shown to highligth this Decision-making process, in which data supported by monitoring, analysis and the expert judgement and knowledge, are essential in defining operational strategies for the different eventualities of each system and empasizes the importance to assessing and managing geohazards as a key for a safe co-existence. Some of these strategies and success stories have been shared in international scenarios in which scientific exchange in interdisciplinary topics have allowed to strengthen Geohazard Risk Management in CENIT.

Some of these strategies and success stories have been shared in international scenarios such as 2nd Workshop on Natech Risk Management (United Nations/OECD - Germany, September 2018), the International Pipeline Geotechnical Conference - IPG (ARPEL/ASME - Argentina, July 2019 and Uruguay, June 2021) and the 5th International Symposium on Natural and Technological Accident Risk Reduction at Large Industrial Parks (Osaka University/University of Tokyo, Japan March 2021), in which scientific exchange in interdisciplinary topics have allowed to strengthen Geohazard Risk Management in CENIT.