

Impact on Air Quality operations cleaning and inspection of Natural Gas pipelines in Central Mexico

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Methane anthropogenic emissions are generated by the production of oil and natural gas leaks (Finlayson-Pitts & Pitts, 2000). The main processes impacting on the atmosphere are transport and storage of natural gas, including fugitive emissions in pipeline derived from the maintenance activities (USEPA, 1996). The Cleaning/ Inspection Process of Oil Pipelines (PLITTH), is a preventative maintenance procedure used to monitor the mechanical integrity of the pipelines, which requires natural gas emission to the atmosphere. In 2011, 69 PLITTH in central Mexico were performed.

In this work, Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT, Draxler and Rolph, 2003) model has been used to predict transport and dispersion of PLITTH emissions. The results showed that Air Quality of Metropolitan Area of Mexico (ZMVM) can be modify in least 12 of the analyzed events in 2011. The impact of PLITTH contaminant in ZMVM is showed in Figure 1 using PM₁₀.

One of the main important episodes of impact occur on 11th January 2011, in which the Metropolitan Environmental Commission (CAM) of the ZMVM, activated the Atmospheric Environmental Contingency Program on 11th - 12th January by high PM₁₀ values recorded at station XALOSTOC (XAL) to Northwest of the ZMVM. The high levels obtained were favored by a high pressure system coupled to the emissions for the PLITTH, and dominant local wind of W, NW and SW.

A solid residual of PLITTH was analyzed using Inductively Coupled Plasma (ICP-MS). 48 toxic potentially elements, among which Pb, Zn, Sr, Cr and lesser proportion of Mo, Cu, Sn, Nb were characterized. During PLITTH, several of toxic elements can be incorporated into the atmosphere as particulate material along with methane and its derivatives, and can impact negatively on air quality of urban areas densely populated.

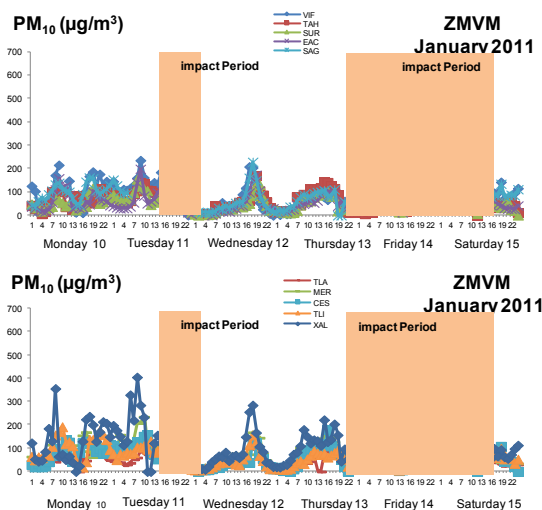


Figure 1. Emission of PLITTH on January 11, 2011 at 13:47 pm and its impact on the monitoring stations of the ZMVM.

In conclusion, approximately 82% of PLITTH impacts were developed at cities or states, most of which have not air quality networks, making difficult to assess the impact on the population and the environment.

Draxler and Rolph, 2003. NOAA *Air Resources Laboratory*, Silver Spring, MD.

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