Mercury pollution in Pavlodar, a city in northeastern Kazakhstan, is the result of chlor-alkali chemical plant operations in 1975-1993, where chlorine production capacity was approximately 100,000 tons per year. The total quantity of metallic mercury released into the environment (mainly in the soil) was estimated to be 1,310 tons. A plume of groundwater contaminated with HgCl<SUB>2</SUB> spread 2 km from an electrolysis workshop at a depth of 5-20 meters. The first stage of demercurization was completed in 2005. It involved dismantling and utilization of all processing equipment of chlor-alkali production, manual collection of metallic mercury, demolition of mercury contaminated production buildings, partial removal of heavily contaminated topsoil, isolation of main underground hotspots of elemental mercury and mercury wastes from the atmosphere and groundwater, and construction of a landfill for mercury-bearing building structures and facility components.

A regional hydro-geological model of the Northern industrial area of Pavlodar and a local model of the groundwater mercury contamination area were produced using GMS 6.0 software. The regional model provided an explanation for the mechanism of formation of the groundwater mercury contamination plume, gave possible scenarios of its development, predicted groundwater rise to the surface at some places, and caused topsoil mercury contamination from groundwater evaporation. Since the groundwater spread in this region was anthropogenic in nature, the direction of the contamination plume can be changed quickly.
Past-demercurization monitoring was conducted in 2004-2008, and included observation of the mercury content in the atmosphere, groundwater, topsoil, and the bottom sediments, water and fish of a wastewater storage pond.
At some sites, in the summer time, mercury vapors were stable when the concentration was greater than10,000 ng/m<SUP>3</SUP>. Measurements of total mercury in the water samples, taken from the observation wells, showed that the general configuration of the groundwater mercury contamination plume and the level of dissolved mercury concentration were the same for four years of monitoring. The topsoil within the industrial site contaminated with metallic mercury is the source of the main risk and must be treated using cost-effective technology. Only then can the correct investigation be conducted to establish an efficient anti-filtration barrier (a "cut-off wall") around the underground mercury hotspots.