



## **Role of Pb mining in Contamination of Groundwater and Surface water, Case study: Bastam drainage basin, Northeastern Iran**

Abdolreza Jafarian

Geology Department, IAU, Shahrood Branch, Iran (r.jafarian@gmail.com)

Groundwater will normally look clear and clean because the ground naturally filters out particulate matter. But, natural and human-induced chemicals can be found in groundwater. As groundwater flows through the ground, metals such as Lead and Cd are dissolved and may later be found in high concentrations in the water. Because water is “Universal Solvent” it can contain lots of dissolved chemicals. And since groundwater moves through rocks and subsurface soil, it has a lot of opportunity to dissolve substances as it moves. For that reason, groundwater will often have more dissolved substances than surface water will.

Bastam watershed with ca 1250 km<sup>2</sup> area and ca 600 km stream networks, contains around 100 spring, ca 300 irrigation wells, and ca 100 Qanat (one of a series of well-like vertical shafts, connected by gently sloping tunnels). This watershed is one of the largest drainage basins in northeastern Iran and also it provides drinking water for 3 town and several villages. An abandoned Pb mine located at northwest of this watershed. To determine contamination of these metals in groundwater and surface water, 8 water samples around this mine, from wells, springs and streams were collected and analyzed for heavy metal (Pb, Cd, and Zn) by AAs method. Pb, Cd, and Zn concentration in these samples are range of 0.11 to 0.18 mg/L, 0.010 to 0.021 mg/L, and 0.0079 to 0.0485 mg/L respectively. Comparison between these results and regulation guidelines of WHO, and United State EPA, reveal high level concentration of Pb and Cd in groundwater and surface water in this water resources. Based on regulation guidelines of WHO maximum contaminant level (MCL) for lead, and Cadmium are 0.015 mg/L, and 0.005 mg/L respectively. As a result, these water resource are affected by high level contaminate of Pb (ca 10 fold of WHO regulation guideline) and Cd (ca 3 fold of WHO regulation guidelines) maybe derived from Galena and other Pb rock minerals from this mining area. To reduce health effect from long-term exposure above the MCL, these water resource need treatment technique. Lead and Cadmium concentrations in drinking water can be reduced by conventional methods of water treatment using coagulants or lime softening.