Kowalska, B., Kowalski, D., Kwietniewski, M., Miszta-Kruk, K., Chudzicki, J. Heavy Metal Content of Water Exposed to Cement Lining in the Water Pipe. *Ochrona Srodowiska* 2011, Vol. 33, No. 4, pp. 41–45.

Abstract: The mechanism governing the release of toxic heavy metals from cement is still far from being well understood. The process is influenced by a diversity of factors such as the quality of the water flowing in the pipes (especially its pH, alkalinity, temperature and chlorine content), or the composition and microstructure of the internal lining applied. This paper reports on model investigations into the presence of selected heavy metals (determined by ICP-OES and ICP-MS) in the water before and after 6-month service. It has been found that in the majority of instances the trace element content (Ba, Fe, K, Ni, Mg, Na, Sr, Zn, V, Cd, Pb, Mn, Cu and As) was below the detection threshold (ICP-OES), regardless of whether the water was exposed to a fresh lining or after six months of service. Structural examinations of the cement lining by scanning electron microscopy (SEM) have produced the following findings: the thin calcite layer covering the cement paste on the internal surface of the pipe was destroyed within a very short time, the chemical composition of the layer, however, remained unchanged after 6-month service of the pipe being tested. At the points of cement lining destruction a large number of ettringite needles was detected, which is indicative of the onset of concrete corrosion.

Keywords: Water-pipe network, cement lining, porous structure, heavy metals, release.