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ENVIRONMENTAL IMPACT ASSESSMENT OF DNEPRODZERZHINSK INDUSTRIAL UNIT

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Powerful industrial plants have significant anthropogenic influence on the environment. Investigation of such effects is especially important for regions with well-developed mining and processing industries. Dniprodzerzhynsk region can be considered as classic example of such objects. In Dniprodzerzhynsk region, there are seven uranium mill tailing dams and two industrial waste storages of the former production association "Prydniprovsky chemical plant" (PCP) as well as sludge dumps and heaps of the coking plant. Other industrial and settlement areas are adjacent to those facilities. Ecological and geochemical methods provide not only data on elements distribution in the environment but also information on technogenic effects on the separate landscape components. PCP has been operating for about 60 years and all time influenced on environment, so the soil can be considered as indicators of the state of the environment.

Objectives: Landscape-geochemical media; Soils.

Research methods: Trace elemental analysis of "technogenic" and urban soils was carried out using atomic emission spectrometry. The mapping of elements distribution in soils were performed using ArcGIS software package.

Following geochemical indices were calculated: Geochemical background content; Clarkes of concentration of elements relative to those in soils and to average value of elements content; Geochemical coefficients of trace elements were normalized to maximum permissible concentration in soils and to clarkes in urban soils.

Rezults: Determination of microelement content in the upper soil in the area affected by tailing dumps and technogenic objects of Dniprodzerzhynsk industrial region as well as schematic maps of Zr, Mn, REE+Y, Ni, Cu, Pb have been carried out. Lithogeochemical and sanitary data for the soils on the areas under study are discussed. Calculated geochemical indices of soil contamination at Dniprodzerzhynsk industrial unit are presented in the table.

Table

Factors of concentration of elements relative to clarkes in soils, in the zone of influence of tailing dumps

Sample location	Clarkes Concentration
Zakhidne tailing dump	Ti**3.2** Mn1.1 Ba**2.1** Zr**2** Sc**4.4** Y**2.9** La1.1 Yb**2.3** Ni1.7 Cu**5.4** Pb1.1 Co0.8 Cr1.4 Bi**7.5**
Tsentralnyi Yar tailing dump	Ti**2.5** Mn1.1 Ba**2.1** Zr**2** Sc**3.1** Y**2** La**0.6** Yb**2.3** Ni1.3 Cu**4.2** Pb0.9 Co0.8 Cr1.1 Bi**10**
Dniprovske tailing dump (near the bridge on the Konoplyanka river)	Ti**3** Mn1.8 Ba1.8 Zr**3.2** Sc**2.5** Y**5** La**0.5** Yb1.7 Ni1.8 Cu**5.5** Pb1.9 Co2 Cr1.4 Bi7.5
Suchahivka-2 tailing dump (body)	Ti0.8 Mn**27.6** Ba1.4 Zr**47.8** Y**30** La25 Yb**2.7** Ni0.5 Cu**5.5** Pb**0.6** Co1.5 Cr1.4 Bi**10**
Baza C (1 m)	Ti**0.7** Mn1.1 Ba1 Zr1.7 Sc**5.6** Y**2.5** La1.5 Yb**2** Ni1.2 Cu**10.9** Pb**2** Co0.4 Cr**0.7** Bi**5**
Baza C (2 m)	Ti**2.1** Mn1.1 Ba**2.1** Zr**2** Sc**5** Y**2.1** La1.5 Yb**2** Ni2.1 Cu**3.3** Pb1.3 Cr**0.7** Cr2 Bi**10**
Suchahivka-2 (on-site of pipeline, 1 m)	Ti1.8 Mn1.1 Ba**2.1** Zr2 Sc**3.8** Y1.8 La2 Yb1.7 Ni2.1 Cu**3.3** Pb1 Co0.8 Cr1.6 Bi**10**
Suchahivka-2 (on-site of pipeline, 2 m)	Ti**0.6** Mn1.1 Ba**2.1** Zr**2** Sc**3.8** Y1.8 La1.5 Yb1.7 Ni2.5 Cu**5** Pb1.3 Co0.8 Cr2 Bi**5**

Conclusion

The exceeding of Ni and Cu maximum permissible concentrations was founded in samples from the waterside of the Konoplyanka River flowing in the immediate vicinity of the tailing dams "Tsentralnyi Yar", "Dniprovske", "Zakhidne" and "Pivdenno-Skhidne". It suggests that the migration of these elements from tailings and their accumulation in riverside soils take place. It was determined that the content of Ni, Cu and Pb in the soil of the settlement zone is twice as large as the maximum permissible concentration, and in soils affected by tailings it is four times higher. The increased concentration of Ce in the upper layer of "technogenic" soil of the studied area is the subject of detailed investigation.