From: VF Belogolovov

TO: US-Russia Health Risk Research Dialogue Participants

Date: November 5, 2014 - revision

Subject: Memo 3 – Zakamensk material inventory outline

The project dates back to 06/10/14

Data to conduct the inventory of materials/information on DTMM's wastes negative health impact in Zakamensk

Prepared with regard to the format of section 5 МУ 2.1.10.3165-14 (1)

Data for medical-biological inventory	Estimations/Assessment and their sources	Lacking information
1. The list of threats and dangers	Soils, surface waters, vegetation are contaminated with heavy metals; the source of pollution is open and underground mining, waste rock stockpiles, mine drainage and pit waters, mill wastes stored at tailings (2) *	Aerial survey data are outdated (shooting of 1987) and small scaled; that prevented us from decoding technogenic spots of the landscape and infrastructure that affect the environment and identifying the areas where dangerous geological process may develop. (2) Risks exist not only for health, but also for other inhabitants' interests.
2. Estimated levels of pollution and population groups at risk	Industrial DTMM's wastes contain harmful and dangerous components in which the total indicator of pollution Zc (aggravate coefficient) is repeatedly exceeded > 128 (which is an environmental disaster criterion/level). Storage conditions do not correspond to standard requirements and affect all constituents of the environment. The estimations have shown that the maximum concentrations of dust exceed maximum permissible concentrations at all check points of Zakamensk's residential area (2).	On the tailings' territory there has not been conducted gas-chemical research; soil air samples to control gas concentrations have not been collected, and emanation survey for radon has not been implemented either. There is no data on potentially harmful impacts from electromagnetic radiation, noise, vibrations, thermal fields, etc.; - Technogenic radioactive substances (radionuclides) have not been fully identified; thus, Cs-137 is widespread/omnipresent and in some samples it exceeds the maximum permissible concentrations; although analyses for Sr-90 and Pu-243 are lacking (have not been

		undertaken) (2) Atmospheric air quality study was conducted under no-wind conditions which does not correspond to the standard requirements (3)
3. Emissions and dumps inventory results	Total emissions in the atmospheric air during the dusting period of 90 days at tailings have resulted in 29.7 thousand t/year. Total emissions of all sources at Zakamensk have been estimated at 32.9 thousand tons. The local pollution rate/amount per one unit of the residential area (S=7.1 km2), is equal to 531 tons. (2)	The systematised data for the DTMM's operating time, periods after its closure and the present are absent/lacking (were not preserved).
4. Conditions for maximum concentration limits to exceed	As a whole the air environment over the Barun-Naryn technogenic deposit and adjoining territory of Zakamensk are viewed to be regularly polluted with dangerous concentrations of heavy metals transferred by air suspensions. The situation is exacerbated by the fact that the mill is located in the intermountain valley marked by long periods of light breezes which together with the landscape peculiarities make it possible to define the general spread/dispersion of pollution over Zakamensk residential area (2)	Lack of meteodata (there is no a meteorological station in Zakamensk) impedes one-time observations to be used for forecasting and retrospective analysis of atmospheric air pollution dynamics caused by DTMM's wastes. Classes of toxicity and sanitary-hygienic dangers of DTMM's wastes from old and new tailings have not been identified; redistribution of heavy metals and organic toxicants caused by atmospheric impacts, processing and storing operations and cases of emergency was not taken into consideration either. **The sanitary - protective zone does not correspond to the requirements of СНиП 2.01.28-85 (it should be no less than 3 km from the residential area borders to toxic wastes burial sites).**
5. Levels and structure of pollution and conditions for its development	The environmental situation around the proposed mill at Barun-Naryn technogenic mining site in Zakamensk and nearby/adjoining territories can be referred to as an environmental disaster area. The situation is exacerbated by the fact that the	There are no monitoring data for all environments including air, water, foodstuff, wild crops; there is also a lack of information on the routes of health impacts (how harmful substances enter the bodies) which hampers

	mill is located in the intermountain valley marked by long periods of light breezes which together with the landscape peculiarities make it possible to define the general spread/dispersion of pollution over Zakamensk residential area (2)	assessment of quantity and structure (composition) of the exposed population at Zakamensk. Heavy metals phase structure, including a share of their soluble form (4) is not counted (considered) that can aggravate the process of cause-and-effect analysis of DTMM's wastes health impact.
6. Record of population groups at risk	The area contaminated with hazardous and highly hazardous substances/elements whose aggregate coefficient (Zc) is more than 32-128, covers about half of the Zakamensk territory (4). The relative risk of general morbidity and respiratory diseases, connected with the pollution, corresponds to the criteria of a critical environmental disaster situation (5).	There has not been study of the air quality at houses and apartments of Zakamensk located on the environmental disaster area; although the preliminary data have shown its exceeding maximum permissible concentrations (6)**. The research conducted in 2013-2014 did not reveal significant excess of heavy metals in people's biological media (6); although it should be mentioned that samples/tests were undertaken outside the terms of the expected body's physiological response to the impact.** The synergy of all impacts and factors remains unclear.
7. The priority toxicants	Heavy metals of 1-11 classes of toxicity - lead, cadmium, arsenic, zinc, molybdenum, tungsten, copper (2)	There is no data on fluorine concentrations. The exceeding limits for mercury have not been revealed. There is no data on organic toxicants (floatation reagents used at the mill). The data on radon and technogenic radionuclides are incomplete (2)

*Comments

I.G.Kremenetsky's report, prepared under the contract with the JSC "Zakamensk" has been issued with the purpose of geoecological study and preparation of initial materials for the EIA (OBOC) of the mill for processing DTMM's wastes, and it is considered to be a rather complete complilation of information on the DTMM problems over the last 50 years. The list of the used literature (references) consists of 93 items from the holdings and published materials (including those of the scientific/research organisations of the Buryat Republic).

The literature/References

1. The ORDER of APPLICATION of RESULTS of MEDICAL AND BIOLOGIC RESEARCH FOR the PROOF of HEALTH DAMAGE CAUSED by NEGATIVE CHEMICAL FACTORS of the ENVIRONMENT. Methodological instructions МУ 2.1.10.3165-14, approved on 5/23/2014

2. Kremenetsky I.G. Consolidated report on the results of engineering-ecological research around the area of the proposed mill aimed at DTMM's technological wastes processing. Ulan-Ude, 2011

3. The adverse results of the State examination № 592-14 ГГЭ-9293-15 (# in the register 3-4-1815-14) on the capital construction of «Mill aimed at DTMM's technological wastes processing», 07/05/2014.

4. Smirnova O. K, Doroshkevich S.G., Dampilova *B.V.* EVALUATION OF TENDENCIES OF TOXIC ELEMENTS CONCENTRATION CHANGE IN SOILS OF ZAKAMENSK AFTER DZHIDINSKY TUNGSTEN-MOLYBDENUM MILL CONSERVATION. Geological institute of the Siberian Branch of the Russian Academy of Science, Ulan-Ude, meta@ gin.bscnet.ru. 2014 The monography is available at http://geo.stbur.ru

5. V.M.Prussakov, et al. Risk Assessment of Children Health Affected by Technogenic Sands of the Tungsten-molybdenum Mill. Bulletin of the East-Siberian Research Center, Siberian Branch of the Russian Academy of Medical Science, 2005, № 8 (46)

6. Belogolovov V. F, BROB. About Health Risks at Houses of Zakamensk (Buryatiya) Caused by Heavy Metals from DTMM's Stockpiles/Tailings. An electronic resource. 2014