

Paper Number: 1889

Geoethical Problems of Developing Mineral Resources of Natural Celestial Bodies

Nikitina, N.K.

Intergeo Managing Company LLC, Tverskaya St., 22, Moscow, Russia, Nikitina-NK@yandex.ru

There are prospecting indicators for the discovery of helium-3, water ice, hydrocarbons, nickel, cobalt, copper, platinum group metals, gold, uranium, thorium deposits on planets and small bodies of the Solar System.

Technical progress leads to the fact that soon the natural resources of the planets and small bodies of the Solar system will be available for use. Mineral resources and useful properties of subsoil become the first objects to attract attention of Earthlings. But the pace of technological progress ahead of ethical understanding of the necessity, admissibility and the possibility of mining operations on other planets.

The helium-3 production on the Moon is the best prospect project on the development of mineral resources of celestial bodies because it would be used as an alternative energy source. According to consolidated feasibility analysis (TST) if annual productive capacity of the regolith is 1348.11 thousand tons (17.52 kg of helium-3), power generation on Earth is 3,066,000 kilowatt-hour per year, payback period will be 9 years.

Similar calculations allow us to remove the problem of developing mineral resources of natural celestial bodies from the realms of fancy into the search of real solutions. A long-term goal of space programs of all countries is the development of natural resources of celestial bodies to integrate them into earth's economic. And at least two companies - Planetary Resources and Deep Space Industries - are openly planning to mine asteroids. It is necessary to get to grips with juridical and ethical problems that may occur during their implementation: to provide a legislative framework for individual provisions of international treaties and develop ethical principles for mining on planets and small bodies of the Solar System.

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies and The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies explicitly forbids any government from claiming a celestial resource such as the Moon or a planet, claiming that they are the common heritage of mankind and state that the exploration of outer space shall be done to benefit all countries and shall be free for exploration and use by all the States. But The Space Act of 2015 (USA) says that resources extracted from asteroids and other objects in space belong to the person or company who extracts them. This statement violates the Outer Space Treaty.

Mining will entail the colonization and terraforming of planets (the process of deliberately modifying its atmosphere, temperature, surface topography or ecology to be similar to the environment of Earth to make it habitable by Earth-like life). Humanity believes that living exclusively on the Earth is too risky and given the natural and human-made risks in the universe that is simply not safe. The moral value of having a "backup Earth" should not be underestimated. In the absence of proof of life on a planet, this is

a philosophical debate. But may we have the luxury of an exceedingly thorough search for life before humans start to contaminate the planet with Earth life?

Suggested geoethical principles comprise following aspects:

- The strong ethical basis for title to subsoil of celestial bodies and recovered mineral raw materials;
- Equitable distribution of extraction benefiting;
- Social responsibility of space mining business;
- Valuing geodiversity; its preservation.

