



"The remediation policy after mining works in the Kyrgyz Republic"

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ABSTRACT

According to the National Statistical Committee of the Kyrgyz Republic, the mining industry in 2014 had more than 53.9% of the value of all industrial products, while the share of the mining industry in GDP in the same year was more than 10%. Under the former Soviet Union, the mining industry was of great importance in the Kyrgyz Republic. In the last 20 years, discoveries of large gold deposits and other valuable minerals brought Canadian and other international corporations to exploit. These companies operate without clearly detailed land remediation law and regulations. Many unresolved and partially resolved issues on disposal, reclamation of disturbed lands after mining, including radioactive waste, have been dealt in a case-by-case manner.

This paper examines the current situation of the post-mining land remediation policy in the Kyrgyz Republic. It focuses on the legal and political frameworks for land remediation after mining works. The topic about remediation has not gained much academic attention in the Kyrgyz Republic and other developing countries, especially as it is related to remediation policies, but this matter is urgent in the country. The Kyrgyz government has updated some strategies to deal with land remediation issues. However, this paper reveals that these recent efforts are still short of securing the health of the environment, which is the bedrock of the national wealth today and tomorrow. The discussion also shows how laws and regulations define and stipulate about remediation issues.

This paper reveals that post remediation regulations do not give a well-defined guideline for administering remediation actions. Consequently, the land law that stipulates procedure on remediation activities are not well explained and do not provide detailed information. In establishing this remediation policy, the first step to be taken is to clearly define land remediation. The second step is to identify the types of remediation processes. The third step is to create new guidelines for appropriate remediation works by clarifying responsible agencies and establishing an adequate fund for all the works required, including monitoring and skill training.

1. Introduction

This paper aims to examine the current situation of post-mining land remediation policy in the Kyrgyz Republic. In doing so, it traces the history of remediation related policies in the Soviet era that laid the legal foundation for the present-day mining policies in the Kyrgyz Republic. The mining industry has been of great importance to the country as it is rich with gold, antimony, mercury, tin, molybdenum, coal, oil, gas, and other minerals.¹ The mining industry, however, has posed many problems to local people (e.g., herders and farmers) as

mineral extractions caused substantial ecological degradation.²

We investigated root causes of these conflicts and found that the Kyrgyz land remediation policy had been plagued with outdated legal frameworks and scientific knowledge as well as lack of public insights for so long.³ We also found some gaps that have existed in the mining guidelines that instruct remediation processes after mining. Most of these guidelines have not improved much since the Soviet Union period. To illustrate this condition, we examine some relevant legal and political documents to the Kyrgyz remediation policy. Then this paper seeks to find the way to make mineral exploitation activities more

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¹ Ivanov, P.P. (1932). A brief historical sketch "To the development of the mining industry in Central Asia", State scientific and technical geological prospecting publishing house. Leningrad-1932-Moscow, p.81.

² Wooden, A. (2017). "Images of Harm, Imagining Justice: Gold Mining Contestation in Kyrgyzstan," in K. Jalbert et al., eds., *ExtraAction: Impacts, Engagements, and Alternative Futures* (London and New York: Routledge); Karpava, A. (2017), "The Mining Sector capacity Improvement in the Kyrgyz Republic through Building Effective Cooperation among Governments, Mining Companies and Local Communities," (M.Sc. thesis, University of Tsukuba).

³ Wooden, A. (2013). "Another way of saying enough: environmental concern and popular mobilization in Kyrgyzstan," *Post-Soviet Affairs* 29 (4): 314–353.

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sustainable in the future.

2. Materials and methods

The focus of this paper is national policies by mainly examining national laws, government documents, survey reports, and academic literature on remediation. Gulzhan Makhmudova, the lead author, has worked for the State Committee of Industry, Energy, and Subsoil Use of the Kyrgyz Government for 10 years. We partly used her insights to have in-depth understanding about remediation policies. We also interviewed with experts and key stakeholders in the Kyrgyz Government.

In the following discussion, we first discuss the importance of mining in the Kyrgyz Republic. We then trace the history of post-mining land remediation policies from the Soviet period to the present. Finally, we reflect on the future implications of Kyrgyzstan's remediation policy.

3. Results and discussion

3.1. Mining and the Kyrgyz Republic

The Kyrgyz Republic is located in Central Asia, bordering China, Kazakhstan, Uzbekistan, and Tajikistan. Until 1990, it was part of the former Soviet Union. The country is surrounded by Tien Shan and Pamir Alai Mountain ranges. More than 80% of the territory is located above 1500 m above sea level.⁴

Since the earliest modern mineral resource development began in present-day Kyrgyzstan more than a hundred years ago, it has produced a class of mining professionals. The geological service was formed more than 80 years ago. This Service has produced detailed geological maps along with geophysical and geochemical ones. The systemic survey under the Service helped the former Soviet Union to extract mineral resources. In the beginning of the 20th century, mining activities mainly focused on producing coal, oil, lead, mercury, antimony, and copper.⁵ During the Second World War, more than 20 enterprises operated and extracted lead, antimony, mercury, gold, tungsten, arsenic, and coal. Later, the mining and smelting industries were established in Kyrgyzstan and supplied a significant amount of raw and refined metals to the USSR.⁶

The mining industry is an important part of the economy of the Kyrgyz Republic. According to the Extractive Industries Transparency Initiative⁷ for 2013–2014, the contribution of the mining sector to Kyrgyz industrial production and exports were more than 50% and 40% respectively. Tax revenue from the mining industry accounted for about 17%.

Gold mining represents a key component in the Kyrgyz Republic mining industry, contributing to about 8% to the country's GDP.⁸ According to the State Committee for Industry, Energy and Subsoil Use of the Kyrgyz Republic, valid licenses for mineral deposits in 2017 were 2483 units.⁹ It is well-known that the gold mining industry comes with

some complex technologies to remove the gold extract from the rocks. These technologies are associated with the usage of environmentally dangerous chemical components (e.g., cyanides¹⁰).

There are many abandoned coal mine sites due to the bankruptcy of some license holders or non-honest subsoil users. They left the sites without remediation processes. The coal mine activities have a huge impact on lands, such as soil fertility and productivity. Gold and coal mining makes a huge impact on the ecosystem and biodiversity.

In the Kyrgyz Government, mining issues go under the jurisdiction of two agencies: the State Committee for Industry, Energy and Subsoil Use (formerly the State Agency on Geology and Mineral Resources) and the State Agency on Environment Protection and Forestry. There is no special research about remediation policy after mining operation. For better understanding the remediation policy framework as well as the experiences and practices of the past mining remediation activities, we traced the past remediation policies from the Soviet Union era to the present.

3.2. Laws related to remediation and mining in Kyrgyzstan

After the collapse of the Soviet system in 1991,¹¹ Kyrgyzstan became independent and adopted democratic governance. It promoted the market economy and privatized some industries. The mining industry experienced a sharp decline. All this led to a socio-economic decline in many regions of the Kyrgyz Republic, where the mining industry was the main source of income. This economic crisis prompted the search for foreign investment and changes in the legislative framework.

Today in the Kyrgyz Republic, the mining industry is regulated by a number of policy documents and laws. The key legal documents are listed below:

- The Land Code. June 2, 1999, No. 45 (amended on July 30, 2016)¹²;
- The Law "On transfer (transformation) of land plots." July 15, 2013, No. 145 (amended on March 19, 2016)¹³;
- The Law "On environmental protection." June 16, 1999, No. 53 (amended on July 25, 2016)¹⁴;
- The Law "On environmental impact assessment." June 16, 1999, No. 54 (amended on April 5, 2015)¹⁵;
- The Law "On tailing dumps and mountain dumps."¹⁶ June 26, 2001,

¹⁰ Mining facts. (2018). *What is the role of cyanide in mining?* <http://www.miningfacts.org/environment/what-is-the-role-of-cyanide-in-mining/>. Access date: 21.6.2018.

¹¹ New York Times. (1991). *The End of the Soviet Union. Text of Declaration: Mutual Recognition and an Equal Basis.* 22.12.1991. <http://www.nytimes.com/1991/12/22/world/end-soviet-union-text-declaration-mutual-recognition-equal-basis.html>. Access date: 2.2.2018.

¹² Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1999). *The Land Code (Земельный Кодекс)*. <http://cbd.minjust.gov.kg/act/view/ru-ru/8>. Access date: 2.2.2018.

¹³ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (2013). *The Law of the Kyrgyz Republic "On transfer (transformation) of land plots"* (Закон КР "О трансформации земель"). <http://cbd.minjust.gov.kg/act/view/ru-ru/203953>. Access date: 2.2.2018.

¹⁴ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1999). *The Law of the Kyrgyz Republic "On environmental protection"* (Закон КР "Об охране окружающей среды"). <http://cbd.minjust.gov.kg/act/view/ru-ru/218>. Access date: 2.2.2018.

¹⁵ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1999). *The Law of the Kyrgyz Republic "On environmental impact assessment" (ecological expertise)* (Закон КР "Об экологической экспертизе"). <http://cbd.minjust.gov.kg/act/view/ru-ru/219>. Access date: 2.2.2018.

¹⁶ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (2001). *The Law of the Kyrgyz Republic*

⁴ NSC KR. (2016). *Annual Report on the Environment in the Kyrgyz Republic*, Bishkek, KR: NSC.

⁵ Bogdetsky, V. et al. (2005). *Mining Industry as a Source of Economic Growth in Kyrgyzstan*. World Bank, Bishkek. © World Bank.

⁶ Djenchuraev, N. (1999). *Current environmental issues associated with mining wastes in Kyrgyzstan*. Department of Environmental Sciences and Policy of Central European University, Budapest, 1999.

⁷ Extractive Industries Transparency Initiative, Kyrgyz Republic, <https://www.eiti.org/kyrgyz-republic>. Oslo, Norway: EITI International Secretariat. Access date: 2.2.2018.

⁸ NSC KR. (2016). *Annual Report "Environment in the Kyrgyz Republic."* National Statistic Committee of the Kyrgyz Republic. Bishkek. 2016.

⁹ SCIES KR. (2017). *List of valid licenses*. State Committee of Industry, Energy and Subsoil Use of the Kyrgyz Republic. <http://www.gkpen.kg/index.php/2017-12-22-09-23-23>. Access date 8.5.2018.

- No. 57 (amended on April 17, 2009);
- The Law "On Subsoil." August 9, 2012, No. 160 (amended on April 19, 2017)¹⁷;
- The Criminal Code. October 1, 1997, No. 68 (amended on November 22, 2017)¹⁸;
- The Law "On production and consumption wastes" of November 13, 2001, No. 89¹⁹;
- The Regulations on the procedure for the subsoil use licensing of the Kyrgyz Republic, The Resolution. December 14, 2012, No. 834 (amended on August 4, 2014)²⁰;
- The Regulation of the remediation (restoration) of disturbed lands and the procedure for their acceptance in operation, the Resolution. July 12, 1993, No. 304 (amended on August 18, 2017).²¹

Among these, arguably the most important legislation in governing the mining industry of the Kyrgyz Republic is the *Law on Subsoil* (2012). This law covers the main issues of subsoil use, regulating industrial safety, air protection, and water and land resources. It emphasizes the rational use of natural resources with a provision on land remediation. Article 47 mentions about the fund to cover the expenses that are needed for remediation after mining operations. This provision also refers to technical efforts though nothing is clear about available technologies.

However, post-mining remediation is administered under the *Regulation of the remediation (restoration) of disturbed lands and the procedure for their acceptance in operation* (1993). It includes a provision about the basic requirements for subsoil users. This regulation was amended in July 2013 and August 2017. These two changes were minor in nature. This is the main law regarding the land remediation issues. The last two amendments did not provide changes that are needed to recognize the availability of new technologies or types of remediation.

The former Soviet Union laid out the legal foundation for mining and, to a small extent, remediation, in the Kyrgyz Republic. In 1977, the USSR government passed the first law of subsoil use.²² This law affected the Kyrgyz SSR. The Soviet regime developed the fuel and energy

complex. By the 1980s, the Kyrgyz SSR had produced about 40% of coal in Central Asia. The Kadamjay Antimony plant, for example, supplied high quality coal to the international market. Products from the Khaidarkan mercury plant were delivered to more than 40 countries.²³

After the collapse of the Soviet system, Kyrgyzstan became independent and established its own mining-related policies. The Kyrgyz Parliament repealed the USSR law on subsoil by the resolution of the Supreme Council in December 1992 (1067-XII). In July 1993 the Government established the remediation (restoration) regulation of disturbed lands. This regulation included a provision for the land remediation procedure after mining operations.²⁴ In 1999, it issued the Land Code to regulate its land.²⁵ Then the most basic law for the mining industry, the Law on *Subsoil* of 2012 took shape to regulating industrial safety, air protection, water and land resources. It emphasizes the rational use of natural resources, including a provision on land remediation.

Other laws that are relevant to land remediation are: The Criminal Code of October 1997 (amended on November 22, 2017)²⁶; the Law "On production and consumption wastes" of 2001²⁷; the Regulations on the procedure for the subsoil use licensing; Resolution No. 834 of 2012 (amended on August 4, 2014).²⁸ These laws and regulations acknowledge the importance of remediation to some extent, but they do not say much about the land remediation procedure. In Section 2 of the "Remediation of territories of EAEU member states affected by uranium mining operations" (December 16, 2010 No. 213-r) mentions that the Kyrgyz Republic did not practically have a national system for remediation of land affected by uranium mining and processing industries. The lack of detailed remediation provisions endangers the lives of many Kyrgyz because of its numerous occurrences of landslides, landslips, and erosions in the country. Mining operations activities have caused several soil subsidence, under-flooding, and air pollution. Moreover, mining actions have possible impacts on the native landscapes and its recreation areas.

Our analysis of these legal documents found a number of shortcomings in setting guidelines for post-mining remediation. One of them is the murky definition of remediation. So far, the Kyrgyz Republic has not come up with a clear definition of remediation. Not having a clear definition has led to different interpretations of remediation and actions among administrations and other stakeholders.

Also, these legal documents show outdated understanding about the

(footnote continued)

"On tailing dumps and mountain dumps" (Закон КР "О хвостохранилищах и горных отвалах"). <http://cbd.minjust.gov.kg/act/view/ru-ru/219>. Access date: 2.2.2018.

¹⁷ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (2012). The Law of the Kyrgyz Republic "On Subsoil" (Закон "О недрах"). <http://cbd.minjust.gov.kg/act/view/ru-ru/203760>. Access date: 2.2.2018.

¹⁸ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1997). The Criminal Code of the Kyrgyz Republic (Уголовный кодекс Кыргызской Республики). <http://cbd.minjust.gov.kg/act/view/ru-ru/568?cl=ru-ru>. Access date: 6.3.2018.

¹⁹ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (2001). The Law of the Kyrgyz Republic "On production and consumption wastes" (Закон Кыргызской Республики "Об отходах производства и потребления"). <http://cbd.minjust.gov.kg/act/view/ru-ru/924>. Access date: 6.3.2018.

²⁰ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (2012). "The Regulations on the procedure for the subsoil use licensing of the Kyrgyz Republic," (Положение "О порядке лицензирования недропользования"). <http://cbd.minjust.gov.kg/act/view/ru-ru/94191?cl=ru-ru>. Access date: 6.3.2018.

²¹ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1993). "The Regulation of the remediation (restoration) of disturbed lands and the procedure for their acceptance in operation," (Положение КР "О рекультивации (восстановлении) земель и порядке их приёмки в эксплуатацию"). <http://cbd.minjust.gov.kg/act/view/ru-ru/38586?cl=ru-ru>. Access date: 2.2.2018.

²² Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1977). *The Code of the Kyrgyz Soviet Socialist Republic on Subsoil from November 22, 1977, (2063-C)*. <http://cbd.minjust.gov.kg/ru-ru/npakr/>. Access date: 2.2.2018.

²³ Office of the President of the Kyrgyz Republic. (2018) *Kyrgyzstan. History* <http://www.president.kg/ru/kyrgyzstan/istoriya/>. Access date: 2.2.2018.

²⁴ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1993). "The Regulation of the remediation (restoration) of disturbed lands and the procedure for their acceptance in operation," (Положение КР "О рекультивации (восстановлении) земель и порядке их приёмки в эксплуатацию"), (1993), <http://cbd.minjust.gov.kg/act/view/ru-ru/38586?cl=ru-ru>. Access date: 2.2.2018.

²⁵ Government of the Kyrgyz Republic. (2017). *The Land Code of the Kyrgyz Republic, June 2, 1999 (45)*, (Amended by the Laws of the KR, July 25, 2017, (139) (Enacted by the Law of the Kyrgyz Republic, June 2, 1999 (46). <http://cbd.minjust.gov.kg/act/view/ru-ru/8?cl=ru-ru>. Access date: 2.2.2018.

²⁶ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (1997). *The Criminal Code of the Kyrgyz Republic (Уголовный кодекс Кыргызской Республики)*. <http://cbd.minjust.gov.kg/act/view/ru-ru/568?cl=ru-ru>. Access date: 6.3.2018.

²⁷ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (2001). *The Law of the Kyrgyz Republic "On production and consumption wastes" (Закон Кыргызской Республики «Об отходах производства и потребления»)*. <http://cbd.minjust.gov.kg/act/view/ru-ru/924>. Access date: 6.3.2018.

²⁸ Ministry of Justice of the Kyrgyz Republic, Centralized Data Bank, Legal Information of the Kyrgyz Republic. (2012). "The Regulations on the procedure for the subsoil use licensing of the Kyrgyz Republic", (Положение «О порядке лицензирования недропользования»). <http://cbd.minjust.gov.kg/act/view/ru-ru/94191?cl=ru-ru>. Access date: 6.3.2018.

Table 1
Remediation types and definition in the laws of the USSR and the Kyrgyz Republic.

Name of document	Adopted date	Definition of remediation	Types of remediation (Describing the process)			
			Tech.	Bio.	Phyto.	Notes
Law of the USSR about the Principles of Land Legislation (3401-VII)	13.12.1968, Moscow, Kremlin Repealed	No definition	No	No	No	– Article 13 protects lands and increases soil fertility through agro-technical, reforestation and hydro-technical measures. – Granted free use of collective farms, state farms, other state, cooperative, public enterprises, organizations, institutions and citizens of the USSR.
Code of the Kyrgyz SSR on "Subsoil" (2063-X)	22.11.1977, (amended 7.1.1983) Frunze Expired	No definition	No	No	No	In accordance with the Fundamentals of Legislation of the USSR and the Union Republics on mineral resources, mineral resources are available for free use , except in cases established by the Council of Ministers of the USSR.
Law of the Kyrgyz SSR "On Land" (56-XII)	14.4.1990 Frunze Expired	No definition	No	No	No	– Chapter 26 protects lands. – Article 130 stipulates on objectives of land protection. – Article 131 sets responsibilities of landowners/land users on land protection, including the remediation of disturbed lands.
USSR Council Resolution on remediation of land, conservation and rational use of the fertile soil layer in the development of mineral deposits and peat, geological exploration, construction and other works" (407)	26.1976 (amended 6.13.1988) Expired	No definition	No	No	No	–
State standard of the USSR, Nature protection, Lands, General requirements of land remediation	GOST 17.5.3.04-83 (ST SEV 5302-85) Introduced 1.7.1984 Not valid	Land remediation is technological process associated with land disturbance.	Yes	Yes	No	–
Regulation of the land remediation process (restoration) and the procedure for acceptance the lands, approved by the Resolution of the Government of the KR (304)	12.7.1993 (changes 10.9.2013, № 509 and 18.8.2017, № 517) Valid	Land remediation aims to restore biological productivity and national economic value of disturbed lands.	Yes	Yes	No	Not specific details of technical and biological remediation activities described common issues.
Land Code (45)	26.1999 (amended 25.7.2017, 139) Valid	No definition	No	No	No	Subsoil users should provide remediation works after their activities.
Law "On environmental protection" (53)	16.6.1999 Valid	No definition	No	No	No	This emphasizes the restoration of the natural environment.
Law "On environmental impact assessment" (ecological expertise) (54)	16.06.1999 (amended 4.5.2015, 92) Valid	No definition	No	No	No	Article 3 requires ecological examination regarding the rehabilitation of territories.
Law "On tailing dumps and mountain dumps" (57)	26.6.2001 (last changes 17.4.2009, 128) Valid	Remediation (reclamation) of tailing dumps and other works carried out to restore land for economic use.	No	No	No	The Remediation of the territory of tailing dumps and mountain dumps is a complex of works carried out to restore the environment.
Law "On Subsoil" (160)	9.8.2012 (last changes 19.4.2017, 62) Valid	Remediation aims at restoring the productivity and economic importance of disturbed lands.	No	No	No	Article 47 briefly describes post-mining remediation mostly in relation to expenses and technical requirements.
The Criminal Code (68)	1.10.1997 (last changes 2.11.2017, 191) Valid	No	No	No	No	Article 273 stipulates that land destruction is punishable by fine or imprisonment for up to three years.
The Law "On production and consumption wastes" (89)	13.11. 2001 Valid	No	No	No	No	In this Law was identified that the local authorities have responsibility in the remediation of subordinated territory.
Regulations on the procedure for the subsoil use licensing of the Kyrgyz Republic (834)	14.12.2012 (last change 4.8.2014, 436) Valid	No	No	No	No	– Chapter 2 requires technical and biological remediation. – Chapter 5 defines the procedure for issuing and extending licenses. – Article 57 allows licensee to reduce the license area. – Chapter 9 stipulates about land remediation and the liquidation of the mountain property.

available types of land remediation methods. Table 1 identifies gaps in the national legislative framework regarding remediation. It shows all land legislation and remediation policy originated in the Soviet era. The *Regulation of the Remediation (restoration) of Disturbed Lands and the Procedure for their Acceptance in Operation* (1993) has not incorporated new scientific remediation technologies in the past 20 years. The *Criminal Code* (1997) and the *Regulations on the Procedure for the Subsoil Use Licensing* (2012), the *Land Code* (1999) and the *Law on Subsoil* (2012) stipulated similarly that subsoil users should conduct remediation activities in accordance with special technical projects. However, the detailed requirements and clean-up standards are not included. The main focus is given to the remediation fund, which represents a guarantee for future remediation actions and others.

Today, similar to many mineral rich developing countries, the Kyrgyz Republic recognizes two types of remediation: biological and technical. These are mentioned in The *Regulation of the Remediation (restoration) of Disturbed Lands and the Procedure for their Acceptance in Operation*. This regulation instructs the following two options:

- In the first option, after the closure of the mine, the soils at the mine site should be replaced with new ones. Then the site requires a planning for slope formation, the transportation of contaminated soil and treatment/storage of the soil.
- In the second option, at the former mine site, agrotechnical and phytomeliorative measures (biological remediation) can be carried out to restore the fertility of disturbed lands. In this method, the necessary doses of organic and mineral fertilizers, gypsum, sowing of perennial legumes can be applied, depending on natural and climatic conditions of target lands.

However, unlike U.S. Environmental Protection Agency's standards for clean-up, including the superfund, or Canada's Environmental Management and Protection Act of 2002,²⁹ this regulation does not provide a well-defined guideline for administering remediation actions. It does not make clear what responsibilities relevant ministries should take and to what extent companies are responsible for clean-up tasks. For some mines, long-term maintenance of tail ponds and dams are necessary, but the regulation does not require foreign investors or mining companies in general to create necessary actions or numerically measured goals for accomplishing these remediation tasks. The mining industry in the U.S. has long developed remediation actions due to the occurrence of several serious pollution cases. Thus, the U.S. Government established a series of laws and programs to stop the risks and damage to health and to the environment.

The U.S. has a wide variety of the remediation policy framework. The main body in environmental protection and data source is the Environmental Protection Agency (EPA). It administers the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Superfund program.³⁰ Under this law, the EPA locates, investigates, and treats hazardous waste sites. In some cases, local governments are ordered to clean up contaminated sites (e.g., a municipal landfill) or transport hazardous substances to a safe site. The EPA developed municipality's CERCLA liability. Local governments may also be reimbursed for responses to emergencies involving hazardous substances and oil. The Surface Mining Control and Reclamation Act of 1977 covers the reclamation and remediation of abandoned mining area.³¹ It also covers the types of reclamation by-products and

remediation of abandoned mining areas. The U.S. created the National Priorities List (NPL) that includes a list of sites for clean-up by national remediation plans.

The U.S. law defines remediation based on the type, character, and site. That means that each object has a proper way to be remediated. For example, in the mining section, the EPA defined remediation for cleaning up heavy metals in water and soils. In addition, the EPA instructs local governments³² how they can reuse less-contaminated sites called brownfields. Brownfields are abandoned industrial and commercial sites which are valuable community resource because of their redevelopment value. The EPA Principles for Greener Cleanups outline the Agency's policy for evaluating and minimizing the environmental "footprint" of activities undertaken when cleaning up a contaminated site.³³ It shows some of the best management practices (BMPs) for ideas. Its green remediation fact sheets can help project managers and other stakeholders.

Also in Japan there is a special measures for cleaning soils. According to Yoshihisa Takei³⁴ (Environment and Energy Research Unit, Science and Technology Foresight Center), there are several technologies for off-site and on-site remediation. Figs. 1 and 2 illustrate off-site and on-site treatment structures. Fig. 1 shows two ways of off-site treatment. The off-site remediation process may be treated by decomposition, bio-treatment, washing, thermal desorption, volatilization and concrete barrier, seepage control, solidifying treatment, reduction treatment and others. On-site remediation means localized decomposition and extraction, which can also be divided into chemical and biological decompositions. On-site extraction involves soil extraction and washing. This remediation treatment is applicable to all hazardous substances. It requires underground impermeable wall and solidifying/insolubilizing treatment technology.

As one of the universal remediation treatment the in-situ remediation technology has a more detailed structure which has four types:

- In situ extraction: soil vacuum extraction, air sparging, extraction of groundwater, soil vapor/groundwater vacuum extraction;
- In-situ chemical decomposition: oxidative and reductive decomposition;
- In situ biological decomposition: bioremediation and phytoremediation;
- In situ soil washing: washing hazardous substances.

In contrast to these international examples for remediation, in the Kyrgyz Republic, in commencing mining works, prospective subsoil users first obtain permission based on reports about ecological impacts and industrial safety, among others. In this process the main requirement for remediation is to open a special bank account. Mining operators deposit a certain amount of money for the future remediation works. Otherwise, the Kyrgyz law does not require mining interests to set up the remediation procedure.

Today, government specialists and project organizations still rely on the norms that were established during the Soviet era regarding monitoring of the post-mining remediation. The main focus is to prevent soil erosion. Mining companies are often required to remove the pre-mining

²⁹ U.S. EPA. (2018). Superfund: CERCLA Overview. <https://www.epa.gov/superfund/superfund-cercla-overview>. Access date: 23.6.2018; Findley, R. and Farber, D. (2008). *Environmental Law*. St. Paul, MN: Thompson/West, 232–236; Benedickson, J. (2009). *Environmental Law*, third edition. Toronto: Irwin Law, 235–236.

³⁰ US EPA. (2018). Superfund: CERCLA Overview. <https://www.epa.gov/superfund/superfund-cercla-overview>. Access date: 23.6.2018.

³¹ OSMRE USD. (2018). *Laws, Regulations, and Guidance. Surface Mining Control and Reclamation Act of 1977 (SMCRA)*. 1977. <https://www.osmre.gov/lrg.shtm>. Office of Surface Mining Reclamation and Enforcement of the United States Department. 2018. Access date: 10.5.2018.

³² US LGEAN. (2018). Local Government Environmental Assistance Network. <http://www.lgean.org/index.cfm>, data accessed 10.5.2018.

³³ US EPA. (2009). *Principles for Greener Cleanups*. United States Environmental Protection Agency. 27.9.2009. <http://www.epa.gov/oswer/greenercleanups>. Access date: 15.5.2018.

³⁴ Takei, Y. (2010). *Current State and Future Prospects of Action for Soil Contamination*. NISTEP Science & Technology Foresight Center, No. 36 July. Pp 55–67.

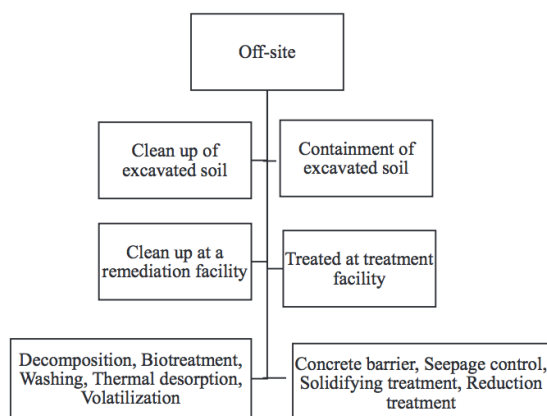


Fig. 1. Off-site treatment.

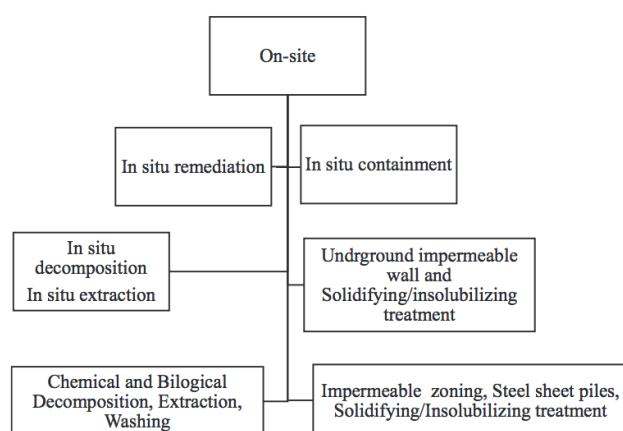


Fig. 2. On-site treatment.

surface soil and store it in designated areas. After closing the mining activity, this soil should be returned to its original place to help. The government guideline has provided financial rewards for improving soil conditions of the post-mining land for agricultural purposes.³⁵

4. Conclusion

This paper has identified the gaps in the legal framework, highlighting the importance of changing and improving the current policy of the remediation process after mining works. Above all, what is missing in the legal framework is the ideas of the Kyrgyz Government to establish sustainable mining policies. It has shown interests in sustainable mining, but still no policy paper or legal document has established a roadmap for it.

The remediation law and policy after mining need a new and clear definition as well as updated information about remediation processes, including phytoremediation, bioremediation, and in situ extraction/decomposition. Kyrgyz administrators can database available technologies and identify their cost-effectiveness so that specific technologies can be administered to meet local conditions. In creating and monitoring remediation processes, the State Committee of Industry, Energy and Subsoil Use (former the State Agency on Geology and Mineral

Resources) needs to establish specific national standards and guidelines.

In 2018, S. Zheenbekov, the new President of the Kyrgyz Republic, declared that: "Kyrgyzstan's national wealth should be used to benefit the people and respect the environment."³⁶ This statement is significant as the President, for the first time, connects nation's wealth with environmental health. The Kyrgyz Republic still believes that mining operations can be a significant part of its economic future, but it has increasingly recognized the importance of considering the health of the environment and people.

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