

Article

Damage Compensation for Indigenous Peoples in the Conditions of Industrial Development of Territories on the Example of the Arctic Zone of the Sakha Republic

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Abstract: In the Sakha (Yakutia) Republic, hereinafter SR, the Arctic zones are the original habitat of indigenous peoples, who can conduct economic activities only in undisturbed or lightly disturbed lands. From this point of view, the problem of compensation for losses of indigenous peoples as a result of industrial development of territories is of particular relevance. At the same time, it is necessary to identify the main problems of indemnification of losses of the indigenous small-numbered peoples of the North (ISNPN) during the industrial development of the traditional natural resource management territories (TNRMT). The study was conducted using historical, geographical, analytical, synthetic, and statistical methods. In the Arctic zone, the diamond mining, gold mining, and coal mining industrial facilities are located inside TNRM areas. In the near future, it is planned to revive the tin industry, develop oil and gas fields on the continental Arctic shelf, and develop the Tomtor Complex Rare-Earth Deposit. In 2010, a law of the SR was passed: “On Ethnological Expertise in the Places of Traditional Residence and Traditional Economic Activities of the Peoples of the SR”. To date, in the ethnological examination of SR, we have investigated 13 investment business projects. In the course of the investigation, it turned out that most of the comments from both experts and tribal communities concern the section of compensation for damages. The official methodology developed on materials from the polar regions of the western part of Russia cannot be extrapolated to the entire territory of the North, Siberia, and the Far East. It is necessary to develop regional methods for calculating losses of indigenous peoples, which regulate the interaction of subsoil users with the authorities and representatives of the clan communities engaged in traditional crafts.

Keywords: Arctic; mining industry; investment project; ecology; small-numbered peoples; damage compensation; traditional natural resource management; method of calculating losses

1. Introduction

Within the territory of the SR there are five administrative districts that are included in the Arctic zone: Allaikhovskiy, Anabarskiy, Bulunskiy, Nizhnekolymskiy, and Ust-Yanskiy Districts (Figure 1). However, as many researchers indicate [1–3], the polar regions of the SR were not included here. The issue of including eight districts of Yakutia (Abyyskiy, Verkhnekolymskiy, Verkhoyanskiy, Zhiganskiy, Momskiy, Olenekskiy, Srednekolymskiy, and Eveno-Bytantayskiy) in the Arctic zone has been agreed

with the Government of the Russian Federation, but not yet approved [4]. Thus, 13 districts are assigned to the arctic and northern zone of the Republic, with population of more than 70,000 people, of which 20,000 are the indigenous peoples of the North (Figure 1). The purpose of this study is to identify the main problems of compensation for losses of indigenous small-numbered peoples of the North (ISNP) during industrial development of traditional natural resource management territories (TNRMT) and recommendations for solving them.

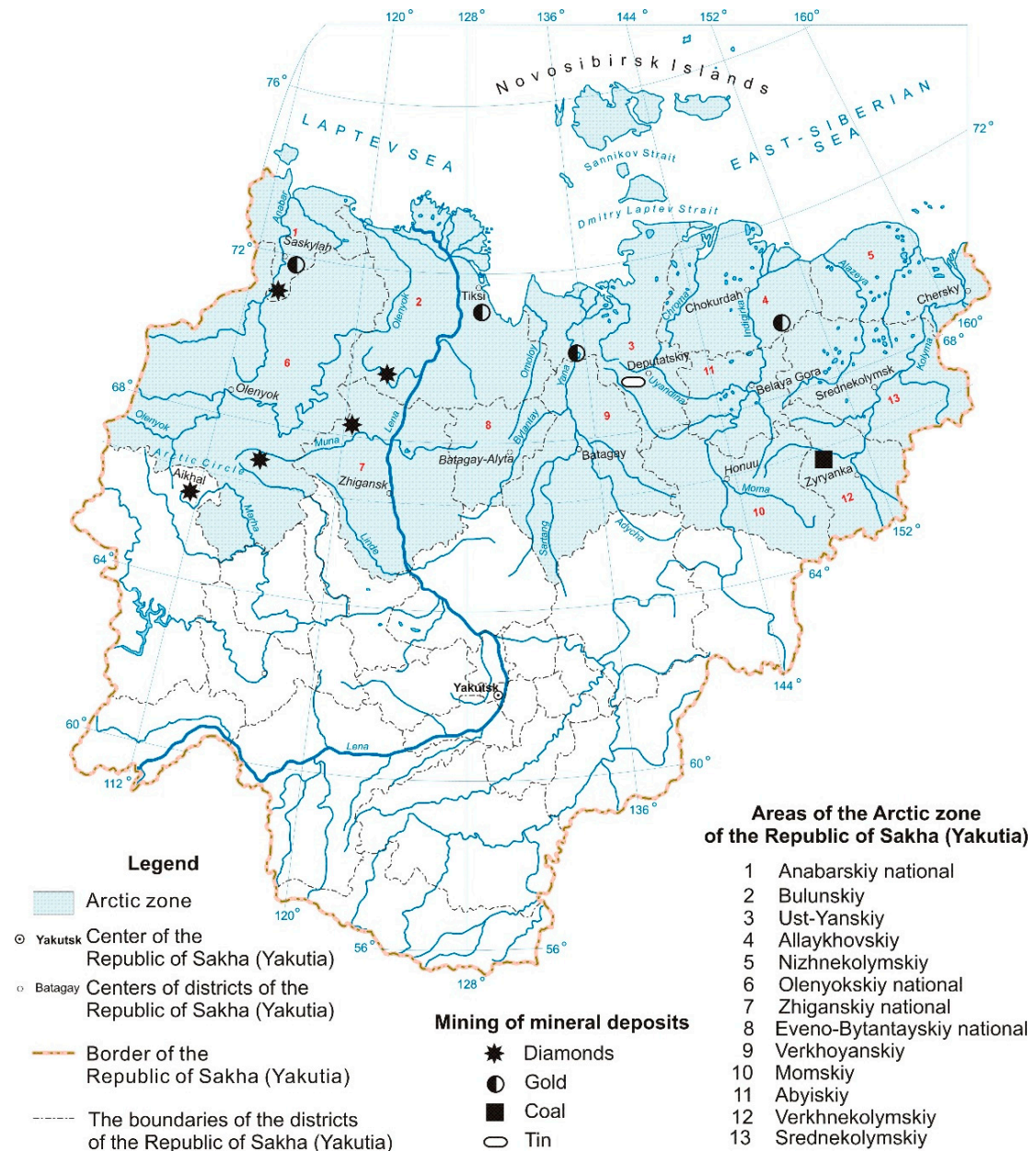


Figure 1. Mining in the Arctic zone of Yakutia (2017).

The procedure of ethnological examination begins with a competitive tender for its implementation. The main documents submitted for ethnological expertise are (a) a draft of proposed economic and other activities; (b) an assessment of the impact of the projected activity on the original habitat and socio-cultural situation of small peoples (Foreign Economic Relations Department—FERD). The composition of the expert committee and the expert opinion are approved by the Government of the SR. The author of this article (Burtseva E.I.) was a member of the expert commission for 10 objects of ethnological examination, and for 1 object served as the Head and Executive Officer of related

FERD [5] Customer—Prognoz PJSC, 100% of which is owned by the Canadian company Silver Bear Resources Plc.

At present, the many researchers have raised the question of sharing the benefits from the development of mineral deposits on TNRMT between industrialists, authorities, and indigenous small-numbered peoples. Tulaeva S. and Tysiachniouk M. [6] considered various models of distribution of benefits: paternalism; corporate social responsibility and partnership. At the same time, they emphasize that, despite the introduction of more formalized methods for calculating the losses of ISNPN, an amount of the compensation does not allow restructuring a traditional economy on a new basis. Tysiachniouk M. et al. [7] considered the issues of agreements on benefit sharing in an oil sector of the Russian Arctic and Subarctic on the example of the Irkutsk oil region. The article emphasizes that despite a significant diversity of the existing agreements, none of them ensure the sustainable development of local communities, which is associated with the incompatibility of post-Soviet heritage, principles of corporate social responsibility, and local institutional structures. Tysiachniouk M. and Petrov A. [8] argue that the indigenous communities do not equally benefit from oil and gas production, and no single model of benefit sharing policy provides the sustainable local development. They propose to improve the knowledge base on the benefit sharing in the Arctic energy sector and call on the Arctic Economic Council to conduct a generalizing study with participation of many interested parties to develop the guiding principles for companies on the benefit sharing agreements in the Arctic.

In Yakutia during the Soviet times the interaction of the mining companies and the population living in the territory affected by the industrial facilities was based on paternalism. In 1993, the Government of RS(Ya) commissioned the Joint Stock Company ALROSA to annually transfer 2% of proceeds from sales of precious stones to improve the environmental situation of the Diamond Province. Compensatory measures included seven programs: construction, ecology, social protection, health, education, sports, and interregional relations [9].

One of tragic pages associated with the development of the diamond deposits was relocation of the Evenki village of Tuoy-Khaya, which was flooded during the construction of the Vilyuy hydroelectric power station designed to provide electricity for the diamond industry. In 1993, 40 million rubles at prices of that time were transferred from a fund of the Supreme Soviet of the Russian Federation for revival of the traditional activities of the Evenks and Evens of the Mirny and Suntarsky districts and material assistance to poor groups of the population. However, these funds were not used for their intended purpose and did not reach addressees (individuals) [10].

At present, compensation payments to the indigenous small-numbered peoples for the loss of the natural resources (reindeer pastures, hunting areas, fish resources, and reserves of wild-growing plants) began to be put into practice only after the issue of the Law “On Ethnological Expertise . . . ” [11]. There are no agreements on the sharing of benefits from the industrial development of TNRMT in the Republic, but in conclusions of the experts of the ethnological expertise, as well as the scientific studies, this question is being considered and it is recommended to approve the tripartite agreement on cooperation between the industrial companies, state authorities of the RS(Ya), and authorized representatives of the ISNPN [12–14]. Thus, the current practice of the compensation payments to the indigenous small-numbered peoples of Yakutia from the loss of the natural resources as the result of the industrial development of TNRMT can be considered as one of the mechanisms for benefit sharing.

In recent years, quite a lot of scientific publications have appeared in the Republic on ethnological expertise and assessment of the impact of industrial facilities on the life of the indigenous peoples: on the development of the Russian Arctic, legal issues of ethnological expertise [15–17]; loss calculation method for ISNPN [14,18]; assessment of the impact of industrial facilities on hunting resources [19–21]; history of Arctic exploration [22]; ethnological examination of projects [23–25]; the issues of compensation of damage to indigenous peoples from industrial development of territories [26]; environmental problems of the Arctic and northern territories of Yakutia [27]; social security system for ISNPN [28], etc.

2. Materials and Methods

The following materials were used to complete this study:

- Research works with participation of the author in the framework of comprehensive research aimed at the development of productive forces and the social sphere for 2016–2020:
 - “Comprehensive Assessment of the Impact of Climate Change and Industrial Development of the Arctic on the Livelihoods of the Indigenous Population of Yakutia’s Nizhnyaya Kolyma District”. Line 1 “Improving the Quality of Life of Yakutia’s Population” (2016);
 - “Assessment of the State and Analysis of the Main Trends in the Natural and Socio-Economic Status of Human Potential in the Arctic Economic Zone of the SR”. Line 1. Assessment of the Current State of Socio-Economic Complexes (2017);
 - “Comprehensive Studies of the Impact of Changes in the Original Habitat of Indigenous Peoples and the Socio-Cultural Situation on the Development of the Ethnic Group During the Industrial Development of Traditional Environmental Management Areas” (2017);
- Government Decree of the SR on the Integrated Program “Socio-Economic Development of the Arctic and Northern Districts for 2014–2017 and for the Period up to 2020”;
- Government Report about the State and Protection of the Environment of the Sakha (Yakutia) Republic in 2014 [29];
- FERD materials on 13 investment projects;
- Opinions of the expert commission of ethnological expertise on 13 investment projects;
- Expeditionary materials in Ust-Yansky (2018) and Anabarsky District (2018) of Yakutia.

The study of the industrial development of the Arctic of its impact on TNRM and the life of the indigenous peoples was carried out using the following methods: historical and geographical (historical and territorial aspect of industrial development), analytical and synthetic (theoretical analysis and synthesis of literary sources), statistical (using statistical data on environmental pollution for 2001–2014), expeditionary and survey (socio-economic studies of the population (Evens) living in the territory of “Vertikalny” silver deposit development at Mangazey sky ore field in SR’s Kobay sky District). For the assessment of pollution in the Arctic areas of natural complexes of the Republic we used methods recommended by Burtseva E.I. [30], i.e., universal quantitative indicator (UQI)—the percentage of the attribute in the estimated system of parameters. This is the factor intensity index (FII), which is the deviation from the average state of the object in relative terms. The essence of the methodical approach is to bring indicators with a different unit of measure into a single quantitatively comparable system using this index, which is determined by the formula:

$$UQI_i = \frac{a_i}{M}$$

where: a_i —absolute value of the i -th indicator; M —absolute average value of a set of indicators.

In order to compensate for the losses of the indigenous minorities of the North, Siberia, and the Far East, in 2009 the method of calculating the amount of losses caused to the associations of these peoples was published for the first time [31]. However, the application of the document in specific projects of impact assessment on the ethnological environment (FERD) caused many controversial issues, and some of its provisions were not acceptable for calculating the damage [14]. Potravny et al. [24] on the basis of studies conducted in areas of compact residence of indigenous peoples in the Arctic zone of the Republic (for example, the activities of the group of companies “Almazny Anabara”), offer mechanisms for public–private partnerships between government, business, and local communities for the socio-economic development of Arctic communities.

3. Results

3.1. Compensation of Damage with Subsoil Use

The withdrawal of land plots for the needs of subsoil use is necessarily accompanied by the requirement of payment of compensation and compensation for the losses caused by the subsoil user.

Experience of Foreign Countries. Practically from the very dawn of the mining industry, starting from the 15–18th centuries, a number of western countries' subsoil users (France, Germany, England, etc.) tended to remunerate the owner of the land plot for damages [32]. Currently, foreign countries have a flexible economic mechanism of compensation measures. For example, in the states of Colorado and Nevada (USA), mining firms begin their activities only after transferring the cost of reclamation and the cost of restoring natural resources to a special account. After mining operations, the money transferred is returned to the company for the restoration of disturbed land [33,34]. In Canada, agreements are concluded on compensation for the impact of industrial facilities between mining companies and indigenous peoples. Agreements for indigenous peoples include specific benefits and procedural measures aimed at protecting their interests and providing compensation in case of damage: payments or funds for community development, development of community infrastructure (public buildings, roads), monitoring and environmental protection, employment, recultivation, restoration, and transfer of land after the development, etc. [35].

Indemnification in Russia. Compensations for damage as a result of industrial activity in the USSR first began in 1962, when the state began to pay state farms and collective farms monetary compensation for the removal (loss) of agricultural land, and thus the damage to natural resources, was officially recognized. In the early 1990s in Russia, the environmental policy pursued by the state was fundamentally changed, when state environmental review bodies were ordered not to take into consideration any pre-planned, pre-project, and project documentation without information on environmental impact assessment (EIA). Unlike most foreign countries, where the EIA procedure and environmental impact assessment have been legislatively consolidated (USA—1969, Japan—1973, Canada—1974, Sweden—1975, etc.), in our country the EIA procedure received legal status only in 2001 with the first law of the Russian Federation “On the Protection of the Environment” (1991).

3.2. Mining Industry Development

The mining industry in the Arctic and the northern territories began to develop from the development of a coal deposit in the Verkhnekolymsky region (1936), and during the Second World War, underground mining began with development of Ese-Khaya Tin Deposit in the Verkhoyansk District (1941). In 1951, the “Deputatsky” Mine was opened in the Ust-Yansky District. The year 1961 saw the start of diamond deposits development: the Aikhal Open-Pit mine (1961) in the Mirny District (Figure 2). In 1963, there was gold mining in the lower reaches of the Yany River: “Kular” Mine in Ust-Yansky District. All of these deposits, except for Ese-Khaya, were developed using the open-pit method. Market relations, which began in 1991, led to the emergence of crises in almost all sectors of the mining industry of Yakutia (except for the diamond and oil and gas) and many enterprises were liquidated (Table 1).

Today in the Arctic zone of TNRM there are objects of diamond, gold, and coal mining industries (Table 2).

Diamond Mining Industry. Starting in 1997, the Aikhal Deposit (after completion of the open pit mining), has been converted to an underground mine. Today the mine has reached its design capacity of 500 thousand tons of ore. The development of placer diamond deposits in the Republic began in the 1990s. In 1994, the Nizhne-Lenskoye Diamond Mining Enterprise was established, which in 2013 sold 100% of the shares to Almazy Anabara OJSC. The company was established in 1998 to develop alluvial diamond deposits in the Anabarsky, Bulunsky, Oleneksky, and Zhigansky Districts. Since 2014, new mountain areas have been developed: “Ebelyakh” and “Gusiny” in Anabarsky, and the development of the “Verkhnee Molodo” section in the Olenek District began.



Figure 2. “Aikhal” Open-Pit Mine, open-pit diamond mining.

Table 1. Liquidated (closed) mining enterprises in the Arctic regions (1951–1994).

Industry	Enterprise	Start	Liquidation	Mining Method	Administrative District
		Year	Year		
Tin Mining	“Ese-Khaya” Despoit	1941	1968	Закрытый (подземный)	Verkhoyansky
	“Deputatsky” Deposit (MPC)	1952	1997	Открытый (карьерный)	Ust-Yansky
	“Deputatskolovo” JSC	1990	1999	“ ”	Ust-Yansky
	“Sakhaolovo” LLC	2000	2009	“ ”	Ust-Yansky
Gold Mining	“Kular” Deposit	1963	1994	“ ”	Ust-Yansky
Diamond Mining	“Aikhal” Deposit	1961	1997	“ ”	Mirninsky
	“Nizhne-Lenskoe” OJSC	1994	2013	“ ”	Anabarsky, Zhigansky, Oleneksky

Table 2. Active mining enterprises in the arctic regions (1998–2015).

Industry	Enterprise	Start	Mining Method	District
Diamond Mining	“Aikhal” Deposit	1998	Closed (underground)	Mirninsky
	“Almazy Anabara” OJSC	1998	Open (open-pit mine)	Anabarsky, Bulunsky, Zhigansky, Oleneksky
Gold Mining	“Arctic-Capital” Holding	2015	“ ”	Anabarsky, Allaikhovskiy, Bulunsky, Ust-Yansky
Coal Mining	Zyryansky Coal Mine	1936	“ ”	Verkhnekolymsky
Tin Mining	“Trekhtyakh” RIC	2015	“ ”	Ust-Yansky

Gold Mining Industry. Today, one of the successful mining companies for the extraction of gold is “Arctic-Capital” Holding, which consists of ten independent companies (LLC). Each of them carries out its own type of activity: geological exploration, transportation of goods, production of mining and processing equipment, etc. In total, the holding employs 881 people—all local personnel, which

contributes to the creation of new jobs for young people, among which there is a high degree of unemployment [36].

Coal Mining Industry. The beginning of the development of a coal deposit in the Verkhnekolymsky District is considered to be 1936, when 8.5 thousand tons of coal were mined at the Zyryansk Coal Mine. At that time, the district was part of the Dalstroy Area of USSR's NKVD (People's Commissariat for Internal Affairs). Currently, coal mining is carried out in the Northeastern District on the basis of the development of the Zyryansk Coal Basin (Verkhnekolymsky District) in the Nadezhdinsky section with more favorable mining and technical conditions for development [37].

Tin Mining Industry. Due to the economic crisis in the country, the fall in tin prices on the world mining market was closed in 1997. However, today tin mining has every chance of a rebirth: the RIC group is implementing a large project of the Tirechtyakhsky Tin Deposit with a capacity of 3000 tons for 20 years. In 2015, "Yanolovo" won a license for 65 million rubles for the right to use the subsoil of the Tirechtyakh Stream. For the development of the deposit, the RIC Group attracts a Chinese investor, currently negotiations are continuing with a Chinese partner [38].

Perspective Projects

Today in North Yakutia, within the framework of complex geological and geophysical studies, a study has begun on the junction area of the Leno-Tunguska oil and gas province and the Laptevskaya potential oil and gas area with the prospect of further development. The area of complex geological and geophysical works for the search for oil and gas deposits and their subsequent exploitation is located in the territory of the Bulunsky and Anabarsky Districts of the SR. The following will fall under the influence of geological and geophysical works in the territory of the Anabarsky Ulus: four tribal communities in the Terpey Thumus Resource Reserve (the Terpyay Tribal Community) and two municipal unitary enterprises. In the Bulunsky District, Taymyllyrsky MUE and KFH Skrybykin I.G. Peasant Farm Enterprise will be affected by these works.

One of the promising investment projects is the development of the Tomtor Complex Rare-Earth Deposit (niobium, yttrium, scandium, lanthanum, etc.) in the Tomtor-Taas Area of the Olenek District. The content of rare-earth metals in its ores reaches 12%, the explored reserves amount to 150 million tons, while the Tomtor ores contain rare metals, in particular, large concentrations (about 5%) of niobium [39]. Tomtor rare earths are radioactive due to the content of uranium and thorium. According to the results of the integrated environmental monitoring of the Ministry of Natural Resources of Yakutia (2014) in certain areas of the Buranny licensed site, where active exploration and mining of ore is planned, the background radiation reaches 40 $\mu\text{R}/\text{hour}$ (safe values are 5–25 $\mu\text{R}/\text{hour}$) [40].

In August 2014, a meeting was held between representatives of the leadership of the SR and local residents in the Saskylakh Village of the Anabarsky National District, where they discussed the issue of the changing borders of "Terpey-Tumus" [40] SPNA. To provide fuel and energy resources for the development of the Tomtor Deposit, industrialists need an autonomous power supply. At the same time, it is planned to use Pronchishchevskaya Oil and Gas Deposit for the construction of its own power generation facilities, but the problem is that it is located on the Terpey-Tumus Resource Reserve. From time immemorial, the indigenous minority peoples of the Anabara—the Evens, the Evenks, the Dolgans—have lived on the resource reserve and they are engaged in traditional types of environmental management. Here lie the lands of several tribal communities, rich in fish, fowl, and wild plants. The meeting ended in favor of the local population: having united the efforts of the municipal authorities, deputies of all levels, the Anabarians managed to convince the government that they were right. As a result, it was decided that "RT—Global Resources" LLC will conduct geological exploration at SPNA under the control of the Ministry of Nature Protection, the entire production process will be accompanied by continuous monitoring.

3.3. Environmental Pollution

Closure of many unprofitable enterprises in the gold, tin, and coal mining industries in the post-Soviet period has led to the reduction of many sources of environmental pollution, which has led to a reduction in emissions of pollutants into the air and pollutants into water bodies. For example, in the Arctic zone, low levels of pollution are identified for pollution of surface waters (Table 3) [27].

Table 3. Discharges of Polluted Wastewater to Surface Water in Arctic and Northern Areas.

Name of Ulus	Discharges (Average for 2001–2010), Million m ³	UQI _i	Discharges	
			Ranking Scale	Pollution Degree
Olenekskiy	0.00	0.00		
Srednekolymskiy	0.00	0.00		
Eveno-Bytantayskiy	0.00	0.00		
Momskiy	0.02	0.00		
Zhiganskiy	0.1	0.02		
Allaikhovskiy	0.27	0.04	<0.2	Low
Abyiskiy	0.27	0.04		
Verkhnekolymskiy	0.66	0.10		
Nizhnekolymskiy	0.96	0.15		
Ust-Yanskiy	1.14	0.17		
Anabarskiy	1.60	0.24		
Bulunskiy	1.81	0.27	0.21–0.4	Lowered
Verkhoyanskiy	1.96	0.30		

However, despite the reduction of pollution sources, the Arctic coast remains one of the ecologically unfavorable regions of Russia. To date, the most acute problem in environmental terms is pollution of surface waters. The condition in the rivers of the Lensky basin is assessed by pollution class 4 (dirty). According to the complex of the main pollutants, the waters of the river basin flowing into the Arctic Ocean are classified as follows: Yana—“dirty”; Anabar at s. Saskylah—“very polluted”; Indigirka—“dirty”; Kolyma and Olenyok—“polluted” [27]. A special role in environmental pollution is played by the effects of underground nuclear explosions (UNE) conducted in North Yakutia. A total of four UNEs were conducted, of which two—“Kristall” and “Kraton-3”—were officially recognized as “accidental” with releases of radionuclides to the surface. At present, the sources of environmental pollution are still the effects of the industrial development of the Soviet Arctic: disturbed lands of the mining industry, facilities of the liquidated (closed) enterprises of the tin and gold mining industry, abandoned weather stations, airfield sites of a military unit of the Russian Ministry of Defense, etc.

The sources of environmental pollution are still the effects of the industrial development of the Arctic during the Soviet era:

1. Disturbed lands of mining industry.
2. Objects of the liquidated enterprises of tin and gold mining industry (tailing dump):
 - Deputatsky Processing Plant (Ust-Yanskiy Ulus);
 - Kularskaya Gold Processing Plant (Ust-Yanskiy Ulus).
3. The Arctic coast: abandoned weather stations (Bulunsky and Nizhnekolymsky uluses).
4. The Arctic coast (Kotelny and Bolshoy Lyakhovsky islands): airfield sites of a military unit of the Ministry of Defense of the Russian Federation

A special contribution to the deterioration of the ecological situation was made by the underground nuclear explosions “Gorizont-4”, “Kristall”, “Kraton-3”, the last two of them were officially recognized as “accidental” with radionuclide releases to the surface.

In the 1990s, in places where the indigenous people of the Republic lived, in order to preserve their original environment, some areas were given the status of national administrative-territorial

formations. As of 1 January 2017, 4 uluses (districts) have such status in the Republic, all of them are located beyond the Arctic Circle:

- Anabarskiy National Ulus (Dolgan-Evenkiyskiy).
- Olenekskiy Evenkiyskiy National Ulus
- Eveno-Bytantayskiy National Ulus
- Zhiganskiy Evenkiyskiy National Ulus

3.4. Ethnological Expertise

For the current period, 13 investment projects were reviewed in the ethnological expertise of SR, including five projects in the Arctic regions. In the course of ethnological expertise, it turned out that most of the questions and comments from both experts and tribal communities concern the section of compensation for losses of the ISNPN peoples.

Official Method [26] for calculating the amount of losses of ISNPN caused by economic activities is based on the income method—the lost annual gross income of right holders as a result of violations of TNRM.

The main remarks to the current methodological approaches for calculating the loss of ISNPN:

- according to the Methodology, possible losses of tribal communities should be calculated using the coefficient for recalculating the lost annual gross income into loss of profits, which expresses the period of recovery of disturbed production. However, production cannot be restored unless disturbed natural resources are restored. In order to calculate losses of ISNPN, the time lag coefficient should be used, which includes (a) the period of recovery of disturbed natural complexes; (b) the deadline for the restoration of disturbed production; (c) the period of construction (operation) of an industrial enterprise;
- questions about the recipient of compensation (communities, local governments, public organizations) and a number of other organizational issues of the examination are not covered;
- the term “stressful impact” refers to anxiety caused in animals and is used in calculating the losses of indigenous peoples from the deterioration of reindeer pastures and hunting resources in 1–2 zones. For fish resources and wild plants, losses are estimated only in the 1st zone, whereas all living organisms, including plants and fishing resources, experience stressful effects.
- socio-economic damage is represented only by its economic component (losses caused to land users), but social damage is not taken into account. Industrial companies conducting production activities in areas of traditional environmental management should compensate for social damage in order to improve and improve the quality of life of ISNPN in the form of money or other social events.

3.5. Discussion

According to the Methodology, the stress impact of industrial facilities is carried out on the basis of the number of resident people: more than 100 people, 50–100 people, 20–50 people, up to 20 people. The practice of calculating the loss of indigenous people in specific projects showed that the allocation of stress zones of industrial facilities to traditional types of use in terms of the number of workers causes many controversial issues and turned out to be unacceptable for calculating the damage, since it depends on many objective and subjective factors. In 2011–2012 by the order of the “Yakutniproalmaz” Institute, we completed work on estimating the damage of ISNPN from the economic activities of “Timir” MMC (iron ore deposits Tazhnoye and Tarynnakhskoye); in 2014, by the order of MMC “Timir” CJSC, the same work was done on the “Tazhnoye” deposit.

According to the materials submitted by different customers, the number of employees at the Tazhnoye deposit differs by 33 times [14]. Accordingly, the amount of compensation payments also differs: based on the materials of the “Yakutniproalmaz” Institute, the annual lost gross income of “Bugat” CSC was 1.6 million rubles, or \$51,379.38 as of 29 November 2012, whereas lost profit

before commissioning of the “Taezhnoye” MMC for 2012–2026 was 22.8 million rubles, or \$732,156.1 dollars. According to materials of “Timir” MMC CJSC, the annual lost gross income of “Bugat” CSC amounted to 10.4 thousand rubles, or \$333.97, loss of profits before commissioning “Taezhnoye” MMC was \$2055.18.

As these figures show, calculating the losses of ISNPN on the basis of identifying stress zones according to the number of employees ultimately affects the size of lost profits and cannot serve as an objective indicator of the allocation of stress intensity zones of industrial facilities on TNRMT.

Recommendations for calculating the size of losses of ISNPN:

- Loss of profits of rights holders depends primarily on the area of man-made violations, which in turn is determined by the radius of the impact of industrial facilities. The intensity of the impact of industrial facilities on natural complexes depends on many factors, of which it is necessary to choose one indicator. We believe that such an indicator is not the number of employees as adopted in the Methodology, but the hazard class, as well as taking into account the nature of violations (areal—open pit mines, other industrial facilities, linear—pipelines, highways, etc.).
- We propose to identify stress zones of industrial facilities by hazard classes. Hazard classes in mining can be defined in accordance with SanPiN 2.2.1/2.1.1.1200-03 and the Draft Federal Law “On Amendments to the Federal Law “On the Industrial Safety of Hazardous Production Facilities” dated 24 January 2012 (Table 4).
- Compensation for losses of small indigenous peoples, including lost profits in case of deterioration of land quality, temporary occupation of land plots, etc., is fully subject to land users, landowners and tenants of land plots according to Art. 57 P. 2 of the Land Code of the Russian Federation dated 25 October 2001 No. 136-FZ (as amended by Federal Law dated 31 December 2014 No. 499-FZ).
- In order to compensate for social damage and improve the quality of life of indigenous peoples, conclude a tripartite “Agreement on Cooperation and Financing Specific Programs to Promote Sustainable Development and Adaptation of Indigenous Peoples in the Project’s Area of Influence Between the Industrial Company (Project Customer), SR Government Authorities and Authorized Representatives of the Indigenous Minorities”.
- In order to clarify the impact of industrial facilities on the territory of traditional environmental management, conduct ethnological monitoring of the monitoring of their condition and quality of life of indigenous peoples, including the subsequent specification of the extent of damage, both environmental and socio-economic.
- The practice of assessing the damage caused to associations of indigenous peoples showed that the cost of products of traditional types of environmental management varies greatly by region: it is 2–3 times lower in agricultural than in industrial ones. This can be explained by the weak development of the domestic market in agricultural areas: for example, small nations give free rein on kinship ties or sell at a very low price when the price of imported essential goods in the northern uluses is 3–4 times more expensive than in the central or southern areas. In this situation, we recommend applying the value of the consumer basket, which constantly monitors prices to calculate the cost of the subsistence minimum for food and non-food items, as a basis for calculating production and economic indicators. However, the cost of living takes into account a certain range of socially important goods regulated by the state. For this reason, the real market value of other goods is much higher, which should be taken into account when calculating the production and economic indicators of the tribal communities using the appropriate coefficient.
- According to the results of scientific research on the impact of industrial facilities on biological resources to calculate losses of indigenous peoples, taking into account the vulnerability of natural complexes, we can distinguish three areas of impact on traditional types of environmental management: 1st zone—complete land alienation, 2nd zone—strong impact, 3rd zone—moderate impact. At the same time, we recommend not to take into account the 4th and 5th zones of impact

of industrial facilities when calculating the losses of ISNPN, since the factorial (technogenic) load in these zones of influence is less than 10%. In addition, these zones are under the influence of other economic and public facilities, which may increase the cost of the total damage caused by industrial enterprises to the TNRMT.

- one of the leading indicators of the allocation of stress intensity bands of industrial facilities is the resistance of natural complexes to anthropogenic factors. According to research conducted in SR, the vulnerability of ecosystems in the tundra (forest tundra) is 3–1.5 times higher than in the northern and middle taiga [30]. For this reason, we believe that it is more expedient to develop standards for the Republic as a whole by zones/subzones of traditional environmental management in stages. Considering the particular danger of industrial development for the Arctic and northern territories of Yakutia, where it is planned to implement large-scale investment projects, the development of standards should begin in North Yakutia.

Table 4. The stressful impact of industrial facilities on the types of traditional environmental management (deer pastures, habitats of wild plants, hunting and fish resources) in the Sakha (Yakutia) Republic for the summer season.

Industrial Impact Category	Intensity of Violations of Earth (Water) Surface and Biological Resources by Areas of Anthropogenic Impact					
	Areal Objects *			Linear Objects **		
	Category 1—Extreme Danger	Category 2—High Danger	Categories 3—4—Medium Danger	Category 1—Extreme Danger	Category 2—High Danger	Categories 3—4—Medium Danger
Ground (Water) Surface and Biological Resources in Tundra, Forest-Tundra, km						
Complete alienation	0	0	0	0	0	0
Strong	4.5	2.5	1.3	2	1.5	0.5
Mild	10	8	2.5	3	2.5	1.5
Ground (Water) Surface and Biological Resources in the Northern and Middle Taiga, km						
Complete alienation	0	0	0	0	0	0
Strong	2	1.5	0.5	1	0.5	0.2
Mild	5	3.5	1	1.5	1	0.3

* At the location of industrial facilities 1–2 hazard classes downstream of the watercourses, when calculating the damage to fish resources, we apply a multiplying factor of 1.5. ** When the routes of deer and hunting species of animals change, all impact zones are equal to complete alienation.

4. Conclusions

In accordance with this study's objective, we have identified the main problems of compensation of losses of indigenous people from the industrial development of TNRMT, which mainly concern methodological approaches to calculating losses. The current official Method of calculating losses of indigenous peoples provides only for the loss of biological resources used by indigenous peoples, and does not provide for damage to ethnocultural and social phenomena—language, culture, way of life. In FERD, social and economic damage is represented only by its economic component (losses caused to land users), but social damage due to the complexity of its assessment is not taken into account. We believe that industrial companies conducting production activities in areas of traditional environmental management should compensate not only for the loss of biological resources, but also social damage to improve and improve the quality of life of indigenous peoples in the form of cash or other social activities (for example, employment). At the same time, it is necessary to adopt Canada's experience in damages in the form of Agreements with the participation of SR state authorities:

5. Findings

1. Some provisions of the official Methodology for calculating losses of small indigenous peoples turned out to be unacceptable for calculating losses. In particular, the number of workers at industrial facilities cannot serve as an objective indicator of the allocation of impact intensity zones (impact radius) on the biological resources of traditional natural resource management.
2. Current official methodology developed on the materials of the polar regions of the western part of Russia cannot be extrapolated to the entire territory of the North, Siberia, and the Far East. It is necessary to develop regional methods for calculating losses of indigenous peoples, which regulates the interaction of subsoil users with the authorities and representatives of the clan communities engaged in traditional crafts.
3. The planned industrial development of the Arctic zone, which is characterized by a high vulnerability of natural complexes to man-made impacts and low assimilation capacity, can cause large-scale disturbances of the earth's surface, environmental pollution of the original habitat of ISNPN.
4. In order to compensate for the social damage of indigenous people, to conclude tripartite "Agreement on Cooperation and Financing Specific Programs to Promote Sustainable Development and Adaptation of Indigenous Peoples in the Project's Area of Influence Between the Industrial Company (Project Customer), SR Government Authorities and Authorized Representatives of the Indigenous Minorities".

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