EVIDENCE REPORT

Coal Dragons of the Koibal Steppe

The FGX-48A units at the Mayrykhsky open-pit mine: operation, dust collection, emissions and consequences for the surrounding area

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Coal Dragons of the Koibal Steppe

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> **Research principle.** Testimony, project calculations, laboratory measurements, judicial findings and unknowns are not conflated. The absence of accessible measurements does not demonstrate that the emissions were safe.

NAVIGATION

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Abstract

In 2019–2020, residents of the Koibal Steppe called the large dry coal separation units at the industrial site of Mayrykhsky Open-Pit Coal Mine LLC in Khakassia “coal dragons”. On 6 January 2020, Natalia Zubkova filmed the site and recorded several long, dark plumes. This investigation establishes that two FGX-48A units and a separate coal-drying complex were operating that day. It does not substitute an impression from the images for an engineering identification of each plume: the equipment, process streams and emissions are compared with the Rosprirodnadzor inspection report, project documentation, laboratory test reports, court decisions and the manufacturer's technical documentation.

The documents confirm that commissioning work on the FGX units began on 6 July 2019; the work-order log records coal processing by both units from 28 December 2019; both FGX units and the dryer were operating on 6 January 2020; and the certificates of entry into service for the two FGX units are dated 27 January `[2, PDF pp. 2–6]`. Before their formal entry into service, the units were not merely standing on site: they were processing coal. During commissioning, the Khakassia Ministry of Natural Resources publicly acknowledged that the secondary removal of fine coal dust was insufficiently effective. At the hearing on 20 December, the company said that adjustment was continuing and that it was awaiting an additional filter component `[1, vol. 3, hearing minutes]`.

Four laboratory reports dated 27 January 2020, based on samples collected on 21 January, show collection efficiencies of 80.0–80.3%. After gas cleaning, each line under the test conditions retained a mass emission of suspended particles of 0.525–0.577 g/s `[3; 1, vol. 2, PDF pp. 41–48]`. These are measurements from one particular day, not proof of constant efficiency before and after the tests. The project separately calculated residual emissions of PM10, PM2.5 and hard-coal dust `[1, vol. 2, PDF pp. 72–78]` and projected 94.477429 tonnes of pollutants per year for the entire coal-loading facility `[1, vol. 1, PDF p. 58]`. This is a design value, not a measured annual emission.

A certificate from the Central Siberian Department for Hydrometeorology and Environmental Monitoring confirms that no regular ambient-air pollution observations were conducted in Arshanovo; the dispersion calculation therefore relied on indicative background concentrations and the designed normal operating mode `[1, vol. 2, PDF p. 31]`. No hourly concentrations near homes during visible dust episodes, or materials from which individual exposure could be reconstructed, were found in the public domain. These are distinct circumstances and must not be conflated: the absence of a regular monitoring station is documented, while the existence or absence of other one-off measurements remains to be established.

Within their respective duties, the company is responsible for industrial environmental monitoring and emissions data; Rosprirodnadzor is responsible for federal environmental supervision and for materials it receives through that work; Roshydromet and regional authorities are responsible for the relevant ambient-air observation systems; Rospotrebnadzor is responsible for public-health and environmental monitoring; and health authorities are responsible for compiling health statistics. These data were not found in the public domain.

The absence of accessible measurements does not demonstrate that the emissions were safe, nor does it remove the question of whether measurements were made, who holds the results and how residents can obtain them.

A separate part of the investigation shows that the effects of coal mining on the steppe were not confined to air. From 2017 to 2020, average mine-water pumping at Mayrykhsky rose from 7.34 to 14.344 thousand m³/day. By 2018 at the latest, the drawdown cones of Mayrykhsky and Arshanovsky had merged into an area measuring roughly 8 × 4.0–4.2 km. Official bulletins recorded chemical changes in groundwater, including arsenic at 1.5 times the maximum permissible concentration at Mayrykhsky in 2018 `[14, 2018 issue, PDF pp. 74 and 76]`. This is a separate line of industrial impact; it is not an FGX emission, but it developed in the same area and during the same years.

Official statistics for 2016–2025 show adverse health indicators in the Altaisky and, especially, Beysky districts. In Beysky District, the prevalence of circulatory diseases rose from 154.8 to 235.1 cases per 1,000 residents; from 2021 to 2025, mortality from circulatory diseases exceeded the republic-wide rate every year; and the crude mortality rate from malignant neoplasms exceeded the republic-wide rate in all ten years examined `[15, 2016–2025 issues, pages containing the health tables; 16, district-series tables]`. The published official tables do not distinguish Arshanovo, Shalginov, workers at the industrial facilities or residents in the path of transported emissions. This is not interpreted as evidence of safety: the report specifies which anonymised indicators should be requested from the health authorities, which environmental data fall within Rospotrebnadzor's public-health monitoring remit, and which air measurements belong to environmental observation systems.

Key findings

1. The industrial site contained **two FGX-48A units**, serial numbers `SZ 20190126` and `SZCK-18-04`. Each unit had two operating lines. `[COURT DECISION / INSPECTION REPORT; 2, PDF pp. 2–4; 4]`

2. The FGX-48A is a Chinese dry coal separation unit manufactured by Tangshan Shenzhou Manufacturing Group. The manufacturer's rated capacity for one unit is 350–480 t/h; its catalogue dimensions are 25 × 21 × 12 m. `[TECHNICAL DOCUMENTATION]`

3. Dust is generated within the air-based coal separation process itself. The enclosure, ducts, cyclone, baghouse, main fan and exhaust fan are functional parts of the technology. `[TECHNICAL DOCUMENTATION / TECHNICAL RESEARCH REPORT]`

4. **The FGX units and the drying complex are different equipment.** Fuel-combustion products belong to the drying complex and machinery, not automatically to the FGX units. `[PROJECT DOCUMENTATION]`

5 On 2 October 2019, the Khakassia Ministry of Natural Resources reported that primary treatment captured coarse dust but that the secondary removal of fine fractions was insufficiently effective; new filter elements were being selected and installed. [POSITION OF A PUBLIC AUTHORITY; 11]

6 At the hearing on 20 December 2019, the company described the FGX operation as testing, said that adjustment was under way and that an additional filter was awaited. [PRIMARY DOCUMENT / COMPANY POSITION; 1, vol. 3, hearing minutes]

7 The work-order log records coal processing by both FGX units from 28 December 2019. Both FGX units and the separate dryer were operating on 6 January 2020. The certificates of entry into service for the two FGX units are dated 27 January. [INSPECTION REPORT; 2, PDF pp. 2–6]

8 Tests on the four lines on 21 January showed 80.0–80.3% collection efficiency and a residual suspended-particle mass emission of 0.525–0.577 g/s per line. [LABORATORY REPORTS; 3; 1, vol. 2, PDF pp. 41–48]

9 The 80% figure cannot be treated as a constant characteristic of the entire operating period: it is supported by four measurements from a single day, but continuous records of pressure drop, bag replacement and abnormal operating conditions were not found in the public domain. Within the applicable requirements, the company is responsible for creating and retaining operational records and records relating to industrial environmental monitoring; materials obtained through federal environmental supervision fall within Rosprirodnadzor's sphere of responsibility. [23][25]

10 The design total of 94.477429 t/year applies to the whole coal-loading facility and includes nine pollutant entries and numerous sources. It is a calculation, not a measured annual total. [PROJECT DOCUMENTATION; 1, vol. 1, PDF p. 58]

11 There were no regular state air observations in Arshanovo. The designers used indicative background concentrations. [HYDROMETEOROLOGICAL SERVICE CERTIFICATE / PROJECT DOCUMENTATION; 1, vol. 2, PDF p. 31]

12 Natalia's footage shows a real visible episode and its spatial context. The date, 6 January 2020, is supported by the provenance of the recordings and the archive register. An image does not itself measure concentration or chemical composition, but the inspection report confirms that the equipment was operating on that date. [PRIMARY AUDIOVISUAL SOURCE / INSPECTION REPORT; 20; 2, PDF pp. 4–6]

13 On 24 November 2020, the court annulled Rosprirodnadzor's fine and terminated the case because the submitted materials did not establish the elements of an administrative offence. Sixty-four appendices were missing from the case, and the existence of a single Category I capital-construction project was not proved. The court did not determine that the air was safe or that the filters were functioning properly. [COURT DECISION; 4]

14 Both FGX units continued to be used after 2020: a published graduation thesis based on operational logs lists seven emergency shutdowns of FGX Nos. 1 and 2 between 2021 and 2023. `[ACADEMIC WORK / INDIRECT EVIDENCE FROM LOGS; 27, PDF pp. 26–27]`

15 Mine-water pumping and the merged drawdown cone are documented. This is not an FGX effect, but an effect of mining within the same industrial area. `[STATE SUBSURFACE MONITORING; 14, 2018 issue, PDF pp. 74 and 76]`

16 District health statistics contain serious adverse indicators. The published official tables do not provide anonymised time series specifically for Arshanovo and Shalginov; the hydrometeorological certificate confirms the absence of regular air observations in Arshanovo. Health authorities are responsible for health statistics, Rospotrebnadzor for public-health and environmental monitoring, and Roshydromet and regional authorities for the relevant air-observation systems. The inability to calculate the contribution of a specific source results from the unavailability of the necessary linked data; it is not evidence that no harm occurred. `[15][16][24][26]`

1. From the author



Natalia Zubkova in the Koibal Steppe, 6 January 2020. Two plumes are visible above the industrial site in the background. Frame from Natalia Zubkova's video archive.

During my years in Kuzbass, I saw a great deal. I saw deep pits appear where residential neighbourhoods had once stood, with smoke rising from them. I saw endless lines of railway wagons carrying coal. I saw smog and black snow.

My children could not simply go outside and remain clean. Their clothes became dirty after a walk; everything was covered in black dust. A black rim was almost always left around their lips.

I thought there was nothing left that the coal industry could do to surprise me. But what I saw in Khakassia was mind-blowing.

Khakassia is my homeland. I was born there.

I saw the “coal dragons”.

In the middle of the Koibal Steppe stood enormous industrial units, with long black plumes stretching away from them. As I looked at them, I could not imagine how anyone could destroy the nature and lives of people in this area so openly and so brazenly.

On 6 January 2020, I was in the steppe, filming the site, the units, the plumes, residents' homes and farms. Those recordings have survived in their original form. They are my testimony to what I saw that day. But in this report, I am not asking anyone to take my word for it. I compare the footage with production tables, project documentation, filter tests, the inspection report and court decisions.

It matters to me to establish more than what appeared on camera. I want to understand what these machines were, when they began processing coal, which filters were supposed to capture the dust, what the measurements showed, and who was responsible for the air that residents breathed.

It also matters to me to explain what activity was concealed behind the words “state need” when land was taken from farmers and livestock keepers for whom the steppe was both home and the foundation of their livelihoods.

2. Research question and method

2.1. Main question

This investigation does not set out to prove a predetermined conclusion. It addresses five groups of questions:

1. What were the two FGX-48A units at Mayrykhsky, and how did they differ from the dryer, crushing operations, stockpiles and loading?
2. When was the equipment delivered, assembled and started; when did it actually process coal; and when was its formal entry into service documented?
3. How was the dust-collection system supposed to work, and what do the documents show about its actual performance?
4. What was recorded by residents, Natalia, the company, supervisory authorities, the laboratory and the courts?
5. What effects on people, land, air and water can be established from the surviving data, and which necessary data were not collected or published?

2.2. Body of material

As at 14 October 2026, the research register contains 85 source records; local files exist for 82 records, and the SHA-256 checksums of 79 files have been verified. The body of material includes:

- three volumes of the environmental impact assessment for Project `390-909-19`, covering expansion of the coal-loading facility with FGX-48A units;
- a separate environmental impact assessment for the drying complex;
- the Rosprirodnadzor unscheduled-inspection report and related court materials;

- four laboratory reports from tests of the gas-cleaning units;
- state subsurface-monitoring bulletins;
- state reports and regional programmes containing health statistics for 2016–2025;
- court cases concerning environmental control, construction, land and compensation;
- the manufacturer's technical materials, a patent, a US Department of Energy report, and publications on the use of FGX in the United States, South Africa, China, India and Poland;
- Natalia's original photographs and video recordings, including the filming trip on 6 January 2020;
- dated testimony from residents of Arshanovo and Shalginov;
- public statements by the company and public authorities.

2.3. Evidence hierarchy

HOW TO READ THE EVIDENCE



Primary material

A document, report, video recording or court decision directly records the relevant fact.



Source synthesis

The conclusion follows from mutually consistent material of different origins.



Necessary data are unavailable

The specific gap and the organisation whose remit includes the information are identified.

The report uses the following labels:

- `[PRIMARY DOCUMENT]` — a project document, report, protocol, register or official report;
- `[COURT DECISION]` — a finding or circumstance set out by a court;
- `[LABORATORY REPORT]` — a primary measurement result with a date and method;
- `[SCIENTIFIC PUBLICATION]` — a scientific publication or government technical report;
- `[TECHNICAL DOCUMENTATION]` — manufacturer data, a patent or a manual;
- `[NATALIA'S TESTIMONY]` and `[RESIDENT'S TESTIMONY]` — a direct, dated observation;
- `[COMPANY POSITION]` and `[POSITION OF A PUBLIC AUTHORITY]` — a statement by an interested party, assessed separately;
- `[NOT CONFIRMED]` — a version has been preserved, but the necessary document or measurement is absent;
- `[REFUTED]` — the preserved materials contradict the version.

Multiple republications of a single report do not increase its evidential weight. An official document establishes what it records, but is not treated as infallible merely because of its author's status.

2.4. How missing data are described

The phrase “there are no data” does not mean “there was no harm”. The report distinguishes among three situations:

- the information was not found in the public domain;
- the information was not provided after a request — this wording is used only where a documented request and response exist, or the stated response period has expired;
- measurements were not made — this is stated only where a document expressly confirms the absence of observations.

For every material gap, the report identifies:

1. the observed event;
2. the known physical or medical mechanism;
3. the specific missing measurement;
4. the organisation whose remit includes the relevant part of industrial, sanitary, medical, meteorological or environmental control;
5. the conclusion that therefore cannot be quantified.

These data were not found in the public domain. Information about environmental pollution and emissions is environmental information to which access must be ensured. It is necessary to establish whether measurements were made, who holds the results and how residents can obtain them. If necessary measurements were not made, a separate question arises: who was responsible for carrying them out, and why were they not performed?

Article 42 of the Constitution of the Russian Federation guarantees everyone's right to reliable information about the state of the environment [21]. Article 4.3 of Federal Law No. 7-FZ provides that environmental information is publicly accessible and requires authorities holding information specified by law to provide and publish it [22]. Article 4.3 was introduced in 2021 and is not applied retrospectively here as proof of a violation in 2019–2020; it supports the requirement that environmental information be accessible now.

An authority's general remit does not mean that it must publish every internal log. It is necessary to establish separately who created a document, to whom it was submitted, whether mandatory-disclosure rules apply and how a resident or journalist can obtain it. Medical information is considered separately: personal data must not be published, but anonymised aggregate indicators are necessary to assess the health of the area.

This approach does not excuse an industrial source. The absence of accessible measurements does not demonstrate that the emissions were safe and does not remove the question of responsibility. It shows precisely where the monitoring system left residents without an answer.

3. The area and its industrial setting

The Koibal Steppe is not empty space between industrial facilities. It contains rural settlements, pastures, hayfields, wells, water bodies, roads and farms. Arshanovo is in Altaisky District; Shalginov is in Beysky District. For residents, air, water, land and health are not separated into different volumes of project documentation.

Mayrykhsky was established in 2013. In 2014, the company obtained a licence for coal exploration and extraction; the first rock mass was shipped in 2015; and, according to the company's official history, extraction and processing began in 2016. Output rose from 450,000 tonnes in 2016 to 1.8 million in 2017, 3.1 million in 2018 and 4.2 million tonnes in 2019. `[COMPANY POSITION]`

Complaints about dust and the loss of pasture predated the start-up of the two FGX-48A units. A publication dated 30 May 2019 recorded black deposits on windows and washing, blasting, waste heaps, coal trucks and the loss of land. The journalist personally described cows covered in dust. He did not confirm reports of mass livestock deaths, while the local veterinarian denied both mass mortality and pathological changes in internal organs. `[JOURNALISTIC PUBLICATION / RESIDENTS' TESTIMONY]`

This chronological boundary matters: the two FGX units did not create the steppe's entire industrial dust burden from nothing. The open pit, blasting, roads, crushing, stockpiles, transfers, loading, waste heaps and diesel machinery already existed. But in 2019, two units were added to the existing burden in which a large airflow is the working medium and inevitably creates a dust-laden air stream that the gas-cleaning system must contain.

4. What the FGX-48A is

4.1. Manufacturer and model

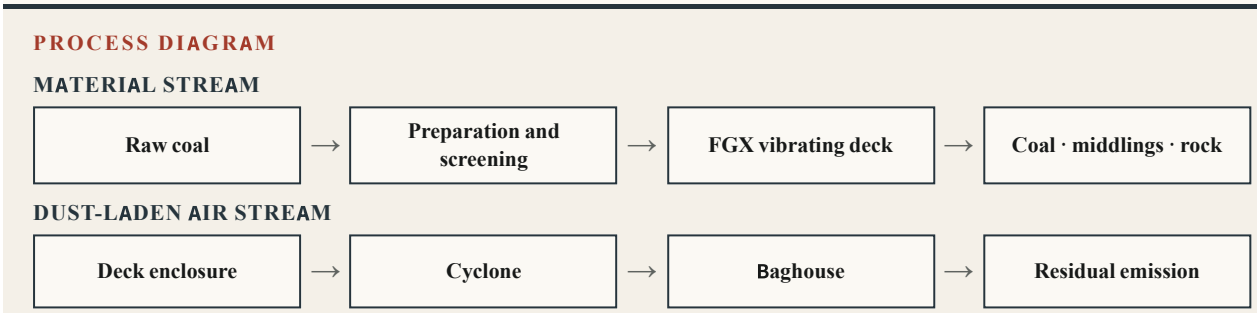
The FGX family was developed by Tangshan Shenzhou Manufacturing Group Co., Ltd., Tangshan, Hebei Province, China. At Mayrykhsky, the documents record two FGX-48A units with serial numbers `SZ 20190126` and `SZCK-18-04`. Capitalisation and spacing follow the inspection report and the court decision `[2, PDF pp. 2–3; 4]`.

The manufacturer's official catalogue gives the following specifications for the FGX-48A:

Parameter	Manufacturer's value
Capacity	350–480 t/h
Feed size	0–80 mm
Dimensions	25 × 21 × 12 m
Numerical power figure on the web page	1322

The preserved English-language brochure gives power of approximately 1,298.68 kW and explains that the figure excludes auxiliary equipment such as conveyors. Catalogue specifications describe the model, not the actual operating mode of the specific units.

4.2. Separation principle



Collected dust is directed to the dust-collection hopper; part of the air returns to the process.

Coal is fed onto an inclined, perforated vibrating deck. A centrifugal fan supplies air from below. The air and fine material form a fluidised bed; vibration, the deck's inclination and differences in density direct the lighter coal and heavier rock towards separate outlets.

Main material stream:

```
raw coal → preparation and screening → feeder → FGX vibrating deck → clean coal + middlings + rock
```

Dust-laden air stream:

```
deck enclosure → cyclone → partial air return to the process
```

```
remaining dust-laden air → baghouse → exhaust fan → residual emission
```

```
collected dust → dust-collection hopper
```

4.3. Equipment of the two units

The court materials list the following equipment for each FGX-48A:

- separator frame and main separator;
- receiving hopper;
- air distributor;
- main fan;
- cyclone dust collector;
- baghouse;
- exhaust fan;
- dust-collection hopper;
- vibratory dust dischargers;
- automated control panel and enclosed panel room.

This confirms the stated configuration. The actual integrity of the enclosure, condition of the bags, pressure drop and operating mode of each fan can be established only from operating logs and repeated measurements.

4.4. Moisture and fine fractions

US tests indicate an operating surface-moisture range of approximately up to 7–10%, while some supplier materials state below 9%. At higher surface moisture, pre-screening is required. The share of fines matters to formation of the working bed; international tests show a sharp deterioration in separation for material smaller than 5–6 mm.

The Mayrykhsky court decision gives an average coal moisture content of 15.7%, and 15.14% for the seams in the first stage. These figures cannot be compared directly with the surface-moisture limit without the method used to determine the indicator. Verification of the operating regime requires the actual feed moisture for each line, particle-size distribution and shift settings. These operational data were not found in the accessible body of material; creating and retaining them forms part of the company's operations.

5. FGX and the dryer: two different processes

The FGX does not burn or dry coal. It separates material using a cold airflow. Its characteristic emissions are coal and mineral dust, PM10 and PM2.5 associated with feeding, the deck, transfer points, conveyors, products and stockpiles.

The drying complex uses heat generators and drying equipment. Its project documentation lists fuel-combustion products and a separate set of sources: nitrogen oxides, carbon monoxide, sulphur dioxide, soot and other substances. The dryer project provides for cyclones and

baghouses with a stated combined collection efficiency of 98%.

Therefore:

- combustion products from the dryer cannot be attributed to the FGX units;
- residual coal dust from the FGX units cannot be concealed within a general description of the dryer;
- a visible plume cannot be identified by colour alone;
- each episode requires the filming location, camera direction, site plan, operating equipment, wind and production log.

The production tables record simultaneous operation of both FGX units and the dryer on 6 January 2020. This confirms the presence of several possible point and fugitive sources in the footage. A precise engineering attribution of each visible plume has not yet been completed.

6. Chronology of the appearance and operation of the “dragons”

Date	Event	Source and status
2018	The company includes construction of an FGX-12 rated at up to 120 t/h in its corporate history	`[COMPANY POSITION]`
21–22 June 2018	A publication reports that one pneumatic unit is already operating and that a second, higher-capacity unit is planned	`[JOURNALISTIC PUBLICATION / COMPANY POSITION]`
2019	The company includes an FGX-48 rated at up to 480 t/h in its history	`[COMPANY POSITION]`
6 July 2019	According to the inspection report, commissioning work on the FGX units began	`[INSPECTION REPORT; 2, PDF pp. 2–3]`
2 October 2019	The Khakassia Ministry of Natural Resources reported insufficiently effective secondary removal of fine dust and the installation of new filter elements	`[POSITION OF A PUBLIC AUTHORITY; 11]`

Date	Event	Source and status
7 October 2019	Public consultation was announced for the project to expand the coal-loading facility using FGX-48A units	[PRIMARY DOCUMENT]
20 December 2019	A hearing was held in Arshanovo; the company described the operation as testing and said it was awaiting an additional filter	[PRIMARY DOCUMENT; 1, vol. 3, hearing minutes]
27 December 2019	A work-order log for the two FGX units began to be kept	[INSPECTION REPORT; 2, PDF pp. 2–3]
28 December 2019	Coal processing by both FGX units was recorded	[INSPECTION REPORT; 2, PDF pp. 3–4]
6 January 2020	Both FGX units operated for two shifts; the dryer processed 4,248 tonnes over the day at a stated maximum capacity of 203 t/h; Natalia filmed visible plumes	[INSPECTION REPORT / PRIMARY AUDIOVISUAL SOURCE; 2, PDF pp. 4–6; 20]
21 January 2020	Samples were taken before and after the gas-cleaning units on the four lines of the two FGX units	[LABORATORY REPORTS; 3; 1, vol. 2, PDF pp. 41–48]
24 January 2020	Testing of the samples was completed	[LABORATORY REPORTS; 3; 1, vol. 2, PDF pp. 41–48]
27 January 2020	Reports Nos. 5–8/Х-Э ПВ and certificates of entry into service for both FGX units were issued	[PRIMARY DOCUMENTS; 2, PDF pp. 2–3; 3]
6 February 2020	The director told journalists that the causes of dusting had been eliminated and that the filters were operating normally	[COMPANY POSITION]
20 February 2020	Rosprirodnadzor's unscheduled-inspection report No. АВЗНТ-028-в was dated	[PRIMARY DOCUMENT]
24 November 2020	The court annulled Rosprirodnadzor's fine and terminated the administrative case	[COURT DECISION]

Date	Event	Source and status
1 February 2021	A new public-consultation procedure for the FGX project was scheduled in the form of a survey	`[PRIMARY DOCUMENT]`
24 February 2021	The Government of Khakassia reported clouds of black dust, a visit by the acting minister and an operating dry coal separation unit	`[POSITION OF A PUBLIC AUTHORITY]`
2021–2023	A published graduation thesis lists seven emergency shutdowns of FGX Nos. 1 and 2	`[ACADEMIC WORK / INDIRECT EVIDENCE FROM LOGS; 27, PDF pp. 26–27]`

This chronology resolves the dispute surrounding the phrase “operating but not in service”. Before the certificates of entry into service were issued, the equipment was undergoing commissioning work, but it was in fact processing coal. The effects of commissioning did not occur in a sealed laboratory: air entered the same steppe where people lived and animals grazed.

6.1. Permitting sequence

The approvals and expert reviews cannot be reduced to the single question of whether “a piece of paper existed”. The site was simultaneously subject to a mining licence, construction procedures, registration as an adverse environmental impact facility, environmental expert review, emission limits and transition to an integrated environmental permit.

In February 2020, Rosprirodnadzor treated the two FGX-48A units and the dryer as a technologically connected Category I coal-processing facility. The court did not find that construction proved in the administrative case before it: the project documentation was not identified and 64 appendices to the inspection report were missing.

The following subsequent positive state environmental review conclusions were found in the public register:

Date	Facility	Conclusion
7 June 2022	development of the Mayrykhsky section at 6 million t/year	No. `19-1-02-1-75-0074-22`, Order No. 209-Э
5 July 2022	drying complex for 0–50 mm long-flame coal	No. `19-1-01-1-75-0085-22`, Order No. 238-Э

Date	Facility	Conclusion
20 August 2024	coal-loading facility at the Arshanovsky-2 section, operated by another company	No. `19-1-01-1-75-0896-24`, Order No. 1551/ГЭЭ

None of these entries is a conclusion on Project `390-909-19` for expansion of the coal-loading facility with FGX-48A units. Searches of the public register for `FGX-48A`, a variant using the Cyrillic “A”, and the project code returned no entry; the register itself warns that its data may be incomplete. An official response from Rosprirodnadzor, or the archived conclusion specifically for this project, is therefore required.

The absence of an integrated environmental permit in February 2020 does not in itself prove a violation: some Category I facilities had a transitional period lasting until 1 January 2025. A legal assessment requires the facility boundaries, its inclusion in the relevant special list, and the permits for emissions, discharges and waste that were in force.

7. Dust collection: design, tests and evidential gaps

7.1. What the collection system was supposed to do

The cyclone separates larger particles by means of a swirling flow. The baghouse is intended to capture finer dust on the filter medium. The main fan generates the operating airflow for separation; the exhaust fan draws air through the cleaning system. The integrity of enclosures and ducts determines what share of the dust-laden air actually passes through the filter and what share escapes through leaks and open components.

7.2. What was officially acknowledged in 2019



Industrial site, 6 January 2020. A visible dark plume above the equipment. Frame from Natalia Zubkova's video archive.

On 2 October 2019, the Khakassia Ministry of Natural Resources reported that primary treatment captured coarse dust, but secondary removal of the fine fractions was insufficiently effective; the company was selecting another solution and installing new filter elements. This is a direct official acknowledgement of a dust-collection problem during commissioning.

The company expected an additional filter component to arrive in January. Its representative said that, once it had been installed, ‘the dust should disappear from 1 February’.

7.3. Four reports from 21 January 2020

Analitik LLC laboratory measured the mass concentration of suspended particles at the inlet and outlet of gas-cleaning unit No. 1. Sampling location: the coal-loading facility 7.5 km north-east of Arshanovo `[3; 1, vol. 2, PDF pp. 41–48]`.

Report	Equipment	Inlet, g/m³	Outlet, g/m³	Before cleaning, g/s	After cleaning, g/s	Collection efficiency
No. 5/Х-Э ПВ	FGX-48 (1), line 1	0.339 ± 0.085	0.061 ± 0.015	2.906 ± 0.785	0.577 ± 0.156	80.1%
No. 6/Х-Э ПВ	FGX-48 (1), line 2	0.302 ± 0.075	0.056 ± 0.014	2.618 ± 0.707	0.525 ± 0.142	80.0%
No. 7/Х-Э ПВ	FGX-48 (2), line 1	0.322 ± 0.080	0.058 ± 0.015	2.700 ± 0.729	0.533 ± 0.144	80.3%
No. 8/Х-Э ПВ	FGX-48 (2), line 2	0.310 ± 0.078	0.057 ± 0.014	2.689 ± 0.726	0.535 ± 0.144	80.1%

The reports establish that the cleaning system operated and removed approximately four-fifths of the measured suspended-particle mass. At the same time, they show a residual emission from every line. “80%” does not mean zero emissions.

7.4. Later tests of individual outlets

The Rosprirodnadzor inspection report contains three later results from the regulator's laboratory: **91.7%** on 24 January for the fabric baghouse of the first FGX unit, discharge stack 1; **98.7%** on 29 January for the filter of the second FGX unit, discharge stack 2; and **98.1%** on 29 January for the dryer's baghouse `[INSPECTION REPORT; 2, Table 5, PDF p. 12]`.

These values relate to different dates, units and selected measurement points. They must not be averaged with the four tests conducted on 21 January, and they do not characterise the condition of the filters on 6 January. The available documents do not establish the reason for the differences between these results and the tests conducted on 21 January.

7.5. Why individual days cannot replace operational monitoring

Answering how the filters performed on other dates requires:

- logs of pressure drop across the filter bags;
- operating modes of the main and exhaust fans;
- records of filter-element replacement;
- the mass of dust discharged from the hoppers;
- records of loss of containment and bypass of the gas-cleaning system;
- test reports for start-up, shutdown and different coal properties;
- the relationship between FGX operation and the emergency shutdowns in 2021–2023.

The company was required to create and retain this information as part of operating the equipment and carrying out industrial environmental monitoring `[23]`. Rosprirodnadzor could obtain and examine material relevant to its supervisory work `[25]`. The accessible body of material contains no continuous series; nor is there a documented response stating that the logs themselves do not exist. It is therefore necessary to establish whether they were kept, whether they were submitted to the supervisory authority, and by what lawful means they can be consulted.

8. Projected emissions

8.1. Two FGX units before and after the assumed cleaning

For each FGX unit, the project calculates the combined flow from the buffer hopper, feeder, separator, receiving hopper, screw conveyor and transfer points. With an assumed collection efficiency of 80%, the following values were obtained `[1, vol. 2, PDF pp. 72–78]`:

Indicator	One FGX before cleaning, t/year	One FGX after cleaning, t/year
PM10	33.314324	6.662865
PM2.5	15.748589	3.149718
Hard-coal dust	11.508585	2.301717

PM2.5 is contained within the PM10 size category. “Hard-coal dust” is a compositional category. The project presents these entries separately but the available explanation does not show how double counting between the size-based and compositional categories was excluded. The rows therefore cannot simply be added together and called the mass of unique particles. They must be retained as presented in the project.

8.2. Other sources at the coal-loading facility

The project register includes not only the four point sources from the two FGX units, but also:

- Liebherr L580 wheel loaders;
- the upper open stockpile of 500–100 mm coal;
- crushing and screening sections with a Metso NW 1213 and screens;
- open stockpiles of 100–50 and 50–10 mm fractions;
- product stockpiles for the two FGX units;
- three loading points;
- open conveyors and transfer points.

For machinery, the project accounts for nitrogen dioxide and nitric oxide, soot, sulphur dioxide, carbon monoxide and kerosene. For coal operations, it accounts for PM10, PM2.5 and hard-coal dust. For some transfer points it specifies ЦН-15-400 cyclones with an assumed efficiency of 70%; for stockpiles, periodic watering.

8.3. Total of 94.477429 t/year

Volume 1 of the environmental impact assessment gives an aggregate projected total for nine pollutant entries of 94.477429 t/year for the entire coal-loading facility `[1, vol. 1, PDF p. 58]`. This figure includes point and fugitive sources, machinery, separation, crushing, stockpiles, transfers, conveyors and loading.

It is not a report of actual emissions during a calendar year. An actual annual total requires the operating time of each source, real airflow rates, results of industrial monitoring, abnormal operating conditions and the company's annual report.

8.4. The drying complex: a separate emissions register

The environmental impact assessment for the drying complex describes heat generators, drying drums, cyclones and baghouses. The projected combined collection efficiency is stated as 98%. This is a property of a separate designed system and cannot be transferred to the FGX units.

Combustion products — nitrogen oxides, carbon monoxide, sulphur dioxide, soot, benzo[a]pyrene and fuel-related compounds — should be attributed to the dryer or engines only where the project does so. Phenol is absent from the list of eleven pollutants in the dryer's environmental impact assessment.

8.5. FGX waste

The project estimated 280,000 t/year of separated waste rock from the two FGX units. The authors assumed a 7% yield based on test runs and stated that the actual volume would be refined during operation. The project also states that approximately 60% of 4 million tonnes of coal is fed to the FGX units, but the 280,000-tonne calculation equals 7% of the full 4 million tonnes. This arithmetic requires clarification from the designer and actual weighbridge records.

Separately, the project calculated 0.16 t/year of used filter bags, based on 80 filters weighing 0.5 kg each and replacement once every three months. The project itself acknowledges that the actual replacement interval was unknown at the time it was prepared.

On 23 December 2019, the laboratory issued Report No. 571/Х-Э О(Т) for a composite sample described as “overburden mixed material”, taken on 6 December near the separation unit. The water extract showed no acute toxicity to *Daphnia magna* or *Chlorella vulgaris* and was used to assign Hazard Class V.

The bioassay characterises one sample and one exposure pathway — a water extract tested on two organisms. It is not an analysis of inhaled dust, does not disclose the chemical or particle-size composition of every batch, and does not assess wind erosion from the waste heap. Even

Class V waste remains a high-volume material stream that occupies land, is moved by vehicles and can generate dust during storage.

9. Dispersion and the absence of a local observation series

The project model produced concentrations below one maximum permissible concentration at the calculation points. At the point near Arshanovo, the contribution was calculated as 0.04 of the maximum permissible concentration for PM2.5 and 0.02 for hard-coal dust.

These numbers describe a mathematical model using the specified sources, collection efficiencies, background concentrations and meteorological conditions. The Central Siberian hydrometeorological service expressly stated that there were no regular ambient-air observations in Arshanovo. Indicative background concentrations were used for the model `[1, vol. 2, PDF p. 31]`.

The project model is therefore not a measurement of the air during the episode on 6 January or during another complaint by residents. It is a prediction for a specified scenario. Testing it required stationary or repeated measurements in Arshanovo and Shalginov, synchronised with equipment operating modes and wind.

9.1. Who was responsible for providing the data

- the company — source inventories, industrial environmental monitoring, documentation and retention of its results, and information about its own emissions to the extent required by law `[23]`;
- Rosprirodnadzor — federal environmental supervision and materials it received or created during inspections within its remit `[25]`;
- Roshydromet and regional authorities — the relevant state and territorial ambient-air observation systems `[24]`;
- Rospotrebnadzor — public-health monitoring of the environment and population health `[26]`;
- health authorities — health statistics, subject to medical confidentiality and anonymisation of aggregate data.

No hourly measurements of PM10, PM2.5 and dust composition near homes on the dates of visible episodes were found in the public domain. The hydrometeorological certificate separately confirms that no regular observations were made in Arshanovo; it does not prove

the absence of every one-off sample. It is necessary to establish whether the company, supervisory authorities or public-health authorities took such samples, who retains the results and how residents can obtain them.

Residents were not obliged to buy certified analysers, organise a monitoring station and prove the composition of every plume. The absence of an accessible hourly series means that the precise exposure of residents cannot be reconstructed from the public record. It does not demonstrate that the emissions were safe.

9.2. Noise

On 5 February 2020, the laboratory measured average equivalent and maximum sound levels of 100 dBA and 105 dBA near the FGX units. Near the Metso NW 1213 crushing and screening unit, it measured 88 dBA and 95 dBA `[1, vol. 2, PDF pp. 110–128]`. The legible part of the report does not give the distance from the microphone to the FGX structure, so these values cannot be transferred to homes.

The project acoustic model included the two FGX units as separate sources of 100/105 dBA each. At a calculation point near the residential area of Arshanovo, the model produced 25.9/25.9 dBA; at a second residential point, 26.9/27.1 dBA; the maximum at the calculated sanitary-protection-zone boundary was 42.2/44.3 dBA `[1, vol. 2, PDF pp. 129–143]`. This is a prediction of attenuation from the combined sources at the coal-loading facility under the specified parameters. The accessible materials contain no actual continuous daily noise series for Arshanovo and Shalginov; nor was documentary confirmation found that such measurements were never made.

10. What the footage from 6 January 2020 shows



Two simultaneously visible plumes above the industrial site, 6 January 2020. Frame from Natalia Zubkova's video archive.

The archive contains separate original video recordings from the filming trip, not only the edit uploaded to YouTube later. Original filenames, sizes, metadata and checksums have been preserved. A scene register links frames to episodes during the trip.

The footage shows:

- the industrial site in the winter steppe;
- operating industrial structures;
- several visible plumes;
- the spatial relationship between the site, steppe, road, farms and the person filming;
- plume movement within continuous segments of the recording.

The date, 6 January 2020, is based on the provenance of the recordings and archival information. The inspection report independently records that both FGX units and the dryer were operating that day.

A frame does not measure the mass, concentration, size or chemical composition of particles. But this does not mean that an image “proves nothing”. It documents a visible episode, its scale within the frame and the simultaneous presence of several plumes. Quantitative assessment should have been provided by industrial and state measurements.

11. Why pollution could remain over the steppe

The Khakass–Minusinsk Basin has a naturally high potential for atmospheric pollution. In winter, prolonged calms, near-surface temperature inversions and weak vertical mixing can retain emissions near the ground. The FGX project also describes winter stagnation, inversions and fog; official Khakassia documents put the frequency of calm conditions at approximately 25%.

This is an established climatic characteristic of the area. Precise reconstruction of the plumes on 6 January would require hourly data from the nearest station, a vertical temperature profile, wind speed and direction at the site, and the exact time of each video segment. Without them, it cannot be stated as established that an inversion occurred during the filming hours themselves.

The main engineering conclusion does not depend on that assumption: siting a source in a basin requires accounting for periods when dispersion is particularly weak. A project dispersion calculation cannot replace measurements during a specific episode of winter air stagnation.

12. Residents' testimony

12.1. Arshanovo



A farm in the Koibal Steppe, 6 January 2020. A visible plume above the industrial site appears in the background. Frame from Natalia Zubkova's video archive.

Before the FGX units, residents had already complained about dust, blasting, coal trucks, waste heaps and the loss of pasture. On 19 December 2019, the Human Rights Commissioner and the prosecutor's office held an on-site reception; residents' concerns included emissions, wastewater, noise, blasting and the “Dragon” machines. The Commissioner noted that an objective assessment was impeded by the complexity of the problem and the division of powers among more than twelve agencies.

At the public hearing on 20 December, residents spoke about operating equipment that was generating dust and demanded that it be stopped until the procedures were complete and the emissions eliminated.

On 6 January 2020, Denis showed Natalia a farm with approximately three hundred sheep and several horses. He spoke about dust on people and animals, falling water levels in wells and standpipes, and shrinking space for livestock farming. This is direct testimony about observations and consequences for a household; the cause of each change is considered separately through the evidence on water, land and industrial sources.

12.2. Shalginov

Field interviews conducted by ADC Memorial on 16 March 2020 record:

- persistent smog and dirt on plants;
- coal deposits on water for livestock;
- dust from the industrial road;
- washing that quickly turned grey;
- soot and coal dust on hay and grass;
- large clouds at night that residents associated with the “dragons”;
- black snow and grass in the morning.

This body of testimony names roads, open-pit mines, waste heaps, blasting and the FGX units. The entire dust burden therefore cannot be attributed to one unit. But the residents' own direct identification of the night-time clouds must not be erased: it is retained as testimony and compared with equipment operating logs.

12.3. Animals, plants and soil

Residents reported dark deposits on cows and sheep, plants, hay and water for livestock. These observations document deposition of visible material and changes in farming conditions. They require examination not only of air, but also of settled dust.

Such an examination requires:

- the chemical and mineral composition of deposits on grass and snow;
- carbon, silica and metal content in soil and fodder;
- control sites outside the industrial transport path;
- veterinary records, causes of death and post-mortem examinations;
- annual crop yields and pasture condition;
- coordinates of roads, waste heaps, stockpiles and sources.

The body of material contains no series of comparable reports of this kind. State and industrial monitoring should have told residents whether industrial dust was entering fodder, water and soil. A single bioassay of overburden does not answer that question.

13. Phenol and other toxic substances

Publications have claimed that phenol was present “in the dragons' emissions”. No primary atmospheric report was found that identifies the location, time, method, phenol concentration and link between a sample and a specific FGX unit. The claim is therefore not used as an established fact.

What is documented is different:

- the FGX project accounts for PM10, PM2.5, hard-coal dust and machinery emissions;
- the dryer project contains a separate set of combustion products;
- state monitoring in 2021–2022 reported the addition of phenols, sulphates, arsenic and fluorides to the Abakan River near the mine-water discharge;
- phenol in water near a discharge and phenol in an FGX atmospheric plume are different claims that require different reports.

If the original atmospheric report is obtained, its coordinates, time, method, detection limit, applicable standard and possible sources must be examined. Until then, the correct status of the claim is: `[CLAIM IN PUBLICATIONS — PRIMARY ATMOSPHERIC REPORT NOT FOUND]`.

14. Water and the drawdown cone

14.1. Increase in mine-water pumping

Year	Average mine-water pumping, thousand m³/day	Calculated annual equivalent, million m³
2017	7.340	2.679
2018	12.364	4.513
2019	13.656	4.984
2020	14.344	5.250

The annual equivalents were calculated from average daily pumping and the number of calendar days; for leap year 2020: 14.344 thousand m³/day × 366 = 5.249904 million m³, rounded to 5.250 million m³. This is a calculated equivalent, not a separate annual measurement `[14, 2020 issue, PDF pp. 74–76]`.

Average daily pumping almost doubled over four years.

14.2. Merging of the cones

The 2018 state bulletin reports that the drawdown cones at Arshanovsky and Mayrykhsky had merged and that the effects of the two pumping operations could no longer be distinguished separately. The area extended for approximately 8 km from west to east and 4.0–4.2 km from south to north `[14, 2018 issue, PDF p. 74]`.

Mayrykhsky's mining operations were approximately 600 m south-west of Lake Turpanye. Specialists associated the eastern and north-eastern boundaries of the cone with Lake Turpanye and the R-1-1 canal, while also stating that further research and observations were required to establish that connection reliably.

14.3. What the cone can mean for the steppe

A drawdown cone means that mine-water pumping changes hydraulic gradients across an area considerably larger than the open pit itself. Possible consequences include:

- falling water levels in connected shallow wells and boreholes;
- reduced groundwater support for grass cover, pasture and wet depressions;

- changes in the water supply to Lake Turpanye and the R-1-1 canal;
- changes in groundwater flow towards the Abakan River;
- transport of dissolved substances along new pathways;
- long-term deterioration in water quality when dewatered rock oxidises and water levels later recover;
- transfer of the burden to surface waters through discharge of millions of cubic metres of pumped water.

These are established hydrogeological mechanisms. Mapping the specific effects requires piezometers between the open pit, lake, canal and villages; water levels over time; chemical and isotopic tracers; and the company's water balance. State bulletins expressly stated that additional observations were necessary; no complete public series is available.

14.4. Chemical composition

In 2017, the aquifer systems at Mayrykhsky were reported to exceed applicable limits for iron by 8–48 times, sodium by 1.3–3.2 times, petroleum products by 4.7–5.1 times, fluorides by 1.1–1.7 times and total dissolved solids by 1.2–1.8 times; individual points also showed exceedances for nickel, magnesium, ammonium and other indicators `[14, 2017 issue, PDF pp. 67–68]`. In 2018, arsenic was reported at 1.5 times the limit `[14, 2018 issue, PDF p. 76]`.

The bulletins associate hydrochemical changes at coal mines both with industrial facilities and with the inflow of deeper water caused by pumping. Identifying the source of a specific substance requires borehole coordinates and construction, background levels, flow direction and primary laboratory reports.

15. Land taken “for state needs” for a private company

Mayrykhsky Open-Pit Coal Mine LLC remained a private company. The phrase “for the state needs of the Russian Federation” arose from a mechanism in land and mining law: land could be expropriated for work under a subsoil-use licence. The private subsoil user submitted the application, the territorial subsoil authority made the decision, and the subsoil user paid for the valuation and compensation.

Date	Event
17 July 2018	Licence АБН 16462 ТЭ was issued

Date	Event
28 November 2018	The company submitted an application for land expropriation
15 March 2019	TsentrSibNedra issued Order No. 216 expropriating plots for state needs for the purpose of subsoil use, at the subsoil user's expense
23 July 2019	Beysky District Court refused to annul the order
29 September 2020	The court granted a claim for compulsory acquisition of a private plot and awarded compensation
2021–2022	The commercial courts considered acquisition of three farm plots and the amount of compensation

In the dispute over three plots, the court-ordered valuation substantially increased the figures:

Plot	Proposed valuation, roubles	Court-ordered valuation, roubles
19:06:050705:33	1,598,000	2,432,000
19:06:000000:667:ЗУ1	1,256,000	2,670,000
19:06:050605:43:ЗУ1	238,000	912,000

On 17 August 2022, the appellate court described the initial offer as containing “manifestly unfair terms of property compensation”.

The legal concept of state need did not make the open-pit mine state-owned. It allowed compulsory acquisition to be used in the interests of licensed subsoil use. The social cost — loss of pasture, hayfields and space for farming — does not disappear when cadastral or assessed value is paid.

16. Population health: what the ten-year series shows

16.1. Established indicators

Diseases of the respiratory and circulatory systems and malignant neoplasms were recorded in Altaisky and Beysky districts in 2016–2025. The figures below were extracted from state reports for 2016–2025 and updated regional programmes `[15, pages containing the health tables listed in the source entry; 16, Tables 2–4 and district cancer tables]`. The most notable findings are:

- Beysky District: prevalence of circulatory diseases rose from 154.8 per 1,000 residents in 2016 to 235.1 in 2025;
- Beysky District: mortality from circulatory diseases in 2021–2025 was 781.4, 777.1, 891.2, 848.0 and 881.8 per 100,000 — above the republic-wide rate every year;
- Beysky District: crude mortality from malignant neoplasms was above the republic-wide rate in all ten years examined;
- in 2025, crude incidence and mortality rates for malignant neoplasms in both districts exceeded the republic-wide rates;
- Altaisky District: in 2023 there was a one-year spike in overall, respiratory and circulatory morbidity; the indicators declined in subsequent years.

16.2. What is known about mechanisms of harm

Coal and mineral dust, PM10, PM2.5 and respirable crystalline silica damage the respiratory and cardiovascular systems. Pneumoconiosis, silicosis, chronic obstructive pulmonary disease and reduced lung function are documented among coal-industry workers. Long-term exposure to PM2.5 and PM10 is associated with increased morbidity and mortality.

This explains why residents' reports of coughing, shortness of breath and deteriorating health require medical and environmental investigation rather than dismissal.

16.3. What state records did not show

The district tables combined Arshanovo and Shalginov with other settlements. The published official tables do not provide:

- indicators for each village;
- residential address without disclosure of personal data;

- occupation and employment at a coal facility;
- the required breakdown by age and sex;
- smoking history and domestic heating;
- links between diagnoses and the dates and levels of pollution;
- a comparable control area.

Nor was a long-term series of PM10, PM2.5 and dust composition near homes found in the public domain. The hydrometeorological certificate confirms the absence of regular observations in Arshanovo, but does not rule out individual one-off samples `[1, vol. 2, PDF p. 31]`. Without linking environmental data to anonymised health statistics, the share of district morbidity attributable specifically to Mayrykhsky or the FGX units cannot be calculated.

This does not negate the established harm from coal and mineral dust, the district's adverse indicators or residents' testimony. The company is responsible for industrial environmental monitoring and information about its emissions `[23]`; Roshydromet and regional authorities for the relevant air-observation systems `[24]`; Rosprirodnadzor for federal environmental supervision and inspection materials within its remit `[25]`; Rospotrebnadzor for public-health and environmental monitoring `[26]`; and health authorities for compiling health statistics.

Settlement-level series were not found in the public domain. This does not automatically mean that primary medical information was not collected. It is necessary to establish which anonymised aggregate indicators can be compiled and provided without breaching medical confidentiality. If the necessary environmental observations or statistical analysis for the area were not carried out, it is necessary to establish separately whose remit included them and why residents were left without an answer. The absence of accessible measurements does not demonstrate that the emissions were safe.

17. Courts, Rosprirodnadzor and the prosecutor's office

17.1. The 2020 administrative case

The Yenisei Interregional Directorate of Rosprirodnadzor fined the company 100,000 roubles under Article 8.4(1) of the Code of Administrative Offences. The Directorate considered that dry coal separation was being conducted at a Category I facility comprising two FGX-48A units and a dryer without positive state environmental expert-review conclusions.

On 24 November 2020, Altaisky District Court annulled the decision and terminated the proceedings because the elements of an administrative offence had not been established. The court found that the submitted material did not prove the existence of a single Category I capital-construction project whose project documentation had to undergo state environmental review. Sixty-four appendices to the inspection report were missing from the case; the project documentation was not identified; and procedural violations had occurred [4].

The judicial outcome cannot be presented either as confirmation of the allegation or as proof of environmental safety. The precise conclusion is that Rosprirodnadzor did not prove the elements of the offence in these administrative proceedings with adequate materials.

17.2. What the court did not examine

The court did not measure:

- dust concentrations in Arshanovo and Shalginov;
- the composition of the plumes on 6 January;
- filter efficiency on the day of filming;
- residents' individual exposure;
- health effects.

The annulment of the fine does not replace these measurements.

17.3. The criminal case before the FGX units

Court materials refer to a conviction on 14 June 2019 under Article 255 of the Criminal Code for work conducted in 2015–2016 without an approved technical project and mining allotment. This episode belongs to the early history of development of the deposit and predates the two FGX-48A units. It is not used as evidence of a violation during the operation of the “dragons”, but shows the broader context in which the company developed.

17.4. What the company and authorities said

During a press tour on 6 February 2020, director Maksim Vinogradov confirmed the purchase of two units, their adjustment over several months by Chinese specialists, adjustment of the filtration equipment and the additional purchase of filters. He stated that the causes of dusting had been eliminated, filtration was operating normally, and monitoring had found no violations. The publication did not reproduce the primary reports from that monitoring.

As early as 2 October 2019, the Khakassia Ministry of Natural Resources had described insufficient secondary removal of fine dust. On 24 February 2021, the Government of Khakassia again reported clouds of black dust near Arshanovo, a visit by the acting minister and a dry coal separation unit that was found operating.

These reports form a verifiable chain:

```
complaint → visit/public response → statement that the problem was remedied → new complaint/new visit
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Completing the chain requires reports with sampling coordinates, a list of substances, results before and after repair, and documentation confirming compliance with any order.

18. Operation after 2020

A graduation thesis published in 2024 by the Khakass Technical Institute of Siberian Federal University uses load sheets and the company's operational staff logs. It lists seven shutdowns of FGX Nos. 1 and 2 in 2021–2023: start-up errors, overcurrent, earth faults and damage to 500-kilowatt motors on FGX No. 2.

The records confirm that both units remained in operation after the company's public statements in 2020. They are not emissions logs. Establishing what happened to the extraction system when the main equipment or fans stopped requires the interlock logic and original operating logs.

The current condition, actual configuration and operating mode of both FGX units as at 14 October 2026 have not been established from documents.

18.1. Seven recorded shutdowns

Date	Equipment	Event and stated cause
6 September 2021	FGX No. 2	КРУНН 1 switchgear trip; start-up error, overcurrent
1 January 2022	FGX No. 2, line 1	500 kW motor burned out; more than two starts per hour
6 June 2022	FGX No. 2, line 2	earth fault in 500 kW motor; frequent starts

Date	Equipment	Event and stated cause
29 November 2022	FGX No. 1	emergency trip of КРУНН 2 switchgear; start-up error, overcurrent
2 January 2023	FGX No. 1	emergency trip of КРУНН 2 switchgear; start-up error, overcurrent
18 March 2023	FGX No. 2	КРУНН 1 switchgear trip; start-up error, overcurrent
24 September 2023	FGX No. 1	emergency trip of КРУНН 2 switchgear; start-up error, overcurrent

The thesis does not state whether coal feeding stopped automatically when a fan was lost or how the extraction system behaved at those times. The process interlock logic should show this.

19. International experience with FGX

FGX is not a machine unique to Khakassia, nor an experiment that existed only at Mayrykhsky. The technology has been tested and used in the United States, South Africa, China, India and Poland.

19.1. What international studies establish

1. FGX can remove a proportion of heavy rock without water.
2. Performance depends on coal properties, moisture, the proportion of fines, airflow, vibration and deck inclination.
3. Separation deteriorates for material smaller than 5–6 mm.
4. The dry process avoids process-water consumption and generation of coal slurry.
5. FGX generally provides less precise separation than dense-medium processing and is not suitable for every coal.
6. A cyclone and baghouse are standard parts of the dust-laden air circuit.

19.2. The stated overseas figure of 98.9%

FGX SepTech material for a typical 250 t/h unit describes a two-stage “cyclone + baghouse” system and claims capture of 98.9% of particles. This is not a test report for an FGX-48A at Mayrykhsky, does not concern the same capacity and does not necessarily use the same metric or method. The 98.9% figure therefore cannot be compared directly with the four Mayrykhsky reports of 80.0–80.3% as a “better versus worse” ranking without full descriptions of the tests.

The international comparison has a different purpose: high-throughput dry separation does not remove the need for effective dust extraction. Dust collection is a condition of using the technology, not an optional addition.

20. Can the steppe be restored after coal mining?

Restoration is possible only as a long-term programme of work, not simply by filling a pit and sowing grass. A steppe landscape requires:

1. elimination or phased reduction of dust sources;
2. safe shaping of pit slopes, waste heaps and surface drainage;
3. replacement of fertile soil and restoration of soil structure;
4. use of native steppe species, not only fast-growing technical grasses;
5. protection of restored areas from erosion and overgrazing;
6. restoration of the water regime and water-quality monitoring;
7. long-term monitoring of vegetation, soil, dust and groundwater;
8. participation by residents and land users in defining the outcome.

International practice shows that some functions can be returned to disturbed land, but the original steppe ecosystem cannot be considered restored merely by reporting an area as reclaimed. The water regime after many years of pumping is particularly difficult: water levels may take years to recover, while oxidation of dewatered rock can continue to affect water chemistry after extraction ceases.

A detailed examination of restoration of the Koibal Steppe, including comparable projects, will be a separate study. The point to record here is that surface reclamation without a programme to restore water and independent monitoring will not remedy the full damage.

21. Contradictions and unexplained matters

Question	One version	Another version	What could resolve the contradiction
How many “dragons” were there?	early accounts refer to one or four units	the inspection report and court record two FGX-48A units, each with two lines, plus a dryer	assembly diagram, equipment data sheets and site plan
Did the FGX units operate before entry into service?	the company called the regime testing and said the units were “not in service”	the work-order log records processing from 28 December; entry into service is dated 27 January	original shift logs and commissioning records
Were filters installed?	the documents list cyclones and baghouses	insufficient secondary cleaning was officially acknowledged and an additional component was awaited	data sheets, installation certificates, pressure-drop logs and bag-replacement records
What produced each plume on 6 January?	witnesses associated them with the “dragons”	two FGX units and the dryer were operating simultaneously	site plan, precise camera views, logs and hourly wind data
Did the problem disappear after 6 February?	the director said the causes had been eliminated	on 24 February 2021, the authorities again reported clouds of black dust and an operating unit	a long series of instrumental measurements and operating logs
Was there a violation concerning the state environmental review?	Rosprirodnadzor initiated administrative proceedings	the court terminated the case because the submitted material did not establish the elements of an offence	the complete administrative file with all 64 appendices and the full permit register
Was phenol present in atmospheric emissions from the FGX units?	publications made this claim	no primary atmospheric report was found; phenol appears in water monitoring	the original air-sampling report with coordinates and method
What was the facility's contribution to illness?	complaints and adverse district statistics exist	there are no settlement-level data or exposure series	village-level data, occupational history, air monitoring and an epidemiological design

22. What is established, what is refuted, and what is missing

22.1. Established

- two FGX-48A units and a separate dryer existed at the same time;
- both FGX units processed coal before the date of their formal entry into service;
- secondary removal of fine dust during commissioning was officially acknowledged as insufficient;
- four measurements on 21 January showed 80.0–80.3% collection and a non-zero residual emission;
- the project allowed for residual fine-particle emissions during normal operation of the cleaning system;
- there were no regular air observations in Arshanovo;
- residents reported dust and consequences for their livelihoods before and after the FGX units appeared;
- on 6 January, Natalia filmed several visible plumes, while production documents record that the equipment was operating;
- the FGX units continued to be used after 2020;
- mine-water pumping created a large merged drawdown cone;
- district statistics contain adverse health indicators;
- the mechanism for expropriation “for state needs” was used in the interests of licensed subsoil use by a private company.

22.2. Simplifications that have been refuted or corrected

- an FGX is not a drying unit;
- the site had not four FGX-48A units, but two, each with two lines;
- 80% does not mean zero emissions and is not a demonstrated constant efficiency;
- 94.477429 t/year is not a measured emission from two “dragons”, but the projected total for the whole coal-loading facility;
- annulment of the fine does not mean that the court found the air safe;
- phenol in water monitoring does not establish phenol in an FGX atmospheric plume;
- a visible black plume is not, by itself, a numerical exceedance of a maximum permissible concentration.

22.3. Not published or not found

- data sheets for the two specific FGX units and filters;
- the complete administrative file with 64 appendices;
- continuous filter and extraction-system logs;
- actual annual emissions from each source;
- hourly PM10 and PM2.5 measurements in Arshanovo and Shalginov;
- the primary atmospheric report concerning phenol;
- settlement-level health statistics;
- the complete water balance and a digital groundwater model;
- the current condition and configuration of the two FGX units.

23. What the company and authorities should provide

Company

- data sheets for the FGX units, cyclones, baghouses and fans;
- certificates covering installation, commissioning, entry into service and modernisation;
- logs of operation, repairs, pressure drop and bag replacement;
- industrial environmental monitoring reports;
- actual annual emissions and data on abnormal operating conditions;
- the programme and results of air, water, soil and waste monitoring;
- documentation showing compliance with orders.

Rosprirodnadzor

- Inspection Report No. АВ3НТ-028-в with all appendices;
- the report and decision in Case No. АВ3НТ-028-059-20;
- photographs, video and laboratory materials from the inspection;
- information on the adverse environmental impact facility, inventory, limits and permits;
- subsequent inspections and verification that violations were remedied.

Roshydromet and regional authorities

- results of any route-based and stationary observations;
- the justification for the absence of a station in Arshanovo and Shalginov;
- hourly meteorological data for the dates of complaints;
- the plan for the territorial monitoring network.

Rospotrebnadzor and health authorities

- anonymised indicators for Arshanovo and Shalginov;
- public-health and environmental monitoring data;
- results of tests of air, water, soil and food products;
- ambulance-call and healthcare-attendance data during pollution episodes;
- age-standardised indicators, rather than only crude rates.

Subsoil-use and water-control authorities

- annual site-specific subsurface-monitoring reports;
- coordinates and construction of monitoring wells;
- the complete water balance, permits and discharge reports;
- a forecast of water-level recovery after pumping is reduced.

23.1. Request to the manufacturer

On 14 October 2026, Natalia sent Tangshan Shenzhou Manufacturing Group a journalistic enquiry in Chinese and English with a link to the video. The questions concern the manufacture and supply of the two units, their original configuration, dust-collection requirements, test results and possible causes of the visible emissions. The manufacturer was also asked to identify the equipment and sources of the plumes in the recording.

The enquiry was sent to `shenzhou@tsshenzhou.com`, with copies to `huangtao@tsshenzhou.com` and `locke@tsshenzhou.com`. The editorial response period proposed in the letter was 14 calendar days after receipt; it is not a period established by law. As at 14 October 2026, no response had been received.

23.2. Checking Natalia's memory

A separate matrix compares Natalia's current recollection with the documents, without rewriting the past retrospectively:

Element of memory	Documentary check	Preliminary result
Natalia filmed a “coal dragon” on 6 January 2020	original files, metadata register and inspection report recording operation of both FGX units and the dryer	`[CONFIRMED]`
Two simultaneous plumes were visible at the site	original video recording and still frame	`[CONFIRMED BY THE IMAGE]`
Each plume came specifically from an FGX unit	FGX units and the dryer were operating simultaneously; precise reconstruction of the view is not complete	`[INSUFFICIENT DOCUMENTATION FOR EACH PLUME]`
The units generated dust while the filters were being adjusted	the Ministry and the company acknowledged insufficient secondary cleaning/adjustment; the video records a visible episode	`[CONFIRMED IN GENERAL]`
The airborne plume contained phenol	no atmospheric report was found	`[NOT CONFIRMED]`
Extraction and mine-water pumping were changing the steppe	state bulletins record the merged cone and increased pumping	`[CONFIRMED]`

This table will be refined only on the basis of sources. An error in one detail does not invalidate confirmed testimony; confirmation of the overall event does not automatically confirm every previous interpretation.

24. Conclusion

The story of the “coal dragons” cannot be reduced to a striking name and a black plume on a video. The documents reveal a specific industrial system: two enormous dry coal separation units, four operating lines, cyclones, baghouses, fans, stockpiles, transfer points and a separate dryer.

They also reveal a specific period: the equipment was already processing coal while the secondary removal of fine dust was still being adjusted. Both FGX units and the dryer were operating on 6 January 2020. Fifteen days later, the laboratory measured approximately 80% collection efficiency and a non-zero residual emission on each line. The project had already allowed for emissions of PM10, PM2.5 and coal dust even when the cleaning system was operating normally.

People did not see the consequences in a project table. They saw dust on snow, grass, water, animals and washing. They spoke about it before the FGX units and continued to speak after they began operating. State documents recorded the complaints, while the hydrometeorological certificate recorded the absence of regular air observations in Arshanovo [1, vol. 2, PDF p. 31]. No continuous series of measurements near homes was found in the public domain; the existence of individual one-off samples and where they are retained remain to be established.

The central gap in this story is therefore not a lack of testimony. There is a great deal of testimony. The necessary linked data are not accessible: the company was required to carry out industrial environmental monitoring [23]; Rosprirodnadzor to exercise supervision and retain inspection material created or received within its remit [25]; Roshydromet and regional authorities to organise the relevant air-observation systems [24]; Rospotrebnadzor to conduct public-health and environmental monitoring [26]; and health authorities to compile health statistics while protecting personal data.

Article 42 of the Constitution of the Russian Federation guarantees the right to reliable information about the state of the environment [21]. Article 4.3 of Federal Law No. 7-FZ, in force since 2021, establishes the public accessibility of environmental information and rules for its provision and publication [22]. It is not applied retrospectively to assess events in 2019–2020, but it defines the requirement that this information be accessible today. The general remit of public authorities does not mean automatic publication of every internal log: it is necessary to establish what information was created, who holds it and how it can be obtained.

The absence of accessible measurements does not demonstrate that the emissions were safe. If measurements were made, the holder of the results and the access procedure must be identified. If necessary measurements were not made, a separate question arises: who was responsible for carrying them out, and why were residents left without those data?

Six years later, the documents allow much to be called by its proper name. Commissioning involved actual coal processing. The filters did not eliminate emissions completely. Judicial annulment of the fine was not proof of safety. Private coal extraction gained access to a legal mechanism for taking land “for state needs”. Mine-water pumping reconfigured groundwater flow across tens of square kilometres. Residents still did not receive a complete answer about the air they breathed.

For Natalia, this story remains personal also because Khakassia is her homeland. But the report's evidence does not rest on the strength of personal feeling. It rests on the reader's ability to open an inspection report, laboratory report, project document, video or court decision and see where every material claim came from.

Appendix A. Population health tables, 2016–2025

The tables reproduce the district time series already prepared, without a new recalculation. The indicators relate to Altaisky and Beysky districts and the Republic of Khakassia; the official tables used do not distinguish individual villages.

A.1. Overall morbidity, cases per 1,000 population

Year	Altaisky District	Beysky District	Khakassia
2016	1,249.5	1,331.3	1,618.7
2017	1,302.1	1,358.3	1,713.7
2018	1,365.8	1,348.9	1,711.0
2019	1,342.9	1,317.9	1,704.5
2020	1,159.8	1,254.4	1,526.3
2021	1,138.0	1,253.3	1,643.3
2022	1,309.6	1,420.6	1,682.1
2023	1,891.5	1,253.8	1,627.9
2024	1,343.0	1,303.7	1,625.5
2025	1,494.8	1,284.0	1,613.5

A.2. Respiratory diseases, cases per 1,000 population

Year	Altaisky District	Beysky District	Khakassia
2016	264.3	305.1	381.6
2017	277.4	317.1	410.0
2018	302.8	301.4	405.6
2019	291.6	295.3	415.8
2020	304.5	277.5	400.5

Year	Altaisky District	Beysky District	Khakassia
2021	no numerical district table	no numerical district table	no comparable value
2022	324.2	313.9	436.6
2023	591.8	305.6	418.8
2024	416.8	327.8	423.9
2025	370.1	317.7	398.7

A.3. Circulatory diseases, cases per 1,000 population

Year	Altaisky District	Beysky District	Khakassia
2016	186.1	154.8	210.4
2017	191.3	165.4	208.3
2018	196.0	165.3	214.0
2019	196.0	170.1	228.1
2020	159.6	187.5	201.9
2021	162.6	191.2	exact value not established[1]
2022	167.1	203.7	212.5
2023	312.9	199.9 / 200.0[2]	246.2
2024	219.4 / 212.4[3]	214.1	243.0
2025	190.5	235.1	245.7

Notes to Table A.3

1. **Khakassia, 2021:** the exact value has not been established. The 2021 state report, PDF pp. 140–141 gives overall primary morbidity in Table 4.2.3 and the share of circulatory diseases in the morbidity structure (12.2%) in Figure 4.1.3, but not the exact prevalence of this class per 1,000 population.
2. **Beysky District, 2023:** 199.9 comes from the 2023 state report, PDF p. 145, Table 4.2.3; 200.0 comes from the updated regional cardiovascular-disease programme, Table 13.

3. **Altaisky District, 2024:** 219.4 comes from the 2024 state report, PDF p. 151, Table 4.2.3; 212.4 comes from the updated regional cardiovascular-disease programme, Table 13. The reason for the discrepancy between the official documents is not explained; both values are retained.

A.4. Mortality from circulatory diseases, per 100,000 population

Year	Altaisky District	Beysky District	Khakassia
2021	541.8	781.4	614.7
2022	546.8	777.1	599.1
2023	560.8	891.2	601.3
2024	583.5	848.0	599.6
2025	705.7	881.8	592.8

A.5. Incidence of malignant neoplasms, crude rate per 100,000 population

Year	Altaisky District	Beysky District	Khakassia
2016	391.7	495.5	409.5
2017	405.4	460.6	413.5
2018	363.0	414.2	429.3
2019	419.5	425.7	418.2
2020	303.9	407.9	398.8
2021	286.8	399.7	402.1
2022	362.3	467.0	408.0
2023	361.0	503.5	412.1
2024	478.9	394.3	420.8
2025	573.1	553.6	488.8

A.6. Mortality from malignant neoplasms, crude rate per 100,000 population

Year	Altaisky District	Beysky District	Khakassia
2016	246.4	263.7	215.7
2017	204.6	335.5	223.2
2018	221.7	285.1	211.6
2019	224.5	297.4	227.8
2020	199.0	334.7	227.3
2021	155.4	226.7	212.9
2022	153.0	236.6	203.0
2023	203.1	331.7	194.6
2024	194.1	291.1	210.9
2025	260.9	248.6	211.4

Sources for the time series: state reports on the environment in the Republic of Khakassia for 2016–2025 and updated regional programmes from 2026. Exact links, years, pages and table numbers are given in Sources 15–16.

Appendix B. Facsimiles of Laboratory Reports Nos. 5–8/Х-Э ПВ

The four two-page reports issued by Analitik LLC are reproduced from Appendix P to Volume 2 of the environmental impact assessment for Project `390-909-19`. Samples were collected on 21 January 2020, testing was completed on 24 January, and the reports were issued on 27 January 2020. Their results are summarised in Table 7.3 of the main text.

Технически компетентная и независимая испытательная лаборатория ООО "Аналитик"
Уникальный номер записи об аккредитации в реестре аккредитованных лиц № RA.RU.21ПФ67
Дата внесения сведений в реестр аккредитованных лиц 08.04.2016
Лицензия на осуществление деятельности, связанной с использованием
возбудителей инфекционных заболеваний №19.01.01.001.Л.000032.02.08 от 21.02.2008
Юридический адрес: 655002, Россия, Республика Хакасия, г. Абакан, ул. Таштыпская, д. 04

Адреса мест осуществления деятельности:
655002, Россия, Республика Хакасия,
г. Абакан, ул. Таштыпская, д. 04;
тел. 8(3902) 305316, 305481, 305317
sirius97@narod.ru

УТВЕРЖДАЮ
Руководитель испытательной лаборатории
_____ Н.В. Маклецова
«27» 01 2020 г.

ПРОТОКОЛ ИСПЫТАНИЙ № 5 /Х-Э ПВ от « 27 » января 2020 г.
проб промышленных выбросов

Наименование и адрес заказчика ***Общество с ограниченной ответственностью "Угольная компания "Разрез Майрыхский"", ООО "УК "Разрез Майрыхский", РФ, Республика Хакасия, Алтайский район, Аршановский с/с, территория разреза Майрыхский, стр. 1***

Место отбора проб, проведения измерений ***ООО "УК "Разрез Майрыхский", РХ, Алтайский район, в 7,5 км северо-восточнее с. Аршаново, Углепогрузочный пункт, установка FGX-48 (1) 1-я линия***

Основание проведения измерений и испытаний: ***договор №066-Э от 21.03.2017, заявление № 53 от 05.11.2019, техническое задание (план) № 006/066-Э от 17.01.2020***

Акт отбора проб*	*№ 5/Х-Э ПВ от 21.01.2020*		
Дата отбора проб*	*21.01.2020*	Время отбора проб*	*11^{00} - 11^{30}*
Дата доставки проб*	*21.01.2020*	Время доставки проб*	*15^{00}*
Номер направления	*3836*	Дата направления	*21.01.2020*

НД на отбор проб: ***ПНД Ф 12.1.1-99, ПНД Ф 12.1.2-99***

Климатические условия окружающей среды при отборе проб: ***давление $_{атм.}$ 737 мм.рт.ст., температура минус 13 °С, влажность 27 %;***

Условия проведения испытаний: ***температура 15 - 25 °С, влажность 30 - 75%***

Дата начала испытаний ***21.01.2020*** Время начала испытаний ***15^{10}***

Дата окончания испытаний ***24.01.2020***

Средства измерений, используемые при отборе проб, измерениях, указаны в акте отбора проб.

Дополнительные сведения: -

Таблица № 1 – ***Параметры газопылевых потоков***

Наименование источника загрязнения (шифр)	Температура газа, °С, T±Δ, P=0,95	Давление, разрежение газа, мм.рт.ст., P±Δ, P = 0,95	Скорость газа, м/с, v±Δ, P = 0,95	Объемный расход газа, приведенный к н.у. м³/с, V ±Δ, P = 0,95	Методика (шифр НД)
Вход в ГОУ № 1 (5.1.01.20.1.6)	-3 ± 2	-0,81 ± 0,05	9,20 ± 0,74	8,57 ± 0,86	ГОСТ 17.2.4.06-90 Охрана природы. Атмосфера. Методы определения скорости и расхода газопылевых потоков, отходящих от стационарных источников загрязнения ГОСТ 17.2.4.07-90 Охрана природы. Атмосфера. Методы определения давления и температуры газопылевых потоков, отходящих от стационарных источников загрязнения Руководство по измерению основных параметров и определению запыленности пылегазовых потоков на источниках выбросов загрязняющих веществ в атмосферу. 2002г. Разработано ФГУП МНИИЭКО ТЭК, город Пермь. Согласовано НИИ «Атмосфера»
Выход из ГОУ № 1 (5.2.01.20.1.6)	-2 ± 2	0,15 ± 0,01	12,40 ± 0,99	9,50 ± 0,95	

Таблица № 2 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовая концентрация, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (5.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,339 ± 0,085	ГОСТ 33007-2014 Оборудование газоочистное и пылеулавливающее. Методы определения запыленности газовых потоков. Общие технические требования и методы контроля
Выход из ГОУ №1 (5.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,061 ± 0,015	

Таблица № 3 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовый выброс загрязняющих веществ, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (5.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	2,906 ± 0,785	Методические указания по оценке эффективности газоочистных установок. Разработчик МНИИЭКО, Государственный комитет по охране окружающей среды Пермской области. ТЭК, город Пермь 2000г. Утверждена Председателем Госкомэкологии Пермской области В.В.Казанцевым 07.12.2000г.
Выход из ГОУ №1 (5.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	0,577 ± 0,156	
Эффективность работы ГОУ (степень очистки)			80,1 %	Приказ Министерства природных ресурсов и экологии Российской Федерации (Минприроды России) №498 от 15.09.2017, зарегистрирован за номером 49549 от 09.01.2018., пункт 13

* в том числе измерения физических факторов

Руководитель отдела физико-химических испытаний и измерений _____ *А.М. Шушеначева*

Ответственный за оформление протокола _____ *Т.А. Долмат*

Примечание: Лаборатория несет ответственность за правильность отбора проб и проведение измерений.
Данный протокол испытаний и измерений касается только образцов подвергнутых этим испытаниям и измерениям.
Запрещается частичное или полное копирование, перепечатка протокола без разрешения ИЛ ООО "Аналитик". Отпечатано в 2-х экз.

ИЛ ООО «АНАЛИТИК» - ФОРМА-2/11
стр. 1 из 2 протокола испытаний № 6 /Х-Э ПВ от 27.01.2020

Технически компетентная и независимая испытательная лаборатория ООО "Аналитик"
Уникальный номер записи об аккредитации в реестре аккредитованных лиц № RA.RU.21ПФ67
Дата внесения сведений в реестр аккредитованных лиц 08.04.2016
Лицензия на осуществление деятельности, связанной с использованием
возбудителей инфекционных заболеваний №19.01.01.001.Л.000032.02.08 от 21.02.2008
Юридический адрес: 655002, Россия, Республика Хакасия, г. Абакан, ул. Таштыпская, д. 04

Адреса мест осуществления деятельности:
655002, Россия, Республика Хакасия,
г. Абакан, ул. Таштыпская, д. 04;
тел. 8(3902) 305316, 305481, 305317
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УТВЕРЖДАЮ
Руководитель испытательной лаборатории
_____ Т.Н. Маклецова
«27» 01 2020 г.

ПРОТОКОЛ ИСПЫТАНИЙ № 6 /Х-Э ПВ от «27» января 2020 г.
проб промышленных выбросов

Наименование и адрес заказчика ***Общество с ограниченной ответственностью "Угольная компания "Разрез Майрыхский"", ООО "УК "Разрез Майрыхский", РФ, Республика Хакасия, Алтайский район, Аршановский с/с, территория разреза Майрыхский, стр. 1***

Место отбора проб, проведения измерений ***ООО "УК "Разрез Майрыхский", РХ, Алтайский район, в 7,5 км северо-восточнее с. Аршаново, Углепогрузочный пункт, установка FGX-48 (1) 2-я линия***

Основание проведения измерений и испытаний: ***договор №066-Э от 21.03.2017, заявление № 58 от 20.01.2020, техническое задание (план) № 010/066-Э от 20.01.2020***

Акт отбора проб*	*№ 6/Х-Э ПВ от 21.01.2020*		
Дата отбора проб*	*21.01.2020*	Время отбора проб*	*11^{35} - 12^{05}*
Дата доставки проб*	*21.01.2020*	Время доставки проб*	*15^{00}*
Номер направления	*169*	Дата направления	*21.01.2020*

НД на отбор проб: ***ПНД Ф 12.1.1-99, ПНД Ф 12.1.2-99***

Климатические условия окружающей среды при отборе проб: ***давление $_{атм.}$ 737 мм.рт.ст., температура минус 13 °С , влажность 27 %;***

Условия проведения испытаний: ***температура 15 - 25 °С, влажность 30 - 75%***

Дата начала испытаний	*21.01.2020*	Время начала испытаний	*15^{10}*
Дата окончания испытаний	*24.01.2020*		

Средства измерений, используемые при отборе проб, измерениях, указаны в акте отбора проб.

Дополнительные сведения: -

ИЛ ООО «АНАЛИТИК» - ФОРМА-2/11
стр. 2 из 2 протокола испытаний № 6 /Х-Э ПВ от 27.01.2020

Таблица № 1 – ***Параметры газопылевых потоков***

Наименование источника загрязнения (шифр)	Температура газа, °С, T±Δ, P=0,95	Давление, разрежение газа, мм.рт.ст., P±Δ, P = 0,95	Скорость газа, м/с, v±Δ, P = 0,95	Объемный расход газа, приведенный к н.у. м³/с, V ±Δ, P = 0,95	Методика (шифр НД)
Вход в ГОУ № 1 (6.1.01.20.1.6)	-3 ± 2	-0,88 ± 0,05	9,30 ± 0,74	8,67 ± 0,87	ГОСТ 17.2.4.06-90 Охрана природы. Атмосфера. Методы определения скорости и расхода газопылевых потоков, отходящих от стационарных источников загрязнения ГОСТ 17.2.4.07-90 Охрана природы. Атмосфера. Методы определения давления и температуры газопылевых потоков, отходящих от стационарных источников загрязнения Руководство по измерению основных параметров и определению запыленности пылегазовых потоков на источниках выбросов загрязняющих веществ в атмосферу. 2002г. Разработано ФГУП МНИИЭКО ТЭК, город Пермь. Согласовано НИИ «Атмосфера»
Выход из ГОУ № 1 (6.2.01.20.1.6)	-2 ± 2	0,15 ± 0,01	12,30 ± 0,98	9,42 ± 0,94	

Таблица № 2 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовая концентрация, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (6.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,302 ± 0,075	ГОСТ 33007-2014 Оборудование газоочистное и пылеулавливающее. Методы определения запыленности газовых потоков. Общие технические требования и методы контроля
Выход из ГОУ №1 (6.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,056 ± 0,014	

Таблица № 3 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовый выброс загрязняющих веществ, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (6.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	2,618 ± 0,707	Методические указания по оценке эффективности газоочистных установок. Разработчик МНИИЭКО, Государственный комитет по охране окружающей среды Пермской области. ТЭК, город Пермь 2000г. Утверждена Председателем Госкомэкологии Пермской области В.В.Казанцевым 07.12.2000г.
Выход из ГОУ №1 (6.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	0,525 ± 0,142	
Эффективность работы ГОУ (степень очистки)			80,0 %	Приказ Министерства природных ресурсов и экологии Российской Федерации (Минприроды России) №498 от 15.09.2017, зарегистрирован за номером 49549 от 09.01.2018., пункт 13

* в том числе измерения физических факторов

Руководитель отдела физико-химических испытаний и измерений _____ *А.М. Шушеначева*

Ответственный за оформление протокола _____ *Т.А. Долмат*

Примечание: Лаборатория несет ответственность за правильность отбора проб и проведение измерений.
Данный протокол испытаний и измерений касается только образцов подвергнутых этим испытаниям и измерениям.
Запрещается частичное или полное копирование, перепечатка протокола без разрешения ИЛ ООО "Аналитик". Отпечатано в 2-х экз.

ИЛ ООО «АНАЛИТИК» - ФОРМА-2/11
стр. 1 из 2 протокола испытаний № 7 /Х-Э ПВ от 27.01.2020

Технически компетентная и независимая испытательная лаборатория ООО "Аналитик"
Уникальный номер записи об аккредитации в реестре аккредитованных лиц № RA.RU.21ПФ67
Дата внесения сведений в реестр аккредитованных лиц 08.04.2016
Лицензия на осуществление деятельности, связанной с использованием
возбудителей инфекционных заболеваний №19.01.01.001.Л.000032.02.08 от 21.02.2008
Юридический адрес: 655002, Россия, Республика Хакасия, г. Абакан, ул. Таштыпская, д. 04

Адреса мест осуществления деятельности:
655002, Россия, Республика Хакасия,
г. Абакан, ул. Таштыпская, д. 04;
тел. 8(3902) 305316, 305481, 305317
sirius97@narod.ru

УТВЕРЖДАЮ
Руководитель испытательной лаборатории
Н.В. Макацова
«01» 2020 г.

ПРОТОКОЛ ИСПЫТАНИЙ № 7 /Х-Э ПВ от «27» января 2020 г.
проб промышленных выбросов

Наименование и адрес заказчика ***Общество с ограниченной ответственностью "Угольная компания "Разрез Майрыхский"", ООО "УК "Разрез Майрыхский", РФ, Республика Хакасия, Алтайский район, Аршановский с/с, территория разреза Майрыхский, стр. 1***

Место отбора проб, проведения измерений ***ООО "УК "Разрез Майрыхский", РХ, Алтайский район, в 7,5 км северо-восточнее с. Аршаново, Углепогрузочный пункт, установка FGX-48 (2) 1-я линия***

Основание проведения измерений и испытаний***: договор №066-Э от 21.03.2017, заявление № 58 от 20.01.2020, техническое задание (план) № 010/066-Э от 20.01.2020***

Акт отбора проб*	*№ 7/Х-Э ПВ от 21.01.2020*		
Дата отбора проб*	*21.01.2020*	Время отбора проб*	*12^{45} - 13^{20}*
Дата доставки проб*	*21.01.2020*	Время доставки проб*	*15^{00}*
Номер направления	*169*	Дата направления	*21.01.2020*

НД на отбор проб: ***ПНД Ф 12.1.1-99, ПНД Ф 12.1.2-99***

Климатические условия окружающей среды при отборе проб: ***давление $_{атм.}$ 737 мм.рт.ст., температура минус 12 °С , влажность 27 %;***

Условия проведения испытаний: ***температура 15 - 25 °С, влажность 30 - 75%***

Дата начала испытаний ***21.01.2020*** Время начала испытаний ***15^{10}***

Дата окончания испытаний ***24.01.2020***

Средства измерений, используемые при отборе проб, измерениях, указаны в акте отбора проб.

Дополнительные сведения: -

Таблица № 1 – ***Параметры газопылевых потоков***

Наименование источника загрязнения (шифр)	Температура газа, °С, T±Δ, P=0,95	Давление, разрежение газа, мм.рт.ст., P±Δ, P = 0,95	Скорость газа, м/с, v±Δ, P = 0,95	Объемный расход газа, приведенный к н.у. м³/с, V ±Δ, P = 0,95	Методика (шифр НД)
Вход в ГОУ № 1 (7.1.01.20.1.6)	-3 ± 2	-0,74 ± 0,04	9,00 ± 0,72	8,39 ± 0,84	ГОСТ 17.2.4.06-90 Охрана природы. Атмосфера. Методы определения скорости и расхода газопылевых потоков, отходящих от стационарных источников загрязнения ГОСТ 17.2.4.07-90 Охрана природы. Атмосфера. Методы определения давления и температуры газопылевых потоков, отходящих от стационарных источников загрязнения Руководство по измерению основных параметров и определению запыленности пылегазовых потоков на источниках выбросов загрязняющих веществ в атмосферу. 2002г. Разработано ФГУП МНИИЭКО ТЭК, город Пермь. Согласовано НИИ «Атмосфера»
Выход из ГОУ № 1 (7.2.01.20.1.6)	-2 ± 2	0,22 ± 0,01	11,90 ± 0,95	9,12 ± 0,91	

Таблица № 2 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовая концентрация, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (7.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,322 ± 0,080	ГОСТ 33007-2014 Оборудование газоочистное и пылеулавливающее. Методы определения запыленности газовых потоков. Общие технические требования и методы контроля
Выход из ГОУ №1 (7.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,058 ± 0,015	

Таблица № 3 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовый выброс загрязняющих веществ, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (7.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	2,700 ± 0,729	Методические указания по оценке эффективности газоочистных установок. Разработчик МНИИЭКО, Государственный комитет по охране окружающей среды Пермской области. ТЭК, город Пермь 2000г. Утверждена Председателем Госкомэкологии Пермской области В.В.Казанцевым 07.12.2000г.
Выход из ГОУ №1 (7.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	0,533 ± 0,144	
Эффективность работы ГОУ (степень очистки)			80,3 %	Приказ Министерства природных ресурсов и экологии Российской Федерации (Минприроды России) №498 от 15.09.2017, зарегистрирован за номером 49549 от 09.01.2018., пункт 13

* в том числе измерения физических факторов

Руководитель отдела физико-химических испытаний и измерений _____ *А.М. Шушеначева*

Ответственный за оформление протокола _____ *Т.А. Долмат*

Примечание: Лаборатория несет ответственность за правильность отбора проб и проведение измерений.
Данный протокол испытаний и измерений касается только образцов подвергнутых этим испытаниям и измерениям.
Запрещается частичное или полное копирование, перепечатка протокола без разрешения ИЛ ООО "Аналитик". Отпечатано в 2-х экз.

ИЛ ООО «АНАЛИТИК» - ФОРМА-2/11
стр. 1 из 2 протокола испытаний № 8 /Х-Э ПВ от 27.01.2020

Технически компетентная и независимая испытательная лаборатория ООО "Аналитик"
Уникальный номер записи об аккредитации в реестре аккредитованных лиц № RA.RU.21ПФ67
Дата внесения сведений в реестр аккредитованных лиц 08.04.2016
Лицензия на осуществление деятельности, связанной с использованием
возбудителей инфекционных заболеваний №19.01.01.001.Л.000032.02.08 от 21.02.2008
Юридический адрес: 655002, Россия, Республика Хакасия, г. Абакан, ул. Таштыпская, д. 04

Адреса мест осуществления деятельности:
655002, Россия, Республика Хакасия,
г. Абакан, ул. Таштыпская, д. 04;
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УТВЕРЖДАЮ
Руководитель испытательной лаборатории
_____ Н.В. Макецова
«27» 01 2020 г.

ПРОТОКОЛ ИСПЫТАНИЙ № 8 /Х-Э ПВ от «27» января 2020 г.
проб промышленных выбросов

Наименование и адрес заказчика ***Общество с ограниченной ответственностью "Угольная компания "Разрез Майрыхский"", ООО "УК "Разрез Майрыхский", РФ, Республика Хакасия, Алтайский район, Аршановский с/с, территория разреза Майрыхский, стр. 1***

Место отбора проб, проведения измерений ***ООО "УК "Разрез Майрыхский", РХ, Алтайский район, в 7,5 км северо-восточнее с. Аршаново, Углепогрузочный пункт, установка FGX-48 (2) 2-я линия***

Основание проведения измерений и испытаний***: договор №066-Э от 21.03.2017, заявление № 58 от 20.01.2020, техническое задание (план) № 010/066-Э от 20.01.2020***

Акт отбора проб*	*№ 8/Х-Э ПВ от 21.01.2020*		
Дата отбора проб*	*21.01.2020*	Время отбора проб*	*12^{10} - 12^{40}*
Дата доставки проб*	*21.01.2020*	Время доставки проб*	*15^{00}*
Номер направления	*169*	Дата направления	*21.01.2020*

НД на отбор проб: ***ПНД Ф 12.1.1-99, ПНД Ф 12.1.2-99***

Климатические условия окружающей среды при отборе проб: ***давление атм. 737 мм.рт.ст., температура минус 12 °С, влажность 27 %;***

Условия проведения испытаний: ***температура 15 - 25 °С, влажность 30 - 75%***

Дата начала испытаний ***21.01.2020*** Время начала испытаний ***15^{10}***

Дата окончания испытаний ***24.01.2020***

Средства измерений, используемые при отборе проб, измерениях, указаны в акте отбора проб.

Дополнительные сведения: -

ИЛ ООО «АНАЛИТИК» - ФОРМА-2/11
стр. 2 из 2 протокола испытаний № 8 /Х-Э ПВ от 27.01.2020

Таблица № 1 – ***Параметры газопылевых потоков***

Наименование источника загрязнения (шифр)	Температура газа, °С, T±Δ, P=0,95	Давление, разрежение газа, мм.рт.ст., P±Δ, P = 0,95	Скорость газа, м/с, v±Δ, P = 0,95	Объемный расход газа, приведенный к н.у. м³/с, V ±Δ, P = 0,95	Методика (шифр НД)
Вход в ГОУ № 1 (8.1.01.20.1.6)	-3 ± 2	-0,81 ± 0,05	9,30 ± 0,74	8,67 ± 0,87	ГОСТ 17.2.4.06-90 Охрана природы. Атмосфера. Методы определения скорости и расхода газопылевых потоков, отходящих от стационарных источников загрязнения ГОСТ 17.2.4.07-90 Охрана природы. Атмосфера. Методы определения давления и температуры газопылевых потоков, отходящих от стационарных источников загрязнения Руководство по измерению основных параметров и определению запыленности пылегазовых потоков на источниках выбросов загрязняющих веществ в атмосферу. 2002г. Разработано ФГУП МНИИЭКО ТЭК, город Пермь. Согласовано НИИ «Атмосфера»
Выход из ГОУ № 1 (8.2.01.20.1.6)	-2 ± 2	0,15 ± 0,01	12,30 ± 0,98	9,42 ± 0,94	

Таблица № 2 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовая концентрация, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (8.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,310 ± 0,078	ГОСТ 33007-2014 Оборудование газоочистное и пылеулавливающее. Методы определения запыленности газовых потоков. Общие технические требования и методы контроля
Выход из ГОУ №1 (8.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/м³	0,057 ± 0,014	

Таблица № 3 – ***Результаты испытаний***

Наименование источника загрязнения (шифр)	Наименование загрязняющего вещества	Единицы измерения	Массовый выброс загрязняющих веществ, ± Δ, P = 0,95	НД на методы измерений, испытаний
Вход в ГОУ №1 (8.1.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	2,689 ± 0,726	Методические указания по оценке эффективности газоочистных установок. Разработчик МНИИЭКО, Государственный комитет по охране окружающей среды Пермской области. ТЭК, город Пермь 2000г. Утверждена Председателем Госкомэкологии Пермской области В.В.Казанцевым 07.12.2000г.
Выход из ГОУ №1 (8.2.01.20.1.6)	Запыленность (массовое содержание взвешенных частиц)	г/с	0,535 ± 0,144	
Эффективность работы ГОУ (степень очистки)			80,1 %	Приказ Министерства природных ресурсов и экологии Российской Федерации (Минприроды России) №498 от 15.09.2017, зарегистрирован за номером 49549 от 09.01.2018., пункт 13

* в том числе измерения физических факторов

Руководитель отдела физико-химических испытаний и измерений _____ *А.М. Шушеначева*

Ответственный за оформление протокола _____ *Т.А. Долмат*

Примечание: Лаборатория несет ответственность за правильность отбора проб и проведение измерений.
Данный протокол испытаний и измерений касается только образцов подвергнутых этим испытаниям и измерениям.
Запрещается частичное или полное копирование, перепечатка протокола без разрешения ИЛ ООО "Аналитик". Отпечатано в 2-х экз.

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