Table 1. Chemical pollution of most concern by the mining tailings dumping permits to Repparfjord (current WFD status: Good) and Førdefjord (current WFD status: Good)

Substance	**Hazard Classification**: e.g REACH SVHC WFD P(H)Ss River basin specific poll. Norway priority list	**Volumes** to be discharged annually according to application and permit	**Risk** in the fjord environment? e.g. PBT/vPvB or acute toxic effects, spread and leakage from the tailings	**Degrading products**, sideeffects and nanoforms a concern?	**The chemical status of the fjord:** An assessment of whether the discharges will deteriorate existing "good" status and potentially cause non-compliance with the WFD, with reference to the classification system of environmental status in water bodies[1].
SIBX/Sodium Isobuthyl Xanthate	Not listed, but see statement from the Norwegian Institute of Marine Research with information and reference to scientific studies about possible hazards of the substance[2]. Very toxic to aquatic life[3]	Førdefjorden: SIBX - 2 tons per year Repparfjorden: SIBX – 100 tons per year	Persistent(P) and toxic (T). Half-life is not documented in the marine environment, but it is suggested 90 days at 4 – 7.5 °C for Repparfjorden[4]. EIA Førdefjorden: A decomposition test was unsuccessful and inconclusive, and the suggested half-life is thus rather questionable[5]	**Decomposition (abiotic)**: A number of new compounds including CS2 are known in freshwater[6]. A number of decomposition products have apparently not been tested for toxicity, except carbon disufid (CS2). **(Bio)Degradation** product carbon disulfid CS2 is highly toxic. Side effect: May make heavy metals more bioavailable by forming LSMCs (liquid-soluble metal complexes)[7]	EIA: Pore water levels of SIBX in the seabed is estimated by DNV GL to 5-10 mikrogram/L which is above the PNEC of 3,4 mikrogram/L. The EIA does not answer these questions, which were also asked by MDIR in 2019 when they demanded additional tests and assessments. Partial simulations[8] leave behind unnecessary uncertainties, and undocumented SIBX leads to underestimation of toxicity (13 in Kvellestad 2021-08-16). Moreover, it has not been evaluated potential interactions between heavy metals and SIBX in flotation and pore water, which likely will be the hot spots[9].

[1] https://www.vannportalen.no/sharepoint/downloaditem?id=01FM3LD2VURCLLL2DT6ZDZJMYFYDFO5QUU
[2] Statement from the Norwegian Institute of Marine Research to the Norwegian Directorate of Minerals, 4 October 2019: https://www.hi.no/resources/Horing-Driftskonsesjonen-til-Nordic-Mining-i-Fordefjorden-1.pdf
[3] REACH dossier for Sodium O-isobutyl dithiocarbonate: https://echa.europa.eu/brief-profile/-/briefprofile/100.042.536
[4] Section 13.3 in Kvellestad 2021.
[5] Section 13.3 in Kvellestad 2021.
[6] Section 12.4 in Kvellestad 2021.
[7] LSMCs: «... in a small number of studies it has been shown that toxicity and bioavailability of lipid soluble metal complexes may exceed that of the equivalent free metal ion species. Some toxicity data has shown that these lipid soluble metal complexes can be up to 25 times more toxic than free metal ions. LMSC are chemical complexes containing a metal and a biotic ligand. The nature of the LMSC means that it readily traverses membranes» (Kilgore 2014) (12.6 in Kvellestad 2021-08-16).
[8] Testing requires well-defined products of known purity. It is not reported control of purity of SIBX used in the tests. However, start concentrations were detected in a decomposition and a binding-leakage test with an improved analytical method. But not in a test for 'chronic' toxicity. Particularly flotation and deposition should be simulated well in tests with SIBX. Magnafloc 5250 was not included in any test. There was no adequate total simulation in any test. EIA Førdefjorden: A claimed PNEC of 3,4 mikrogram/L is too high because the test lasted for only 6 days and because it was used test chemical of unknown purity (13.5.4 in Kvellestad 2021-08-16).
[9] DNV GL demonstrates minor understanding of the chemical interactions between SIBX and heavy metals (13.4.4 in Kvellestad 2021-08-16).

Substance	**Hazard Classification**: e.g REACH SVHC WFD P(H)Ss River basin specific poll. Norway priority list	**Volumes** to be discharged annually according to application and permit	**Risk** in the fjord environment? e.g. PBT/vPvB or acute toxic effects, spread and leakage from the tailings	**Degrading products**, sideeffects and nanoforms a concern?	**The chemical status of the fjord:** An assessment of whether the discharges will deteriorate existing "good" status and potentially cause non-compliance with the WFD, with reference to the classification system of environmental status in water bodies[1].
Copper (Cu)	WFD River basin sp. Norway Very toxic to marine life and bioaccumulating in some organisms.	Repparfjord: 1400 tonnes[10]	P, slightly Bioaccumulating (B) and acutely T. Secondary poisoning possible. Can expect both toxic and behavioural effects. Repparfjord: Laboratory tests show leakage to water column far exceeding PNEC and EQS	Fish are sensitive to Cu concentrations (smell) far below the toxic effect level, and respond by e.g escape mechanisms, this could disturb river salmon and cod spawning e.g. in both fjords by dramatically altering the chemical smell cues of the fjord.	In the Førdefjord tailings have CU conc up to the double of natural sediment. Some leakage expected. In The Repparfjord (Copper mine) far above background and also above the EQSsed of 84mg/kg dw, up to 700mg/kg (!) dw For Repparfjord: ecotox tests show that pore water in seabed would be acutely toxic to most marine test organisms of relevance.
Zink (Zn)	WFD River basin sp. Norway	Førdefjorden: Repparfjorden:	Zink is probably the substance most likely to make water quality challenges in the Førdefjord, looking at estimated leakage rates.		In the Førdefjord the tailings have Zink levels up to above 200 mikrogram/kg which is a doubling of present sediment, and above the EQSsed of 139 mg/kg TS. Also water is expected to reach "poor".
Nickel	WFD PS	Repparfjorden: 240 tonnes			In the Repparfjord the tailing is expected to have Nickel concentrations of up to 400 mg/kg dw which is far above the EQS of 42 mg/kg dw
Cadmium (Cd)	WFD PS Priority Haz Substance REACH SVHC & Annex XVII Norway priority list	Førdefjord: 130 (400) kg Cd annually in the tailings dumped in the fjord			NIFES (now IMR) thinks Cd may accumulate in marine organisms, despite no measurable deterioration of EQS, since there was observed leakage in experiments with the mining tailings. EQS Cd=2,5mg/kg dw
Chromium	WFD River basin sp. Norway Norway Priority list	Repparfjord: 588 tonnes			
Lead	WFD PS				
Microplastics	Not listed Unwanted pollution.	Not known. From general industry information it would be about 0.2g plastic pr m3 of disposed	Persistant, Bioaccumulating. Effects not well known, but see recent research from the	Some plastics contain chemicals, depends on the brands of blasting materials used in the mines.	Would give significant visual and ecologically relevant contribution to beach littering in that fjord compartment if plastic has positive buoyancy. Will aggregate over years.

[10] Gruvedrift ved Repparfjorden – gjennomgang av utredninger om samfunnsmessige konsekvenser, Vista Analyse, Karin Ibenholt, Ingeborg Rasmussen og John Magne Skjelvik, 2016/26, see page 4: http://gruve.info/gruveslamrepparfjorden.pdf

Substance	**Hazard Classification**: e.g REACH SVHC WFD P(H)Ss River basin specific poll. Norway priority list	**Volumes** to be discharged annually according to application and permit	**Risk** in the fjord environment? e.g. PBT/vPvB or acute toxic effects, spread and leakage from the tailings	**Degrading products**, sideeffects and nanoforms a concern?	**The chemical status of the fjord:** An assessment of whether the discharges will deteriorate existing "good" status and potentially cause non-compliance with the WFD, with reference to the classification system of environmental status in water bodies[1].
		rock, some of this from detonation cords left among the rocks and then milled. Discharges depends on treatment process.	Norwegian Institute of Marine Research on microplastics[11].		
Mineral micro- and nanoparticles	No strict standards established, but a cautionary approach should be applied.	Førdefjord 2014 estimate: 3000 tons/year of particles smaller than 100nm TiO2-partiklar about 4% of this (>100 tonnes/year)[12]. Further: 10 % of particles will be smaller than 10 µm, that is 600 000 tonnes of very fine particles discharged per year. Repparfjord: 20% of particles will be smaller than 10 µm, 400 000 tonnes/year[13]	Institute of Marine Research has shown dramatic particle spread of the smallest particles[14]. Førdefjord: 5–10 µm particles could travel 14–58 km, smaller particles even farther. For Repparfjord the area influenced by fine particles is estimated by IMR to cover the whole fjord. This could reach important aquaculture and wild fish	Yes. Nanoparticles of minerals would have other properties, more likely to clog gills and enter animal body tissues by passing body membranes and cell membranes. Tio2-nanoparticles is of special concern, genotoxic, cancer causing and very toxic to aquatic organisms. The European Commission has adopted a ban on the use of Titanium Dioxide as a food additive (E171)[15]. Since Førdefjord is used for fishing and aquaculture the seafood risk,	Both Repparfjord and Førdefjord have important cod spawning grounds and rich fisheries, important rivers for salmon and are today in WFD "good" state. Huge discharges of very fine particles alone will dramatically alter the chemical status of the two fjords, from what is known about the long floating time and long transport distances of such particles in seawater, as well as how the finest particles add to leakage potential and bioavailability of any chemicals and heavy metals that would always be present in mining tailings.

[11] https://www.nature.com/articles/s41598-022-07080-z

[12] Letter from Naturvernforbundet to the Government in 2014: https://naturvernforbundet.no/getfile.php/1361895-1390825553/Bilder/140114-forureining-nanopartiklar%20F%C3%B8rdefjorden.pdf. The emission of 100 tons TiO2 particles/year is confirmed by consultant company DNV in attached letter from DNV to the mining company: «Letter from DNV to Nordic Mining 2014 TiO2.pdf». The Norwegian Institute of Marine Research have also commented this: https://www.hi.no/resources/Horing-Driftskonsesjonen-til-Nordic-Mining-i-Fordefjorden-1.pdf

[13] IMR 2012 Hearing document on the Repparfjord discharge permit application

[14] https://www.hi.no/resources/Asplin-m.fl.-2014-Notat-om-modellering-av-spredning-av-gruveavfall.pdf

[15] https://ec.europa.eu/commission/presscorner/detail/en/MEX_22_361

Substance	**Hazard Classification**: e.g REACH SVHC WFD P(H)Ss River basin specific poll. Norway priority list	**Volumes** to be discharged annually according to application and permit	**Risk** in the fjord environment? e.g. PBT/vPvB or acute toxic effects, spread and leakage from the tailings	**Degrading products**, sideeffects and nanoforms a concern?	**The chemical status of the fjord:** An assessment of whether the discharges will deteriorate existing "good" status and potentially cause non-compliance with the WFD, with reference to the classification system of environmental status in water bodies[1].
			breeding areas in both Førdefjorden and Repparfjorden.	reputation and also secondary poisoning for sea animals and seabirds should be considered.	Norwegian fjords have naturally very low sedimentation rates, and huge new inputs like this is nothing like the natural and good state.

Table 2. Chemical and ecological status of water bodies affected by underwater mining tailings deposits.

Fjord area/water body	Company	Pollution limits for high concern chemicals and heavy metals according to the pollution permit	Monitoring	**The chemical and ecological status of the water body** (HMWB = Heavily Modified Water Body)
Paused tailing dumpsites				
Bøkfjorden (1906–25, 1927-42, 1952-97, 2010-14), fjord area	Sydvaranger Drift AS[16]	Last permit granted 2014[17]. No limits on specific chemicals/heavy metals other than treatment chemicals (Polyakrylamid and polyDADMAC). The limits on emissions to the water body are: Tailings: 4 million tons/year. Treatment chemicals: 65 tons/year.	The Marine Research Institute concludes that it is not possible to quantify the effect the historic dumping in Bøkfjorden has had on the environment. This is because the controls that have been done before, during and after the dumping have had severe deficiensies.[18] The results from a NIVA study[19] indicate unfavorable conditions for benthic fauna in the immediate vicinity of the discharge. This is due to probably sludge effects and the fact that the	The Norwegian Institute of Marine Research also describes how the condition in the fjord sediments has deteriorated after the dumping was renewed in 2009. Condition went from "moderate" to "very bad".[21] Bøkfjorden-indre https://vann-nett.no/portal/#/waterbody/0424030500-5-C Bøkfjorden-midtre https://vann-nett.no/portal/#/waterbody/0424030500-5-C Bøkfjorden-ytre https://vann-nett.no/portal/#/waterbody/0424030500-3-C Bøkfjorden Indre: Environmental status: Moderate Chemical status: Undefined (no comments)

[16] https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=18222

[17] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=47326&documentType=T&companyID=18222&aar=0&epslanguage=no

[18] https://www.hi.no/resources/20-02773-Rapport-om-horingsuttalelse-Sydvaranger-11122020.pdf

[19] https://niva.brage.unit.no/niva-xmlui/handle/11250/215821

[21] https://www.hi.no/resources/20-02773-Rapport-om-horingsuttalelse-Sydvaranger-11122020.pdf

			effluent contains very little organic carbon. Even with normal primary production and sedimentation (approx. 1-3 mm / year), the bottom substrate will consist of material with a very low carbon content and thus provide poor growth conditions for benthic animals. Results from another NIVA study[20] indicate that a future use of Lilaflot D 817M could have acute toxic effects in the recipient, but probably only in the immediate vicinity of the discharge.	Bøkfjorden-midtre: Ecological status: Moderate, with Cu levels scoring "Bad". Chemical status: Bad Bøkfjorden-ytre Ecological status: Moderate Chemical status: Bad Unknown degree of impact noted, for sludging / spreading from mining deposits. Environmental objectives are set to good ecological and good chemical for all three, by 2027 for inner and outer parts of the fjord, and by 2033 for the middle part.
Ongoing tailing dumpsites				
Ranfjorden (1965-), fjord area	Rana Gruber[22]	Last permit granted in 2015[23]. No limits on specific chemicals/heavy metals other than flotation	Inspection in 2021 [24] showed several deviances from the permit, including unsufficient program for environmental assessment.	Ranfjorden – Mo https://vann-nett.no/portal/#/waterbody/0362011000-2-C Designated as HMWB.

[20] Attached document «NIVA_report_2010».
[22] https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=5124
[23] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=57516&documentType=T&companyID=5124&aar=0&epslanguage=no
[24] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=632913&documentType=K&companyID=5124&aar=2021&epslanguage=no

		chemical (Diamin/diamin acetat = Lilaflot D 817M). The limits of emission to the water body are: Tailings: 3 million tons/year. Flotation chemical: 40 kg/year.		The ecological potential is assessed as Moderate, but with PAH, Cu and Zn concentrations scoring «Bad». The chemical status is Poor. Mining is far from the only activity with negative impact on the fjord. Environmental objective is to reach good ecological potential, and good chemical status by 2033, with extended deadline due to technical reasons and costs. Environmental assessment from 2021 shows declining ecological status in the fjord, caused by increased mining activity [25] It should be noted that Rana Gruber was «allowed» to release four tonnes of Lilaflot without a permit before the Norwegian Authorities decided to get it formalized. The reason given was that Lilaflot was not on the list of chemicals of concern in 1994 when the permit was issued. [26] In the EC JRC Technical Report on Identification of marine chemical contaminants released from sea-based sources, Lilaflot is mentioned as considered to be very toxic to aquatic biota with

[25] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=681581&documentType=U&companyID=5124&aar=2021&epslanguage=no

[26]

				reference to Olsvik et al., 2015[27] and Ramirez-Llodra et al., 2015[28].
Elnesvågen/Frænfjorden (1982-), fjord area	Omya Hustadmarmor[29]	Last permit granted in 2015[30]. No limits on specific chemicals/heavy metals other than oil. Emission limits to water body: Tailings: 0,7 million tons/year. Oil: 300 liters/year.	The permit states that there should be done an environmental assessment of the fjord every 3rd year.[31] Inspection in 2017 revealed deviation from the permit: the company does not measure turbidity outside the depot, and therefore cannot know if they exceeds the legal limits for turbidity outside the depot.[32]	Elnesvågen https://vann-nett.no/portal/#/waterbody/0302012400-2-C Ecological status: Good (but undefined for all river basin specific pollutants) Chemical status: Poor Large impact from mining deposits, including hydromorphological changes. According to Brooks et al (2019)[33] sediment contact assay revealed toxicity from the fine particles in the Hustadmarmor tailings. Affects on benthic fauna also studied by Trannum et al (2019)[34].

[27] Olsvik, P.A., Urke, H.A., Nilsen, T.O., Ulvund, J.B., Kristensen, T. 2015. Effects of mining chemicals on fish: exposure to tailings containing Lilaflot D817M induces CYP1A transcrip-tion in Atlantic salmon smolt. BMC Research Notes. doi: 10.1186/s13104-015-1342-2

[28] Ramirez-Llodra, E., Trannum, H.C., Evenset, A., Levin, L.A., Andersson, M., Finne, T.E., Hilario, A., Flem, B., Christensen, G., Schaanning, M., Vanreusel, A. 2015. Submarine and deep-sea mine tailing placements: A review of current practices, environmental issues, natural analogs and knowledge gaps in Norway and internationally. Marine Pollution Bul-letin 97, 13-35.

[29] https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=5294

[30] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=569726&documentType=T&companyID=5294&aar=0&epslanguage=no

[31] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=569726&documentType=T&companyID=5294&aar=0&epslanguage=no

[32] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=302278&documentType=K&companyID=5294&aar=2017&epslanguage=no

[33] https://www.sciencedirect.com/science/article/pii/S004565351931224X?via%3Dihub

[34] https://www.sciencedirect.com/science/article/pii/S0025326X19307040

Lillebukt/stjernøysundet (1961-), fjord area	Sibelco Nordic (earlier called North Cape Minerals)[35]	Last permit granted in 2000[36]. No limits on specific chemicals/heavy metals. Emission limits to water body: Tailings: 300 000 tons/per	The permit demands the company to investigate the environmental effects during the sommer of 2000. They have to do an investigation one year after start and 3 years after starting the mine.[37] An inspection in 2017 revealed several non-compliances from regulations[38].	Lillebukta - Ytre Simavik https://vann-nett.no/portal/#/waterbody/0420030200-1-C Ecological status: Moderate Chemical status: Undefined Large degree of impact from mining deposits, including morphological changes affecting habitats. Large degree of sludging from deposits. Environmental objectives: Good ecological status by 2027 Good chemical status With "Risk" noted as it wil require measures.
Bergsfjorden (1932-), fjord area	Skaland Graphite[39]	Permit granted in 1989, last changed in 2002[40]. Emission limits to water body: Tailings: 40 000 tonnes/year.	Naturvernforbundet asked the company in writing 02.04.21 to give us a report of the level of heavy metals and other harmful substances in the mining waste deposited in the fjord. 26.04.21 the company replied that they	Bergsfjorden https://vann-nett.no/portal/#/waterbody/0401011400-C Environmental status: Ecological status: Good (despite moderate benthic diversity for two of the indexes) Chemical status: Good chemical status (despite

[35] https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=6538
[36] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=2646&documentType=T&companyID=6538&aar=0&epslanguage=no
[37] Permit https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=2646&documentType=T&companyID=6538&aar=0&epslanguage=no

[38] 2017 inspection
https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=256367&documentType=K&companyID=6538&aar=2017&epslanguage=no

[39] https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=5765
[40] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=546983&documentType=T&companyID=5765&aar=0&epslanguage=no

		Flotation chemical MIBC (metyl-isobutyl-carbinol): 30 000 liters/year. Sepco CE 3040 LH: 5000 liters/year. Oil: 50 mg/l per year Zink (Zu): 4.11 g/day and 1500 g/year. Nickel (Ni): 14.25 g/day and 5200 g/year. Copper (Cu): 2.74 g/day and 1000 g/year. Chromium (Cr): 1.37 g/day and 500 g/year. The monitoring is to be made by the company and sent to the county governor for approval.	could not produce these numbers before September-October because a test could not be performed until then. We have not heard back from the company.	According to Vann-Nett, there is "low impact" from the mining deposits despite the 40 000 tonnes per year, and with hight levels of Cr, Cu and Ni concentrations in the sediments. Environmental objective: is good ecological and chemical status. Bergsbotn i Bergsfjorden https://vann-nett.no/portal/#/waterbody/0401011300-C Environmental status: Ecological status: Moderate (with levels of Cu scoring «Bad») Chemical status: Poor Environmental objectives by 2027: Good ecological status Good chemical condition But with "risk" for not reaching the objectives. (For both water bodies, studies in 1994 are mentioned as seemingly the most recent.)
Tysfjord (1985-), fjord area	The Quartz Corp Drag[41]	Permit granted in 2011, last changed in 2020[42]. No limits on specific chemicals/heavy metals other than process chemicals.	Non-compliance was detected during inspection in 2021[43], including using non-declared chemicas and lack of Reach registrations. The company's environmental [overvåkning] also had	Tysfjord Environmental objective: is good ecological and chemical status. Ecological status: Moderate, considered with low precision River basin specific pollutants: High levels of arsenic and zinc in the water mass. Chemical status: Bad, considered with high

[41] https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=6230
[42] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=590872&documentType=T&companyID=6230&aar=0&epslanguage=no
[43] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=659821&documentType=K&companyID=6230&aar=2021&epslanguage=no

		Emission limits to water body: Tailings: 37 000 tonnes/year. Fluorosilicic acid (100%): 8500 tonnes/year. Petroleum sulfonate: 25 tonnes/year. Diamine: 6 tonnes/year. NaCl: 230 tonnes/year.	deficiencies. The buouy that measures pH was placed 180 m from the outlet, not maximum 30 m away from the outlet as described in the permit. In its report, the Norwegian Environment Authority point at faulty methodology for monitoring of pollution control.	precision. High levels of lead and anthracene in water mass and sediments. Impacted by: *Chemical pollution from industry- Norcem Kjøpsvik Increased emissions of Lead, zinc, thallium and cadmium to Landfill. Poor documentation of spreading effects. *Wastewater from municipal wate sewage plant. Risk of not achieving environmental objectives due to lacking data.
Historic tailing dumpsites				
Repparfjord (1972-78), fjord area	Folldal Verk			Inner Repparfjord: Environmental objective: is good ecological and chemical status. There seems to be an error with the objective of good ecological status being listed as void, due to being too high cost to achieve – yet the ecological status is still already listed as good. Ecological status: good, considered with moderate precision Chemical status: good, considered with moderate precision. Impacted by: Diffuse run-off from mines / landfill. Parts of the water body are still affected by previous mining activities, the closed Folldal plant. Specifically, there is talk of somewhat elevated copper values in sediment in the old sea landfill for Folldal works in the innermost part of the fjord. See Akvaplan-niva AS Report 4973-02, chapter 6.4: "The reason for the elevated levels is probably that these stations are affected by runoff from the old Folldal verk".

				Outer Repparfjord: Ecological status: good, considered with moderate precision Chemical status: good, considered with low precision.
Jøssingfjord (1960-84), fjord area	Titania[44]		Inspection in 2019 showed serious non-compliance[45]. The company exceeds allowed limits for nickle. The company was also reprimated after inspections in 2017 and 2018 because of the same non-compliance. This has caused Sandbekkelva to have poor chemical condition. The company's environmental assesment plan has deficiencies.	Jøssingfjord https://vann-nett.no/portal/#/waterbody/0240000100-C Environmental status: Ecological status: Moderate with Cu and Zn levels scoring "Bad". Chemical status: Poor Large degree of impact from mining deposits, including morphological changes leading to deteriorated habitats. Environmental assessment from 2021[46] classify Jøssingfjord as having "poor" to "moderate" ecological condition and considered Jøssingfjord to be a HMWB. That is not the current status in Vann-Nett (as per 25 March 2022).

[44] https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=5123
[45] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=577176&documentType=K&companyID=5123&aar=2019&epslanguage=no
[46] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=680329&documentType=U&companyID=5123&aar=2021&epslanguage=no

Hudningevatnet (1972-98), water body (also spelled Hudningsvatnet or Huddingsvatnet)	Grong Gruber	Mining activity, finished in 1998. 10,5 million tons of mining waste and pyrite deposited in total.		The current pollution of the lake is described in a NIVA report from 2004[47]. Current classification of the lake: https://vann-nett.no/portal/#/waterbody/307-1124-2-L Report on the contents of the deposited masses in the lake. In 1989, the lake was divided by a dike to contain the pollution from the mine in the eastern 2.8 km^2 of the lake. Lake Hudningvatnet does not fulfill WFD demands for good ecological and chemical condition (2020 report). Removal of the mining waste is cited as a proposed action for this water body. https://vann-nett.no/portal/#/measuredetails/2-2776-M .The action has so far been postponed for "technical reasons"[48]. Both the local muncipality and Miljødirektoratet has voiced that the ambitions for ecological and chemical conditon in this lake should be lowered, to "mindre strengt miljømål". In accordance, they argue, with Vannforskriften § 10. Røyrvik kommune Miljødirektoratet This will mean that the pollution in lake Hudningevatnet will not be removed, and will continue polluting the lake. [In our view should

[47] https://niva.brage.unit.no/niva-xmlui/bitstream/handle/11250/212519/4871_72dpi.pdf?sequence=1&isAllowed=y
[48] Complaint to ESA 22 February 2021, attached: «Complaint to ESA-WFD-Joma-22-02-2021 With attachments.pdf»

				Vannforskriften § 10 not be used on this manner: it should be a high treshold for invoking this paragraph. We argue that this is in conflict with the intentions of the WFD.]
Sulitjelma/Langvatnet (1887-1991), water body				Vann-Nett: Langvatnet øvre https://vann-nett.no/portal/#/waterbody/164-811-1-L https://vann-nett.no/portal/#/waterbody/164-811-1-L and Langvatnet nedre https://vann-nett.no/portal/#/waterbody/164-811-2-L The lake is defined as HMWF, with current status as moderate potential and bad chemical status. There are morphological Morfological changes and large degree of impact from run-off from mining deposits. Measures conducted 1991-2004 have reduced the Cu and Zn pollution to the lake has been reduced by 50% compared with the situation in 1991 when the mining ended. The lake Langvatnet is still heavily polluted by Cu and Zn. Investigatsion show that the 50% of the Cu pollution comes from the “Nordgruvefeltet” which is under water. There benthic organisms are negatively affected.

				The Institute of Marine Research[49] underline that deposits in freshwater, although the water in the lake will end up in Skjerstadfjorden.
Svensendammen (Konnerudfeltet, Drammen) (1731-89, 1851-52, 1866-75, 1906-18), water body				Svensedammen 013-5669-L https://vann-nett.no/portal/#/waterbody/013-5669-L Ecological status: Moderate, with Zn levels scoring "Bad". Chemical status: undefined, with no comments. The dam as well as the area upstreams and downstreams is affected by earlier mining, and measures must make sure that the conditions do not deteriorate. Environmental objective: Moderate ecological status – due to disproportionate costs. Chemical objective: to reach good chemical status by 2027. But with "risk" of not reaching the objectives.
Recently granted permission or proposed plans, not yet started tailing dumpsites				
Førdefjorden, fjord area	Nordic Rutile, daughter company of Nordic Mining	Permit granted in 2015, with changes made in 2016 and 2021[50].		Førdefjorden-indre https://vann-nett.no/portal/#/waterbody/0281010201-3-C Designated as HMWB Ecological status: Poor ecological potential

[49] https://www.hi.no/hi/nyheter/2021/september/hi-advarer-mot-gruvedeponi-i-sulitjelma-kan-ga-ut-over-marint-liv

[50] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=661937&documentType=T&companyID=74055&aar=0&epslanguage=no

		No limits on specific chemicals/heavy metals other than process chemicals. Emission limits for water body: Tailings: 4 million tons/year. Magnafloc 5250: 4 tons/year. Sodium isobutyl xanthate (SIBX): 2 tons/year. Dow Froth 400: 3 tons/year. See more details in Table 1.		Chemical status: Undefined Environmental objectives: Good ecological potential and good chemical status, but with "risk" noted because of the effects of the planned mining activities. Førdefjorden-midtre https://vann-nett.no/portal/#/waterbody/0281010201-1-C Environmental status: Good ecological status Undefined chemical status Environmental objectives: Good ecological and good chemical, The Norwegian Environment Agency (former Klif) confirms a deterioration in the environmental status of discharges in the Førdefjord and that paragraph 12 cannot be used unless the additional conditions are met[51].
Repparfjorden, fjord area	Nussir	Permit granted in 2016[52]. Revised permit in 2021[53]. No limits on specific chemicals/heavy metals other than process chemicals.		See previous comments on current status of Repparfjorden.

[51] See page 57 in the attached document «Miljødirektoratet 2012 Gruvedrift i Engebofjellet - Klifs vurdering og anbefaling».
[52] https://www.norskeutslipp.no/WebHandlers/PDFDocumentHandler.ashx?documentID=86501&documentType=T&companyID=43356&aar=0&epslanguage=no
[53] Attached document: «Pollution permit 2021 – Nussir».

		Emission limits to water body: Tailings: 6500 tonnes/day Sodium Isobutyll Xantat: 300 kg/day Karboksylmethyl cellulose: 350 kg/day Methyl Isobutyl Karbinol: 350 kg/day Magnafloc 10: 240 kg/day Burnt lime: 600 kg/day See more details in Table 1.		
Proposed projects				
Sulitjelma/Langvatnet[54], water body	Sulitjelma Gruver			See previous comments on ecological status
Tosenfjorden[55], fjord area	Bindal gruber			Inner Tosen: Environmental objective: is good ecological and chemical status. Ecological status: good, considered with low precision Chemical status: Undefined, considered with low precision. Impacted by: Salmon aquaculture, impact level low. Outer Tosen Ecological status: good, considered with high precision

[54] https://www.miljodirektoratet.no/hoeringer/2021/juni-2021/nye-sulitjelma-gruver-as-soker-om-tillatelse-om-gruvedrift/
[55] https://www.nrk.no/nordland/kjemper-mot-avfall-fra-gullgruve-i-tosenfjorden-i-bindal-1.14926932

				Chemical status: Undefined, considered with low precision. Impacted by: Salmon aquaculture, impact level low.
Hudningevatnet, water body (see earlier entry in table)		Proposed plans for resumed mining. Dumping in the water is not proposed in this instance. The mining waste will instead be stored close to the lake, and then refilled into the mine.		New activity could disturb the polluted masses in the lake. The waste water from the production process, water from the impermanten deposit and water from de de-watering process is proposed cleaned, and then returned to the lake.