

= Kirkenes ? Bjørnevatn Line =

The Kirkenes ? Bjørnevatn Line (Norwegian : Kirkenes ? Bjørnevatnbanen) , or the Sydvaranger Line (Sydvarangerbanen) , is a 8 @. @ 5 @-@ kilometer (5 @. @ 3 mi) long railway line between Kirkenes and Bjørnevatn in Sør @-@ Varanger , Norway . Owned by the private mining company Northern Iron , the single @-@ track railway is solely used to haul 20 daily iron ore trains from Bjørnevatn Mine to the port at Kirkenes . It was the world 's northern @-@ most railway until 2010 , when the Obskaya ? Bovanenkovo Line in Russia went further north .

The line was built by the mining company Sydvaranger , who started construction in 1907 and inaugurated the railway in 1910 . From 1912 , the port network received electrification , as did the mainline in 1920 . Originally , free passenger trains services were also offered . During the Second World War , the line was largely destroyed , but rebuilt afterwards and re @-@ opened in 1952 . Electric traction was abandoned in 1955 when two EMD G12 diesel locomotives were bought . The line closed in 1997 , but was reopened in 2009 , following a change in ownership of the mine . There are proposals to connect the line to either one or both of the Finnish and Russian railway networks .

= = Route = =

The Kirkenes ? Bjørnevatn Line is 8 @. @ 484 kilometers (5 @. @ 272 mi) long and runs from Bjørnevatn Mine to Kirkenes Port . While the line had passenger transport , it had two stations , Kirkenes Station and Bjørnevatn Station , which were located 7 @. @ 5 kilometers (4 @. @ 7 mi) from each other . A third station , Armeverplegungslager , was only used during the Second World War and immediately afterwards and was located 5 @. @ 01 kilometers (3 @. @ 11 mi) from Kirkenes Station . The railway is standard gauge , non @-@ electrified and single track .

Starting at Bjørnevatn , the railway line starts underground at a silo , 77 @. @ 0 meters (252 @. @ 6 ft) above mean sea level (AMSL) . From Bjørnevatn , the line starts to fall with a 0 @. @ 3 @-@ percent gradient . After passing the residential area , the gradient drops to 1 @. @ 5 percent . On this section , the line passes through its only tunnel , which is 68 meters (223 ft) long . The line then runs along a flatter terrain , and crosses through a 450 @-@ meter (1 @, @ 480 ft) long cutting towards the lowest point of the line , at 50 @. @ 4 meters (165 ft) AMSL .

The railway then runs under European Road E6 and starts climbing at a 1 @. @ 0 @-@ percent gradient until reaching 56 @. @ 2 meters (184 ft) AMSL . From this point to Kirkenes it runs next to the E6 , and passes by the lakes Tredjevatn , Stuurajávn and Førstevatn . While the first part of this section is flat , towards Kirkenes the landscape is more rolling . The line passes Kirkenes Station , which is 59 @. @ 5 meters (195 ft) AMSL . The swing towards the station is as a curve radius of 275 meters (902 ft) , while the remaining part of the line has a minimum radius of 300 meters (980 ft) . The line terminates at the silo in Kirknes after running over an elevated section , nicknamed the Air Bridge .

= = History = =

= = = Construction = = =

Iron ore was discovered at Bjørnevatn in 1866 . The ore was of poor quality , but lay close to the surface ? allowing for open @-@ pit mining , had large deposits and was located close to a port . The mining company Sydvaranger was established by German and Swedish investors in 1906 . A separation plant was built in Kirkenes and the company decided to transport all ore from the mine to the port by rail . Inge T. Wiull , former manager of the Valdres Line , was hired as divisional leader for the construction of the railway , the port and the residential areas .

Construction of the railway was given high priority to as early as possible aid in transport of workers to the mining sites . Both stations were completed in 1908 , the same year as the laying of tracks started . The line originally had a rail profile of 30 kilograms per meter (60 lb / yd) . The first steam

locomotive , built at Hamar Jernstøperi , was delivered during the fall of 1908 . For the tacks in the mine , a shunter needed and the company bought a fireless locomotive . At the time of the opening , the line was 7 @. @ 5 kilometers (4 @. @ 7 mi) long , in addition to tracks at both Kirkenes and Bjørnevatn . Both stations received a turntable , while Kirkenes also received water tower , motive power depot and a workshop . Bjørnevatn Station received a depot for the fireless locomotive . Tracks were laid through the open @- @ pit mine , with the length varying . For instance , in 1910 there were 5 kilometers (3 mi) of tracks in the mine .

Mining started on 7 July 1910 , with the first ore train being run on 13 July . The first shipload left Kirkenes on 11 October , but SS Bengal sank with the first shipment . In 1911 , the system exported 330 @, @ 000 tonnes of ore . The railway was also used for transporting workers , with trains running from the towns to the plants in the morning and returning after the working day was over . Prior to private cars becoming common , the railway operated a passenger carriage on the trains between Kirkenes and Bjørnevatn ? allowing free travel . The railway has never had any scheduled or public transport of passengers , but the company 's concession specifies that the authorities could at a later date require the company to operate public passenger services under specified conditions .

= = = Electrification = = =

In 1910 , construction started of an electric power supply for tracks at the port . Originally it had 500 volts direct current , but this was later reduced to 400 volts . Because an overhead wire could interfere with the cranes , third @- @ rail conduction was chosen . However , because of the possibility of iron slimes spilling onto the tracks , the railway chose to use two third rail conductors , one on each side of the track , and avoid the return current running through the tracks . The electric components were delivered by Siemens @- @ Schukert and were taken into use in 1912 . The company took delivery of two electric locomotives , both with a Bo wheel arrangement , in 1910 and 1911 . Sydvaranger operated one port train every 45 minutes , consisting of one locomotive and four hopper cars , with a combined 25 tonnes (25 long tons ; 28 short tons) of ore .

The original system was designed for an export capacity of 650 @, @ 000 tonnes (640 @, @ 000 long tons ; 720 @, @ 000 short tons) , and in 1913 , the company exported 427 @, @ 000 tonnes (420 @, @ 000 long tons ; 471 @, @ 000 short tons) and had 1 @, @ 150 employees . The company initiated plans to start electrification of the mainline , but the plans were placed on hold during the First World War . Sales plummeted during the war . At first , the mining company stored the overproduction , but later production was reduced significantly . In 1918 , the tracks at the mine were electrified at 750 volts direct current . Two 50 @- @ tonne (49 @- @ long @- @ ton ; 55 @- @ short @- @ ton) Bo 'Bo ' locomotives were delivered by Siemens @- @ Schukert and Skabo Jernbanevognfabrikk in 1917 . The following year , another Bo @- @ locomotive was built for the port . Power was secured with the construction of Jarfjord Power Station . However , lack of materials after the war delayed the electrification of the mainline railway until 1920 . Also the port received overhead wires , as the third rail caused problems for snow removal . The new electric system was taken into use on 23 December 1920 .

In the 1920s , the economy fell into a low conjuncture , forcing Sydvaranger to file for bankruptcy in 1925 . However , the facilities were quickly reopened . Two new Bo @- @ locomotives , which could operate both on the mainline and at the port , were delivered in 1930 . Built by Siemens @- @ Schukert , they were christened Lisa and Sonja . Two mainline Bo 'Bo ' locomotives were delivered by Siemens @- @ Schukert in 1935 , which were named Oscar and Ivar . They were followed by the Bo Laila and Gerd two years later ? which could operate both on the mainline and at the port . During the late 1930s , the railway company started replacing the rails with heavier 35 kilograms per meter (70 lb / yd) rails , although this work was not completed . The final electric locomotive was a Siemens @- @ Schukert @- @ built Bo unit delivered for the port in 1940 . In 1938 , the last year before production was reduced because of the Second World War , the mine exported 900 @, @ 000 tonnes (890 @, @ 000 long tons ; 990 @, @ 000 short tons) .

= = = Occupation and reconstruction = = =

After the occupation of Norway by Nazi Germany , mining continued under German administration until January 1942 . Kirkenes and the areas along the railway and at the mine were being used to store material for Wehrmacht . To allow better capacity to ship out the materials , in 1942 , a 2 @. @ 5 @-@ kilometer (1 @. @ 6 mi) branch line was built to Haganes . Known as the Port Line (Norwegian : Havnebanen , German : Hafenbahn) , the line was completed in 1943 and demolished after the war . Wehrmacht also established Armeeverplegungslager Station , which was used during the and slightly after the war . From the spring of 1944 , German authorities ordered that mining was to resume , and allocated two steam locomotives and thirty hooper cars to the line . There was also built a new depot for the German rolling stock .

As part of Operation Nordlicht , Kirkenes was scorched , causing extensive damage to the mining company 's infrastructure . During the reconstruction , Sydvaranger needed to transport large machinery to Bjørnevatn , so the loading gauge was increased to 6 meters (20 ft) . All heavy transport during the reconstruction was done using railway , and tracks were laid throughout the mining facility . From 1945 , passenger trains ran between the two settlements , at first with steam locomotives , and from 1950 with electric locomotives . New storage silos were built in Bjørnevatn , but from operations started , transport within the mine was performed using trackless machinery . A new port facility was built in Kirkenes , with the line terminating at the Air Bridge , an elevated railway which led to the plant . Mining operations and revenue service on the railway did not start until 1952 .

The Directorate for Enemy Property took over the German portion of the ownership of Sydvaranger after the war . In 1948 , ownership of the company was transferred to the state . The initial post @-@ war plans were to use the existing rolling stock . The only remaining locomotive which could haul an ore train from the mine to the port was Oskar , which could haul up to 14 hooper cars and a train weight of 800 tonnes (790 long tons ; 880 short tons) . However , the locomotive proved unreliable , so Sydvaranger decided to order new locomotives . The electric traction was taken out of use in 1955 , but the overhead wires remained until 1963 . Two G12 diesel @-@ electric locomotives were delivered from General Motors Electro @-@ Motive Division in 1954 and 1956 . The Bo 'Bo ' units had a power output of 977 kilowatts (1 @, @ 310 hp) . In addition , new hooper cars were built by Skabo .

To allow for larger trains , the permanent way was upgraded . The rail profiles were upgraded to 49 kilograms per meter (78 lb / yd) , were continuously welded and the gravel ballast was replaced with crushed stone . The distance of the line was after the upgrades 8 @, @ 484 meters (5 @. @ 272 mi) . The upgrades allowed the maximum axle load to be increased to 22 tonnes (22 long tons ; 24 short tons) and the train weight to increased to 1 @, @ 800 tonnes (1 @, @ 800 long tons ; 2 @, @ 000 short tons) . A nominal train consisted of 20 hooper cars with air brakes . In 1960 , work started on demolishing the tracks at the port , followed by all tracks at the workshop at Kirkenes the following year . From then , all non @-@ ore transport in the company was taken over using road transport . The three remaining electric shunters and the steam locomotive were chopped up . Two diesel shunters were sold to Norsk Jernverk in Mo i Rana . Up until this point , the railway had operated 33 steam locomotives , 14 electric locomotives and 4 diesel locomotives .

In 1980 , the mine 's production peaked with an export of 2 @. @ 4 million tonnes and 1 @, @ 000 employees . In 1984 , to improve the workplace environment , a used Allmänna Svenska Elektriska Aktiebolaget (ASEA) -built T45 locomotive was bought from Sweden . However , it suffered several breakdowns and was retired in 1989 . As a replacement , a new G 1203 BB was bought from Maschinenbau Kiel and was delivered to Kirkenes on 8 February 1991 . In 1988 , the first part of the Kirkenes plant was closed , and the mining company drastically reduced production because its owner , the Ministry of Trade and Industry , would no longer subsidize operations . All mining ceased in the spring of 1996 , and the last load of ore was hauled in April 1997 . After operations closed , the oldest G12 was transferred to Sør @-@ Varanger Museum .

= = = Reopening = = =

Arctic Bulk Minerals bought the mining rights , and operated a train once to twice a year to keep the track and rolling stock maintained . This company filed for bankruptcy in 2002 . The mining company was then bought by the local power company Varanger Kraft and Sør @-@ Varanger Municipality . In 2006 , they sold the mining company to Tschudi Group for 102 million Norwegian krone (NOK) . The Tschudi Group established Northern Iron , registered in Perth , Australia , as a holding company to own the mining company . Operations in the mine and on the line resumed in 2009 , after the price of iron had risen dramatically since the closing of the mine . With the opening of the mine , production is estimated at 3 million tonnes of export per year . The Kirkenes ? Bjørnevatn Line was the northern @-@ most railway in the world until 2010 , when Russia 's Obskaya ? Bovanenkovo Line was opened .

To haul the trains , the mining company took delivery of a Vossloh G1000 BB . Built new in 2009 , it was delivered to Kirkenes on 12 February 2010 . The unit deviates from standard production by having its maximum speed reduced by software from 100 to 45 kilometers per hour (62 to 28 mph) ; it is further equipped with snowploughs , air supply to open the hopper car doors , radio remote control and janney couplers . As a back @-@ up , the company will retain the MaK G 1203 . The old hooper cars were renovated and put into service , while the track received new concrete ties . The train runs up to 20 trips per day .

On 18 November 2015 the mining company went into bankruptcy .

= = Expansion = =

In the Railway Plan of 1923 , Parliament decided to extend the Nordland Line from Fauske to Vadsø with a branch to Kirkenes . During the Second World War , the Wehrmacht revitalized the plans to build a railway to Kirkenes . No more than the unfinished Polar Line was built and there was never any railways built north of Narvik and the Ofoten Line . However , detailed plans were made for the line , including surveying geological conditions and choice of the route .

Since 1992 , there have been proposals to extend the Kirkenes ? Bjørnevatn Line to either Nickel or Zapolyarny , Russia , where it would connect to the Murmansk ? Nickel Line . About 40 kilometers (25 mi) of railway is missing to connect the two lines . The proposal calls to develop Kirkenes as a port for export of Russian products , as the Murmansk is less suited and under @-@ dimensioned . Major transshipment products include metals from MMC Norilsk Nickel , steel from Arkhangelsk and crude oil . The Murmansk ? Nickel Line was built in 1936 , is 206 kilometers (128 mi) long , is not electrified and is operated by the Russian Railways . As it is Russian gauge , the Kirkenes ? Bjørnevatn Line would be presumably undergo gauge conversion or get dual gauge . A new railway would be able to transport 5 million tonnes of cargo per year .

In 2003 , the cost of the necessary 40 kilometers (25 mi) of new railway was estimated at 1 @.@ 4 billion Norwegian krone (NOK) , while the cost of upgrading the existing Russian line was NOK 400 million . In 2007 , Murmansk Oblast 's governor , Yury Yevdokimov , rejected the plans for a connection to Russia , stating that his opinion was supported by President Vladimir Putin . Because Kirkenes is a better suited port than Murmansk , local authorities in Murmansk do not want to lose transshipment business to Norway . However , with the increased realism of a line to Rovaniemi , which would serve as an alternative route to Kirkenes from Russia , Russian authorities have since 2010 again supported a railway line between Kirkenes and Russia .

A prestudy also exists about the possibility to connect Kirkenes to the Finnish railway network , named the Arctic Ocean Line . Possible routes include from either Rovaniemi , Kolari , Kemijärvi or multiple of these , via Sodankylä , Saariselkä and Ivalo , then either east or west of Lake Inari or via Nickel to Kirkenes . The length of the line would be between 480 and 550 kilometers (300 and 340 mi) . The background is the boom of mining in Finnish Lapland and the need for access to a deep , ice @-@ free port . Railway lines exists to the Baltic Sea , but the bay is both shallow and ice @-@ covered during winter . The line would also allow for export of lumber and other products from Finland , while it would provide a route to export fish from Norway to Finland and Eastern Europe . In 2011 , the costs of the line were estimated at ? 1 @.@ 1 to 1 @.@ 6 billion . A significantly

deviating alternative is to build westwards from Kolari to Skibotn (300 km) .