



Baltic Sea challenge

**OUTO
KUMPU**

Baltic Sea challenge:

Outokumpu's action programme

Outokumpu shoulders its responsibility for the Baltic Sea. The company seeks to take practical steps to help improve the condition of the sea – after all, its major production facility is located in Tornio on the shores of the Bay of Bothnia, in the northern reaches of the Baltic Sea.

The Tornio Works includes ferrochrome and steel mills with an annual production capacity of about 270,000 tonnes of ferrochrome and 1.2 million tonnes of stainless steel products. The production facility also includes a mine in Kemi that produces chromite ore concentrate.

Impacts of Outokumpu's operations on the Bay of Bothnia

Steel production involves high-temperature processes. Cooling is necessary to protect people and equipment. Water is the natural choice as a coolant. Cooling water is returned as is – only slightly heated by the process – into the watercourse. Outokumpu also uses large volumes of water in rinsing and cleaning. The water is sourced either from the surface of rivers or the sea, or from the municipal water supply. To minimise the risk of environmental impacts, Outokumpu recirculates a large amount of the water used in the production process.

The Tornio Works is renowned for boasting the best energy and material efficiency in the industry. In practical terms, this means that its production results in the lowest emissions into the air and bodies of water. The Works is making

a concerted effort to further reduce its watercourse loading, as can be clearly seen from the metal discharges diagram (Figure 1).

The Tornio Works uses a total of about 11 million m³ of water annually. Most of this water goes for cooling.

Exceptionally, cooling water – which is not effluent per se – is factored into the environmental loading of the Tornio Works. After the cooling water has circulated in the heat exchangers, it is returned into the watercourse, only slightly warmer than when it was extracted. Large volumes of cooling water are used. The cooling water contains naturally occurring metals and nitrogen bound to solids. The effluent permit defines cooling water as an effluent and for this reason the reported loading of the Works is higher than that of equivalent industrial facilities in the EU.

The long-term water protection efforts of the Works have also reduced water consumption. Lower water consumption cuts pumping costs (=energy consumption) and, of course, watercourse loading. Figure 2 shows the reduction in water consumption.

Steps taken in the 2000s to reduce discharges to water

- The ferrochrome plant installed sand filters to treat process wastewater, significantly reducing zinc and solid discharges. For example, zinc discharges declined from 4 kg/day to less than one kg/day.
- The cooling water system of steel melting shop 2 was built as a closed circulation system. This reduces the volume of cooling water used but does not significantly affect its quality. The heat exchangers only warm the water and do not contaminate it. The hot rolling mill also has a closed circulation system.
- The cold rolling mill employs three pickling acids. This method, developed in-house at Outokumpu, replaces part of the nitric acid with sulphuric acid. In practice, this halves nitrogen discharges into the sea.
- Thickener development work at the cold rolling mill resulted in higher operational reliability and reduced accidental discharges of solids to water. This work is ongoing.
- The cold rolling mill changed over from discrete small oil separators to the centralised treatment of oily water. This has reduced oil discharges into the sea to such a low level that it is no longer even possible to measure them in ordinary conditions.

Constantly monitoring the condition of marine areas

Monitoring reports and environmental impact assessments by external consultants show that the current discharges of the Tornio Works have a slight impact on the marine environment*). This can also be seen by comparing the effluent loading of the Works with that of the Tornionjoki and Kemijoki rivers in the same part of the Bay of Bothnia (Figure 3).

The fish in the seawaters by the shore of the Tornio Works are healthy. Professional fishing is carried out almost right next to the Works. The metals contained in the effluents of the Tornio Works do not concentrate or accumulate in the food chain, as has been shown by marine monitoring reports and studies carried out by external parties (Outokumpu Chrome Oy and Outokumpu Stainless Oy, Tornio Works' annual effluent, watercourse and fishery monitoring reports, by Pöyry Oy).

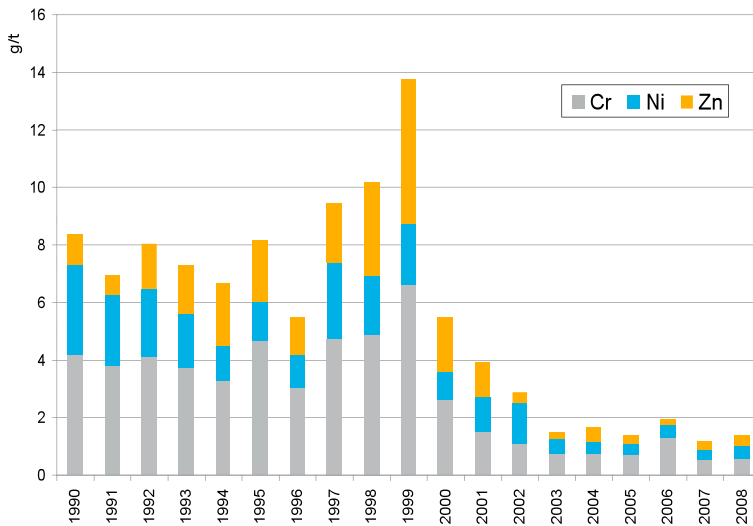


Figure 1. Metal discharges to water (chrome, nickel and zinc) by the Tornio Works from 1990-2008 per tonne of ferrochrome and stainless steel slab produced (g/t).

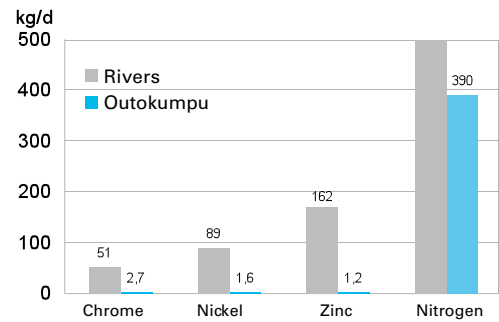


Figure 3. Watercourse loading of the Tornio Works per average annual day (kg/d) compared with the loading of the Tornionjoki and Kemijoki rivers on the same coastal area of the Bay of Bothnia.

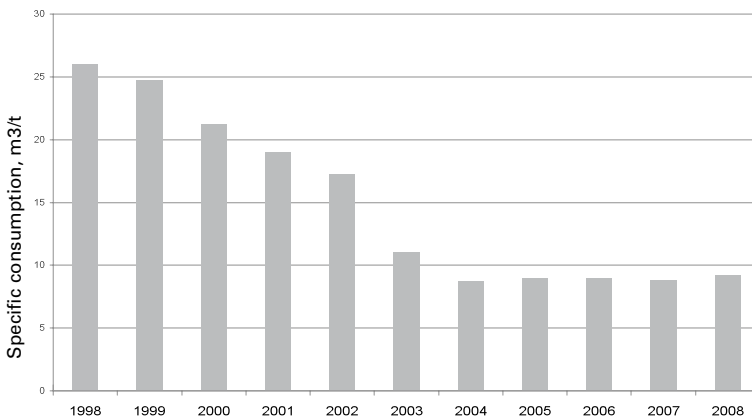


Figure 2. Water consumption at the Tornio Works per tonne of ferrochrome and stainless steel slab produced.

*) The annual effluent, watercourse and fishery monitoring reports of Outokumpu Chrome Oy and Outokumpu Stainless Oy, by Pöyry Oy, Expansion of certain functions at the Tornio Works, Outokumpu Stainless Oy, Environmental impact assessment report, by Jaakko Pöyry Infra/Soil and Water, 2005, Cycle, behaviour and importance of nitrogen in the aquatic environment of the Bothnian Bay nearby the discharging points of Outokumpu Tornio Works and Kemi Mine, by Mirikka Tuokila, 2008

Future measures planned by Outokumpu will substantially cut discharges

- All effluents will be discharged into the sea via a suction-dredging basin located by the Works. The basin will have a surface area of about 70 hectares and a volume of about one million cubic metres. Effluents from the Works will stay in the basin for weeks. This will give solids in the water time to settle on the bottom of the basin, which means that they will not be discharged with the effluent into the sea. Nitrogen amounts will also be reduced significantly due to the effect of vegetation and denitrification (in which bacterial activity breaks down nitrates into nitrogen that is released into the atmosphere). The introduction of the suction-dredging basin requires amending the effluent permit. The permit process has been started.
- The sanitary treatment facility will be modernised in 2011-2012. The current facility does not fulfil the treatment efficiency requirements set for the next environmental permit. This measure will help reduce the amount of nutrients ending up in the sea.



Figure 4.
Professional salmon, common whitefish and trout fishing with a traditional fyke net by the Tornio Works.

For additional information, contact:

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Activating Your Ideas

Outokumpu is a global leader in stainless steel with the vision to be the undisputed number one. Customers in a wide range of industries use our stainless steel and services worldwide. Being fully recyclable, maintenance-free, as well as very strong and durable material, stainless steel is one of the key building blocks for sustainable future.

What makes Outokumpu special is total customer focus – all the way, from R&D to delivery. You have the idea. We offer world-class stainless steel, technical know-how and support. We activate your ideas.

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