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Andrei V. Vanyukov, a son of **Prof.Vladimir A. Vanyukov** – the first Chemical Engineer at Tomsk Technological Institute named after Nikolay II, Emperor of Russia. Doctor of Engineering, Professor, Father of School of Thought in the field of heavy non-ferrous metallurgy, demiurge of the Vanyukov Process and Vanyukov Furnace

### **Background of Vanyukov Furnace Development and Implementation**

In 1949, Andrei Vanyukov, a young scientist from Moscow, patented the new smelting process, later being named after him as a tribute to his deed. The same year, Reverberating Furnace installed in the distant Siberian town of Norilsk produced the first batch of matte marking the Copper Plant start-up. Twenty five years later the Reverberating Furnace foundation was used for construction of the first commercial scale Vanyukov Furnaces packaged system...

There were a lot of amusing and sometimes inexplicable or even detective things taking place at Andrei Vanyukov’ making headway for his smelting method. To start with, the rumour is that the method of sulphides smelting in the fluid bath was thought out by the 32-year old postgraduate student of MISiS (Moscow Institute of Steel and Alloys) when he was taking tub in his bathroom. Doesn’t it remind you the steeped in legend Archimedes and his ‘Heureka!’?

To remove sulphur from ore not at the Furnace’ banks but immediately in the melt – at that time it was an absolutely unbelievable, impudent and out of line approach, and all the Big Heads of metallurgy boiled over the young scientist who they considered to be nothing but a parvenu. Vanyukov turned out to be a man of character, and was firm in his decision to arrange a plant trial of the process developed. Sorry to say, but at that time he didn’t even picture to himself that it would take him long, long 20 years to convince his opponents – old and eminent scholars.

A thorny path was waiting for him. Neither his colleagues nor process engineers wanted even to listen to him, to say nothing of holding the discussion. Trials were invariably postponed due to this or that reasons, and pilot units installed and ready to produce matte were dismantled according to somebody’s order. For five years Vanyukov was camping on the doorsteps to get approval for mastering the process at one of the metallurgical operations in the Urals, but the initially issued permit was withdrawn on the eve of the trial with the following statement: ‘No dubious testing on commercial scale is possible’. It took Vanyukov another five years to get permission for the pilot unit construction at the testing ground in Kazakhstan, but all of a sudden the newly appointed Minister of Non-Ferrous Metallurgy called it a ‘dead-end method’ and gave order to dismantle the unit.

The following attempt to construct the Furnace at the Tin Plant in Riazan came to scandal: it turned out that the Plant Manager acted at his own risk, without consulting ‘Moscow authorities’.

By the end of 1960s, after twenty years full of failures and disappointments, when Vanyukov was almost ready to give up, proposal of his postgraduate student Valentin Mechin came out of the blue. Valentin offered to do a last-ditch attempt at Norilsk Combine where he worked at that time, and Vanyukov made a decision to take the chance...

Preparation work was in full play when an unexpected turn nearly ruined everything. While inspecting the Plant, the newly appointed General Manager of the Copper Plant, Mr. Johnson Khagazheev, saw a very strange ‘pot’ which, as you might guess, was the Vanyukov pilot unit. Having no idea of the ‘pot intended use’, he gave order to dismantle it ‘Now!’. Prof.Vanyukov was in Moscow at that time, and on getting the sad news, he immediately left for Norilsk. Being extremely upset and angry, he rushed into the Manager’ study to ask for explanations but could

not utter a word and ... burst into tears. The perplexed Manager was listening to Prof.Vanyukov for several hours without interrupting him. The 'speech' being over, they left the room together and went to Boris Kolesnikov, the then Director of Norilsk Combine, to convince or to entreat him to give 25 mln roubles for construction of ... the semi-industrial unit at the Smelter!

Since that fabulously happy moment, Vanyukov Smelting Process has become the Norilsk Combine 'resident'. Later Prof.Vanyukov called Johnson Khagazheev and Boris Kolesnikov the Godfathers of Bath Smelting Process. It was in Norilsk where he managed to make his dream true, and Norilsk Combine is considered to be the Vanyukov Process' Motherland.

Nowadays, there are three Vanyukov Furnaces operating at Norilsk Combine: two are at Copper Plant, and one – at Nadezhda Plant. For the Vanyukov Smelting Process implementation Valeri Bykov, Norilsk Combine' metallurgist, became the recipient of the State Prize. Two Vanyukov Furnaces have been built at Revda Copper Smelter, and Norilsk metallurgists headed by Valeri Drobyshavsky, the 'Vanyukov Process veteran', came there to assist in the process' implementation. Vanyukov Process is used at Kazakhmys Corp.' operations (two Furnaces), in China (5-6 Furnaces), and in South Korea. There is a project for using Vanyukov Furnaces in power industry, in boilers for Heat&Power Plants...

The process developed by Andrei V. Vanyukov was not just an invention; it was a pure revolution in metallurgy. Prof.Vanyukov has created a new principle of metallurgical transformations.

Vanyukov Process has 'blended in' the Norilsk Combine' production loop quite naturally. Now, Vanyukov Furnaces are successfully operating side-by-side with the modern Flash-smelting Furnaces at Nadezhda Plant.