

# *Great Challenge*

Global Leader of Fe-Ni Smelting Technology

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Apr 5, 2006



POSCO and SMSP  
signed the JVA

May 22, 2006



Founded SNNC

Oct 19, 2008



Initiated the first tapping  
from the electric furnace No.1

Oct 31, 2009



Reached normal  
operation level

## About SNNC

### SNNC's challenge of securing global No.1 Fe-Ni production technology continues.

SNNC was jointly established by SMSP, the largest nickel exporter in New Caledonia, and POSCO, the world's leading steel company, in 2006, and it is Korea's first specialized ferronickel manufacturer producing and selling ferronickel, the main component of stainless steel, and other slag products. SNNC established a successful business model by realizing the world's first vertical combination leading to nickel mine, nickel smelting and to stainless manufacturing. Although SNNC had no advanced technology and accumulated experiences in the beginning, it successfully grew its business by creating everything out of nothing.

However, SNNC will not rest on its past achievements. With a firm faith in constantly taking up new challenges, putting passions into action and the infinite potential within us, SNNC will never stop taking up new challenges until the day it becomes the world's most competitive company in the industry. Moreover, rather than merely focusing on economic profitability, SNNC will do its best to fulfill its responsibility as a corporate citizen in order to grow together with the community by harmonizing environmental soundness and social responsibility and pursuing sustainable management to create values greater than profits on the basis of communication with stakeholders.

<b>Foundation Date</b>	May 22, 2006
<b>Business</b>	Producing and selling Fe-Ni and Fe-Ni by-products
<b>Production Capacity</b>	54,000 ton/year based on pure nickel
<b>Customer</b>	POSCO
<b>Shareholder companies</b>	SMSP(51%), POSCO(49%) *SMSP : Nickel mining company in New Caledonia
<b>Location</b>	2148-139, Jecheol-ro, Gwangyang-si, Jeollanam-do, Korea

## SNNC History

### 2005

May 18 POSCO and SMSP signed an MOU

### 2006

Jan 12 Establishment of a corporation and investment approved (POSCO Board of Directors)

Apr 5 POSCO and SMSP signed the JVA

May 22 SNNC founded

Aug 1 Established and proclaimed ethical standards

Aug 28 Initiated building site development

### 2007

Jan 22 Approved an enforcement plan on construction of a Fe-Ni plant

May 2 Initiated construction of a Fe-Ni plant

Nov 30 Completed building site development

### 2008

Jun 2 Initiated a trial operation

Jul 22 Made the first delivery of nickel ore

Oct 19 Initiated the first tapping from the electric furnace No.1

Nov 3 Held a ceremony celebrating completion Fe-Ni Plant No.1

Dec 17 Awarded Knowledge Economy Minister Commendation for vitalization of the Free Economic Zone

### 2009

Jun 4 Awarded Management Innovation Award from Korea Management Evaluation Research Institute

Oct 31 Reached normal operation level(for 30,000-tons of nickel products per annum)

Nov 5 Awarded Prime Minister Award on '2009 Foreign Companies' Day

Sep 19, 2011



Signed the 2nd Investment Agreement

Dec 18, 2014



Initiated the first tapping from the electric furnace No.2

Mar 6, 2015



Held a ceremony celebrating completion of Fe-Ni Plant No.2

May 22, 2016



SNNC, 10th Anniversary

### 2010

Oct 13 Received 'The 11th Korea Finance Management Award'

### 2011

Aug 18 POSCO and SMSP signed the Investment Agreement on Construction of the 2nd Nickel Refining Facility

Sep 19 Jeollanam-do, Gwangyang-si, GFEZ and SNNC signed the Investment Agreement on Construction of the 2nd Nickel Refining Facility

Oct 12 Received Grand Prize in 'The 12th Korea Finance Management Award (in the category of large companies)

Dec 13 Acquired ISO 14001 Certification (Environment Management System)

### 2012

Jul 11 Acquired ISO 9001 Certification (Quality Management System)

### 2013

Aug 22 Achieved the sale and production of 100,000 tons of nickel products

### 2014

Jun 30 Completed construction of an appropriated wharf for nickel in Gwangyang Port

Dec 18 Initiated the first tapping from the electric furnace No.2

### 2015

Mar 6 Held a ceremony celebrating completion of Fe-Ni Plant No.2

### 2016

Mar 2 Received Jeonnam governor's Exemplary taxpayer award

May 22 SNNC, 10th Anniversary



# Sustainability

**SNNC will continue its sustainable growth based on trust and emotional engagement, balance and harmony.**

Besides engaging in profit-making business, SNNC also strives to make systematic endeavors to fulfill its responsibility and role as a corporate citizen.



- The Exterior View of SNNC -



## Sustainable Management

### Ethical Management

SNNC strives to win the trust and love of all stakeholders. In addition to adopting the practice of doing the right things in the right way as its basic principle, SNNC is engaged in active efforts to realize ethical management by implementing a voluntary corporate ethics implementation program in which all executives and employees voluntarily participate to address ethical risks and an education program aimed at preventing unethical behavior and detecting violations of the code of ethics.

### Fair Trade

To meet the changing needs of society and build a win-win corporate culture, SNNC applies relevant provisions in the Fair Trade Act quickly to corporate rules and operates fair-trade CP (Compliance Program) to prevent violation of the law. By using its electronic procurement system, SNNC carries out a fair bidding process to improve transparency of all the processes from the bidding to signing of contract to establish a fair contractual relationship.

### Shared Growth

Competition among individual companies has recently changed into competition among business ecosystems in the business environment, and the importance of forming strategic partnership with related SMEs has been increased for the purpose of enhancement of competitiveness. Against this backdrop, SNNC introduces and operates shared growth programs in an effort to further strengthen shared growth along with SMEs.

### Environment Management

Environment is a base for a pleasant and beautiful world where human beings are harmonized with the nature. SNNC finds the highest value for the future generations in the environment. The company proclaimed its environmental policy in Nov 2011 and has concentrated on internalizing environment management as POSCO family. It is realizing environmentally friendly ferronickel plants by minimizing environmental effect on local community and making diversified efforts to preserve ecosystem.

### Quality Management

SNNC strives to become No 1 in the world in ferronickel production technology by building and running its optimal quality management system and creates the highest customer value and management performance through continued efforts to improve the quality of work.

### Social Contribution

In an effort to fulfill corporate social responsibilities and perform a role as a sound corporate citizen, SNNC conducts diversified social contribution activities where all employees take part from the early stage of foundation of the company. SNNC will continue to fulfill corporate social responsibilities by spreading corporate culture concentrated on sharing and achieve growth and development along with local communities.



# Product Quality

**SNNC enhances customer value through continued technology development.**

Now you are invited to see technologies and products of SNNC, a company that constantly pushes the limits and creates new values.

- Outflow of Molten Fe-Ni -





## Products

### Fe-Ni products

- **Fe-Ni (Ferro-Nickel)**    **Component :** Ni 20%, Fe 80%    **Formation :** Granule    **Granularity :** 3~80mm



Ferronickel is mostly used as main raw material of stainless steel. Stainless steel belonging to nickel is not only heat-resistant, corrosion-resistant, acid-resistant and abrasion-resistant, but it also boasts of excellent processability. As it is environmentally-friendly material that is harmless to the human body, it is used in making tableware and kitchen utensils for most households. Nickel used in various purposes such as medical equipment, aircrafts and coins is a very useful metal in our daily lives.

### By-products

- \* Acquired KS certification for concrete ferronickel slag fine aggregate (KS F 2790)
- \* Acquired E-mark for roadbed ash and caisson fills

- **Prime Stone (air-cooled)**



It is a product made in the form of gravel through gradual cooling based on natural air-cooling of smelting slag. It boasts of excellent compaction rate at a time of being used as civil engineering aggregate.

**Usage** aggregates, roadbed ash, asphalt aggregate, substitutes for serpentinite

- **Prime Sand (water-cooled)**



It is a product made in the form of sand through spraying of water on to smelting slag. As it has better properties than natural sand, it can be used as concrete sand.

**Usage** aggregates, substitutes for serpentinite, concrete aggregate, asphalt aggregate, electric furnace filler, molding sand, abrasives, steelmaking flux at steel mill, caisson fills

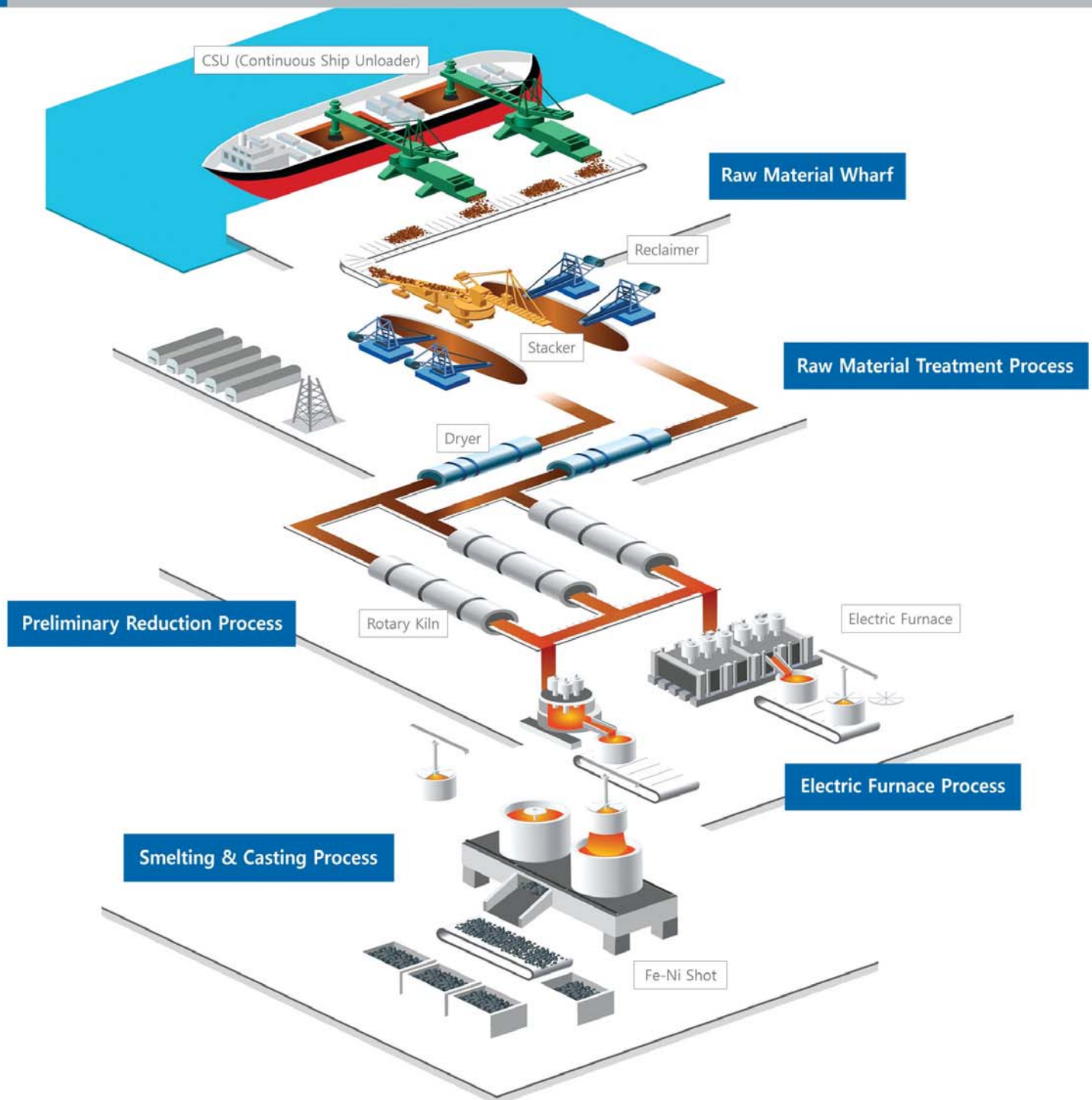
## Story of Nickel

### Why is it called Devil's metal?

A.F. Cronstedt, a Swedish mineralogist, separated nickel from a mineral specimen brought from Germany in 1751. The first nickel that he acquired was so similar to copper that it was difficult to distinguish it from copper at a glance. German mine workers came up with the nickname considering it as Nick Alt, a legendary mischievous spirit known to appear in remote mine and haze miners. As it was present mixed with copper that could not be smelted easily in the early 20th century, it was nicknamed as Kupfernickel meaning Devil's Copper.



# Manufacturing Process





It is a dry manufacture method that was developed by SLN in France in the 1890s before being adopted in Japan and Colombia. It is concentrated on manufacturing ferronickel by smelting and reducing ore in electric furnace. Main processes include raw material treatment, drying, preliminary reduction, smelting reduction (electric furnace process), refining and casting, and final ferronickel products contain about 20% of nickel and 80% of iron.

## Raw Material Wharf

It consists of a birth facility and CSU, an unloading facility that aims to move nickel ore transported from New Caledonia in a ship to an open-air yard for raw materials in SNNC.



## Raw Material Treatment Process

Nickel ore unloaded through a raw material wharf is transported through the use of a belt conveyer to be piled up in an open-air yard for raw materials. Raw materials amassed by mine are uniformly mixed according to target component to be put into a dryer so that moisture is removed. At a final stage, ore is transported to preliminary reduction process. Moisture is reduced from 30% to 20% in the dryer, which uses the exhaust heat generated by the electric furnace process and the heat generated by combustion of pulverized coal in case of needing additional heat.



## Preliminary Reduction Process

Preliminary reduction process aims to remove remaining moisture in ore to be supplied to an electric furnace through the use of rotary kiln facilities so that oxygen in nickel and iron existent in the form of oxide can be eliminated. For this process, coal is used as a reducing agent, and by burning the pulverized coal through the burner, the heat necessary for reduction is supplied.



## Electric Furnace Process

An electric furnace is a process of producing Fe-Ni molten iron and slag through smelting and reduction of ore that went through preliminary reduction process. When electricity is supplied through the electrodes of the slag, the resistance heat and Arc heat is generated, which is then divided into Fe-Ni and slag by gravity separation after reduction.



## Smelting & Casting Process

1,500°C Fe-Ni molten iron produced in an electric furnace process is manufactured as ferronickel products in the form of Luppe in a casting process.





# Shareholder Companies

POSCO, the world's leading steel company, and SMSP, the largest nickel exporter in New Caledonia, joined forces to produce the world's highest quality ferronickel.



- Amedee Lighthouse Island of New Caledonia -





## Shareholder Companies

### The world's First Vertical Combination among Nickel Mine - Smelting - STS Manufacturer



In 2006, SNNC was jointly established by POSCO, a global steelmaker, and SMSP, the largest nickel ore exporter in New Caledonia, with an aim to facilitate supply of nickel, the main material of stainless steel. Through the structure, SNNC secured nickel ore that can be used for the next 30 years from NMC, a mine company that was established in New Caledonia, while creating a new history of ferronickel based on stabilized business structure.



#### SMSP, Largest Nickel Ore Exporter in New Caledonia

It was founded in 1990 to own about 25% of nickel ore reserves in New Caledonia. As it jointly established SNNC with POSCO to engage in nickel smelting and go beyond ore export business while emerging as one of the most representative companies in New Caledonia.



#### POSCO, The World's Leading Steelmaker with Global Competitiveness

POSCO was established in 1968 without sufficient capital, advanced technology and accumulated experiences before emerging as a world-renowned steel maker. As human civilization has been evolved along with advancement of steel, the path that POSCO has followed is closely related to history of development of the Korean economy.

## *Story of New Caledonia*

### The Island Closest to Paradise!

New Caledonia, the French island located in the South Pacific also known as 'the island of eternal spring' or 'the island closest to paradise', boasts beautiful natural environments and has continuously existed for the past 220 million years. It is the world's largest coral island and 60% of the entire land is registered as UNESCO Natural Heritage. Frequently spotted red colored soil in New Caledonia originates from nickel. It is the world's largest nickel producer, accounting for 20% of the world's total nickel reserves. In addition to nickel, the island is also rich in chrome, cobalt and iron.

