

LIME FOR THE PULP INDUSTRY



The Eternal Ecocycle

SMA Mineral is one of the largest producers of lime products in the Nordic countries. We have extensive experience of lime and handling lime. Applying lime, a product of nature, is the most natural method of resetting the balance in nature.

The path lime travels to its different areas of use can be viewed as an eternal ecological process, where very little of the raw material is wasted.

And its areas of use are many: from gardens, forestry, agriculture, and lakes, to steel mills, power plants, flue gas cleaning, water purification, and the pulp industry. Lime is found in all geological formations, all over the world. It plays a versatile and practical role. SMA Mineral masters the many possibilities for using lime, as well as the technology, processes, and areas of use in which it plays a crucial role. We have extensive experience of the industry.

Our headquarters is located in Persberg, Värmland's largest mining region with a tradition stretching back hundreds of years in time.

One of SMA Mineral's specialities is lime products for the pulp industry.

The causticizing process in the pulp industry requires a lime product of high purity that also has outstanding causticizing properties – and this has been our focus when developing these lime products. In our major initiative in Sandarne, we developed extremely cost-effective and high-quality products aimed directly at the mill's surplus lime mud.

Lime is a natural and important element in nature. We understand its life cycle and its areas of use – whether dealing with limestone, burnt lime, or slaked lime.





From waste to raw material

The sulfate process consumes vast quantities of lime. Extremely high demands are placed on the burnt lime used in the process: NPE* purity, degree of calcination, and function in the causticizing process are just a few of them.

When the kraft pulp mill recovery cycle is interrupted because the lime mud kiln breaks down, vast quantities of lime mud are precipitated. The lime mud is usually sent to the landfill as waste, resulting over time in major storage problems.

By applying the Sandarne concept, the lime mud from the breakdown is converted from landfill waste into a new raw material: a high-quality burnt lime, ready to be used again.

Through SMA Mineral's considerable storage capacity and efficient transports, which are handled by its logistics department, the foundation is laid for rapid, reliable deliveries directly to and from the kraft pulp mills. Down time becomes less of a problem, and both the mill's finances and the environment are spared.

The lime mud resulting from the breakdown is transported from the landfills to Sandarne's lime mud kiln, where it is burnt. The burnt lime mud is



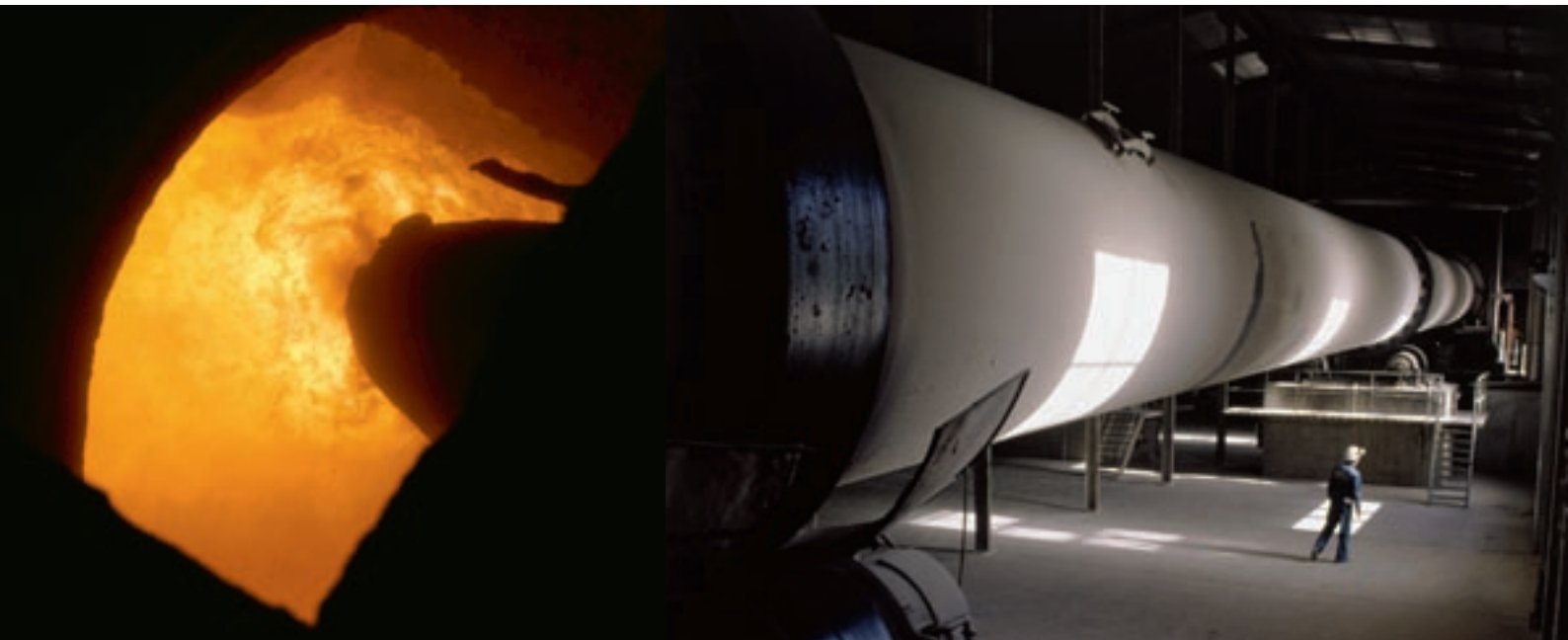
then delivered back to the kraft pulp mills as lime** or as "make-up lime", after mixing in burnt lime of high purity.

Lime mud and different qualities of burnt lime, both domestic and imported, are mixed in the mixing station according to formulas that have been shown to be appropriate for each use through experimenting and research.

** Non Process Elements (NPEs)*

Compounds that contain Si, Al, Mn, and Mg cause problems in the process and are mainly introduced with the wood raw material, though even with input goods and chemicals such as lime.

*** Replacement lime at lime mud reburning breakdown.*



Lime fo

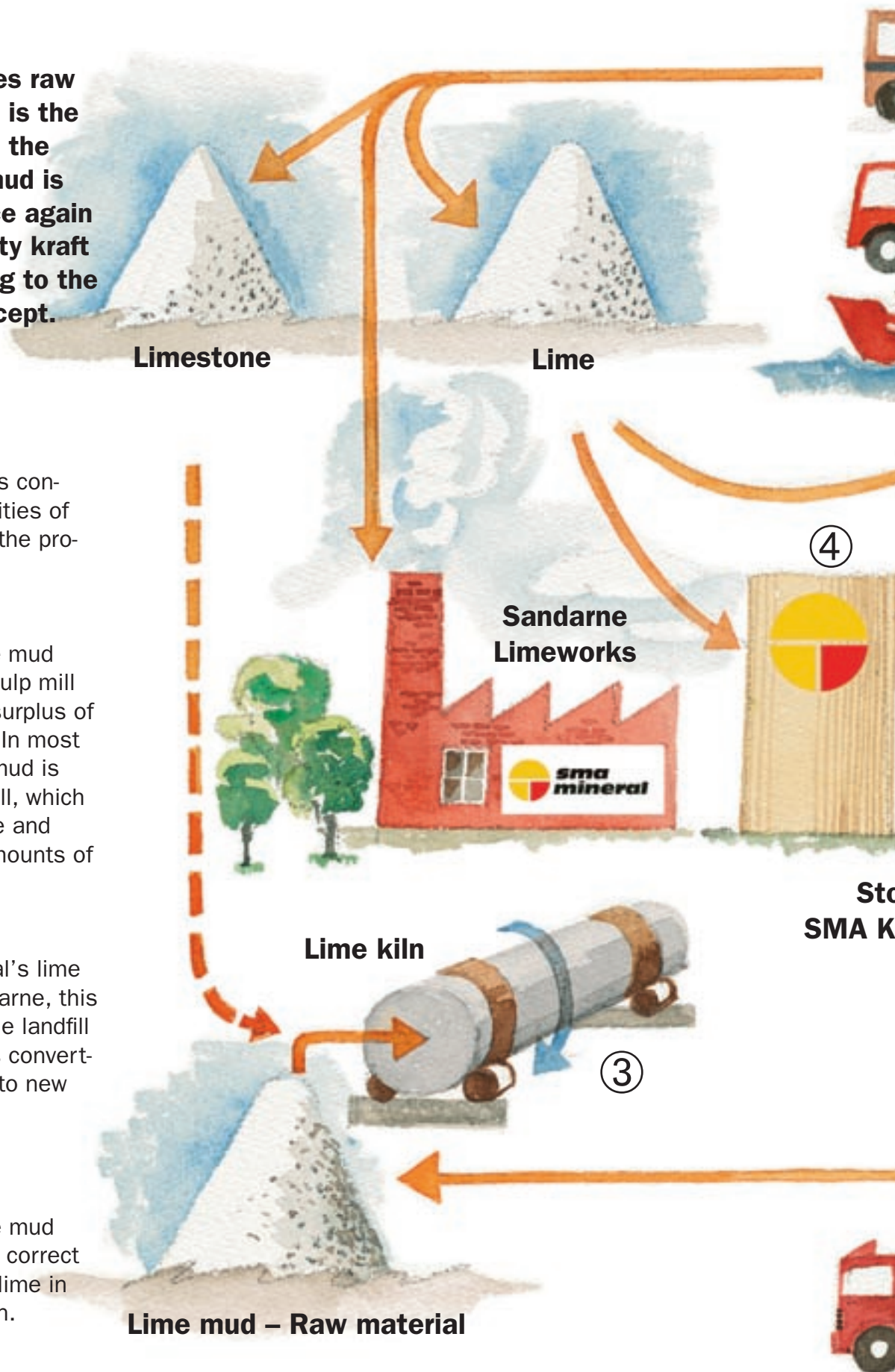
Waste becomes raw material. Here is the cycle in which the surplus lime mud is converted once again into high-quality kraft lime, according to the Sandarne concept.

1. Kraft pulp mills consume vast quantities of lime products in the production of pulp.

2. When the lime mud kiln in the kraft pulp mill breaks down, a surplus of lime mud forms. In most cases this lime mud is sent to the landfill, which is both expensive and requires large amounts of space.

3. In SMA Mineral's lime mud kiln in Sandarne, this lime mud from the landfill is burnt and thus converted from waste into new raw material.

4. The burnt lime mud is mixed with the correct amount of burnt lime in the mixing station.



Limestone

Lime

Sandarne
Limeworks

Lime kiln

Lime mud – Raw material

Sto
SMA K

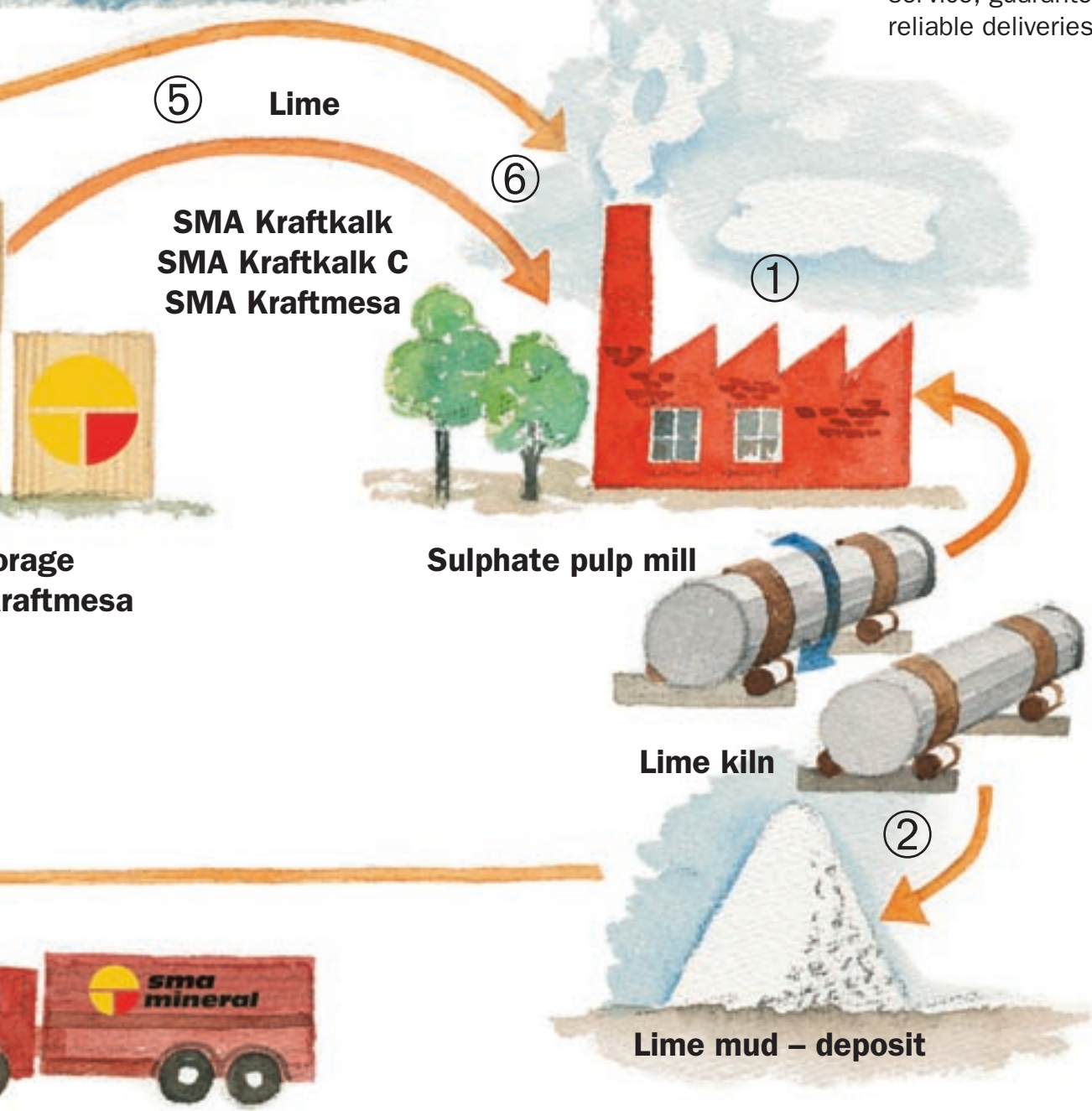
or kraft



5. The burnt lime mud is delivered back to the pulp mill in the form of lime* or “make-up lime”. SMA Mineral’s large warehouses enable the company to provide highly reliable deliveries.

* Replacement lime at lime mud reburning breakdown.

6. SMA Mineral’s transport organization, with twenty-four hour service, guarantees fast, reliable deliveries.



⑤ Lime

SMA Kraftkalk
SMA Kraftkalk C
SMA Kraftmesa

⑥

①

Sulphate pulp mill

Lime kiln

②

Lime mud - deposit

orage
kraftmesa

Complete Security

SMA Mineral produces several lime products for use within the pulp industry. The type of lime delivered is based on the customer's needs and requests combined with our experience.

No matter which product is selected, the customer may rest assured that the type of lime delivered is the right one for the production process involved – at the same time that the problem with waste heading to the landfill is conveniently solved.

We offer the following types of lime for the pulp industry:

SMA Kraftmesa

– pure reburnt lime mud resulting from mechanical breakdown at the kraft pulp mills. From having been waste in the landfill, lime mud becomes a new raw material.

SMA Kraftkalk

– a mixture of reburnt lime mud and burnt lime from domestic lime plants, passes through the system unnoticed; good filtering properties, reduced need for acid washing, full capacity utilization during lime mud kiln breakdown, unchanged white liquor and pulp production, good reactivity that resembles the pure lime mud in the slaker.

SMA Kraftkalk C

– a mixture of reburnt lime mud and imported burnt lime of high purity, passes through the system unnoticed; good filtering properties, reduced need for acid washing, full capacity utilization during lime mud kiln breakdown, unchanged white liquor and pulp production, good reactivity that resembles the pure lime mud in slaker, high degree of purity.

SMA Cellkalk – import

– with a calcium carbonate residue adapted for the pulp industry, extra high quality for the application, high purity regarding NPES, high CaO level.

Burnt lime – Boda, Röyttä, Mo i Rana

– normal burnt lime, produced in domestic limeplants, reactive lime adapted for the application, high purity regarding NPES.

Burnt lime – Rättvik

– hard-burnt lime, a calcium carbonate content adapted for the application, high purity regarding NPES.



SMA Mineral has several lime products in its product portfolio that are suitable for internal water purification and for adjusting the pH of process water. No matter which product is used, SMA Mineral can meet the customer's needs for high-quality products.

The most common products for this type of application are burnt lime, slaked lime, and crushed and ground limestone products.

Crushed and ground limestone products

– pure limestone products from a sedimentary and single-crystalline origin are produced in most fractions, suitable for pH-adjustment of water.

Internal water purification and pH-adjustment

Burnt lime

– pure normal burnt lime with high reactivity, with a very low proportion of inert material. The burnt lime is produced in several fractions at lime plants in Boda, Oxelösund and Röyttä.

Slaked lime

– slaked lime is used when great demand is placed on the ability to dissolve quickly; the slaked lime is produced in Rättvik and Röyttä and has a high level of purity.





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