

Wet Separation Techniques

The current status & overall perspective in Europe

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SUEZ SOIL REMEDIATION

STEVE LEROI

ready for the resource revolution



Basic Building Stones of Wet Separation Technology

Differences in properties allows separation, decomposition & recomposition

Process based on physical separation

Separation based on difference in physical characteristics :

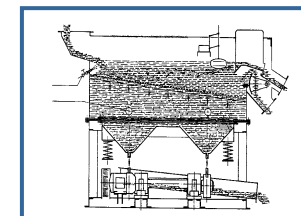
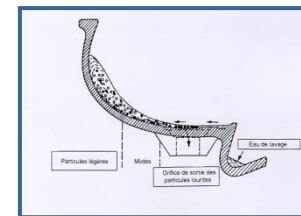
- data : density, grain size, ratio density /surface area, ...
- Sieves, drums, jigs, hydrocyclones, spirals, thickeners, belt press or chamber press, ...



Process based on chemistry

Chemical properties & chemical breakdown :

- Flocculation (VanderWaals forces)
- Acidic decomposition

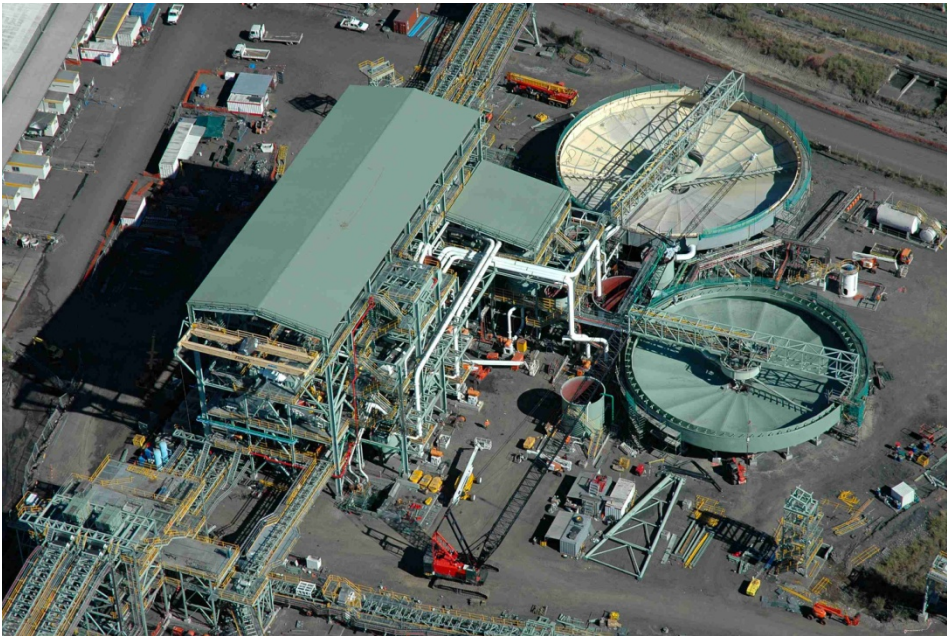


A physical and chemical process

Commodities market

For centuries wet separation techniques have been used for commodities

Washing technologies and plants



Source : www.javelinassociates.com – BHP Billiton Black Water Coal Plant



Source : <http://kerkosand.quarzwerte.com>

Coal and sand recovery

Contaminated Land market

Recovery of sand and stones

Sand recovery based on a landfill ban or high landfill taxes interval



Sand recovery to protect scarce hazardous landfill resources

Soil Related Waste Market

Different industries use sand as production medium or sands gets mixed in the other waste streams

Casting Sands, C&D wastes and Shooting range sands

Waste stream containing sand as add-on for existing soil washing plants

- Sand beds, filtering sand, shooting ranges sand are all media that are meant to capture other wastes
- While collecting construction and demolition wastes, sands gets mixed with other wastes



Roadsweepings

Waste streams with high organics and sand, for recovery due to re-use relaxation and increasing landfill taxes

- Leafs, branches, candy paper, cans, carparts, lighters,
- Light fraction (organic, candy paper), heavy sandy fraction, magnetics (ferro metal),
Coarse fraction larger pieces (bins in the storage)



Source: www.pulisabbie.it

Recovery of sand from various application in Defence, Industry and Municipal origin

Geographical spread of recovery in Europe

From early adaptors to current fast roll-out across corners of the continent

Early adaptors (Belgium, The Netherlands, Switzerland, Italy, ...)

Market driver - contaminated soils legislation
(inventory and deadlines in investigation and clean-up)

- Contaminated land industry – impossible to clean all soils
- Tools and practices to assess re-use possibility of light and medium impacted soils.

Fast roll-out of recovery from waste (landfill tax and re-use practise) (UK, Italy, ...)

Economical driver based on sole financial incentives

- Recover sand for re-use (Tuscany as a 'puller'-role, UK = increasing landfill tax – tax administration)
- Defence working cost considerate

Recovery from Micro market to Macro market in small applications

The European market for Roadsweepings

Two countries at high paced development - United Kingdom and Italy

List of locations with operating roadsweepings recovery plant

United Kingdom

- SITA UK – *Neachells Lane*
- Blue Haze Landfill Site
- Horsham Landfill Site
- Ewelme landfill site

Italia

- Ecoliguria (LG)
- Gruppoesposito (BG)
- EXE SpA (FRI)
- RMT (UM)
- Pulisabbie (TN)

- Teseco (TOS)
- Pbr-intergreen (BS)

A success story recovery of sand from roadsweepings

Recovery of metals from the Aluminium industry

Success to Failure

Pure economical driver as in commodities market

All recovery fraction need to have a value:

- Aluminium metals
- Serox (mineral wool market application)
- Salts to aluminium industry
- Ammonium sulfate

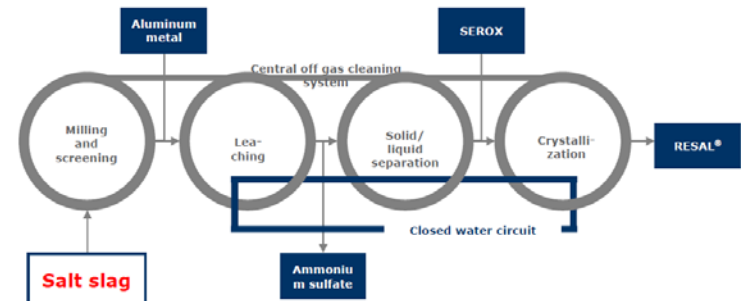
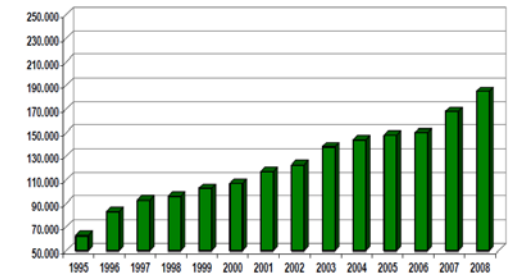
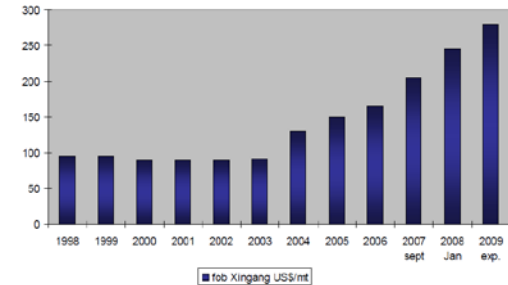
Interesting similarities with history

of contaminated soil treatment

- Started out as mobile treatment (Canada)
- ramped up during same period

Bust due to economical down-turn

From Gerhard Merker, ALSA paper, 14th bauxite and alumina seminar Miami 2008



Closing the loop until it breaks

Recovery in the Municipal Waste Market

Urban Mining through recovery of metals from incinerator bottom ashes

Combination of dry and wet processes :

- Magnetism & eddy-current separation (SITA Valomac (B), LHJ Group (FI))
- Wet Separation (soil washing) (HVC (NL), MVO (NL))

Enhanced recovery of different kinds of metals

- Enhanced wet separation with heavy waters (Dolphin Metals (NL))



Source : www.mvogroep.nl



Source : voortgangsrapportage Boskalis mid 2015

nederland.boskalis.com

Closing the loop through a cross-border network of companies

Recovery through hot water application

Pushing the capabilities of wet separation technology – full scale applications

Recovery through wet separation of Iron works residues

Iron scraps, iron-oxides, WTPP sludges, dusts etc

Recovery of iron and iron oxides from waste for re-use

- Hot water to cope with high % of oil in water

Recovery through wet separation of Oil sludge of heavy oils

Recovery of sand and combustible filter cake residue (cement plant)

- Hot water to cope with high % of oil in water & to lower viscosity of the oil in the sand
- Filter cake as energy source



Temperature to increase effectiveness

Wet Separation – Conclusions & outlook

Legislative & economical stimuli – general recovery and water recycling trend

Recycling & Recovery Utopia

Legislative frameworks condition for a performant market

Trade-off's to be made

- Landfill surfaces (real-estate vs void) – export money in country

Networks (cross-border) of Circular economy

Success and failure - future perspective

- Networks reaching economical stability & developing new ventures
- Economics can be a driver (even though fluctuation might prevail)

Outlook

- Transformation of the energy sector (conventional & radio-active)
- Practices and innovation for Plastics & WEEE (rare earth metals)

Conclusions & outlook