

		Minutes from project meeting 15.06.2016 – v3 as of 4th July 2016			
TOPIC: Status and further action		Present	Apologies	Informing	
Sent to:					
Jens-Petter Andreassen, NTNU		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ina Beate Jensen, NTNU		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ana Maria Martinez, SINTEF		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bjarte Øye, SINTEF		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liv Stavsetra, IFE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tor Bjørnstad, IFE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Alexander Krivokapic, IFE		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tom Rames Jørgensen, Yara		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kari-Anne Leth-Olsen, Yara		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oluf Bøckman, Glencore Nikkelverk		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ole Morten Dotterud, Glencore Nikkelverk		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maria Førde Møll, Boliden Odde		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steinar Jørstad, Boliden Odde		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Alessio Vascon, UiO		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grethe Wibetoe, UiO		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jon Petter Omtvedt, UiO		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hans Vigeland Lerum, UiO		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Niels Højmark Andersen, UiO		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dag Øistein Eriksen, UiO		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Archive code	Grade CONFIDENTIAL	Ulf-Rune Visur Syversen, NFR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Electronic archive code		Invited by Jon Petter & Dag	Recorded by Jon Petter, Hans & Dag		
Project no.	Date 16.06.2016	Place, Radisson Blu, Gardermoen	Meeting dates, hours: 15.06: 10.00 – 15.15		

Agenda:

- 2016-01. Welcome and agreement of agenda
- 2016-02. Status – Reports and economy
- 2016-03. Progress of Glencore's tasks – Hans' presentation
- 2016-04. Discussion and proposition for further work
- 2016-05. Lunch
- 2016-06. Progress of Boliden Odde's tasks – Ina's and SINTEF's presentation
- 2016-07. Discussion and proposition for further work
- 2016-08. Isotope exchange as method for determining the concentration of fluoride
- 2016-09. Progress of Yara's tasks – Alessio's and IFE's presentation
- 2016-10. Discussion and proposition for further work
- 2016-11. Educational issues: Seminars, work-shops, etc
- 2016-12. AOB

- 2016-01: Welcome**
The agenda was accepted as proposed. Dag Eriksen headed the meeting. As there were at least three people attending for the first time a short introduction was made.
- 2016-02: Status – Reports and economy**
Progress report to NRC has been submitted within dead-line, but was not accepted. A new version with updated project summary is accepted.
The seminar held in Trondheim in March was arranged within budget. The project is also so far within budget.
- 2016-03/04: Progress of Glencore’s tasks – presentation by Hans**
Hans presented the work done so far on speciation of Cd in chloride media. The methods used are solvent extraction, NMR, Raman/IR, ICP-MS and computational chemistry to measure compounds and model the species. The work is on-going and was well received.
Glencore will develop a new process for zinc and would like to see a process separating both Zn and Cd. Radioactive Zn is now available at UiO and will be used in further studies.
Yara commented on the societal needs for handling and disposing of Cd. This should also be addressed by the project.
- 2016-06/07: Progress of Boliden Odda’s tasks – presentation by Bjarte and Ina**
Bjarte gave a short introduction to the different mineral phases encountered by Boliden Odda and possible fluoride compounds (or lack of such). SEM-studies indicate absorption of F⁻ at surfaces of minerals.
Ina then presented her work on precipitation of ferric and ferrous hydroxides and the co-precipitation of fluoride. So far their results indicate that the surface size is the key parameter.
- 2016-08: Isotope exchange**
It has been proposed that radioactive fluorine may be used to help the determination of the fluorine concentrations in the real solutions and to see how much is co-precipitated. Dag presented some logistic challenges to enable the use of ¹⁸F as a fluoride tracer.
Jon Petter proposed the possibility of sending samples from NTNU to UiO for isotope dilution analysis, but use as a tracer for fluoride is also possible, but a lot more elaborate.
- 2016-09: Progress of Yara’s tasks – presentation by Alessio**
IFE and UiO has been working on finding solid particles covered with some compound which will effectively extract Cd from the very saline environment called Yara’s Mother liquor. The particles can be magnetic to facilitate "easy" harvesting, but also other separation methods can be applied. Alessio presented the work performed by IFE and himself on chemical stability of extractants and their extracting power. Kelex 100 was reported in the literature to work under similar conditions as we have, but the published results turned out to be wrong.
A new extractant reported in the literature was proposed to be tested. It is presumably too expensive for being used in the industry, but could be interesting to know its extracting behavior at Yara’s conditions. Also, a simple test using pure

yellow sulphur, S₈, was proposed. The method will be so simple and cheap that testing it should be done, although the probability for success is considered as low.

2016-11: Educational issues

Jon Petter asked about the possibility for arranging course seminars at the premises of the industrial partners. This was approved. Such a seminar will be open for our PhD-students but also for other students in hydrometallurgy. Some input and sightseeing of the site must be included, but also lecturers from other institutions will be involved.

The next project meeting and Steering Committee meeting is scheduled for the autumn at Yara's at Herøya. Then it may be economical efficient to arrange the seminar in connection with these meetings.

It was also approved that Jon Petter arrange for purchase of the textbook decided, Michael Free "Hydrometallurgy – Fundamentals and Applications". About ten hard-copies will be purchased and distributed among the project participants.

2016-12: AOB

As there was no other business, the meeting was adjourned at 15:15.

All presentations will appear at the project home page, www.hydromet.no, under the login portal.