

| | | Minutes from project meeting 5.-6.10.2016 | | | | |
|---|------------------------------|--|--|-------------------------------------|-------------------------------------|--------------------------|
| 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 checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Katrine Lie Bøyese, Yara | | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Oluf Bøckman, Glencore Nikkelverk | | <input checked="" type="checkbox"/> | <input 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 Odda | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Steinar Jørstad, Boliden Odda | | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input 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 checked="" type="checkbox"/> | <input 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"/> | |
| Trond Sæterlid, Glencore | | <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 checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | Kari-Anne Leth-Olsen, Yara | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Electronic archive code | | Invited by Jon Petter & Dag | Recorded by Dag | | | |
| Project no. | Date 7.10.2016 | Place, Adminiet, Herøya | Meeting dates, hours: 5.10: 12.00 – 16.00 6.10: 08.45 – 13.00 | | | |

Agenda:

- 2016-13. Welcome and agreement of agenda
- 2016-14. Status – Update on economy
- 2016-15. Seminar in March 2017
- 2016-16. Progress of Yara's tasks – Alessio's and IFE's presentation
- 2016-17. Discussion and proposition for further work
- 2016-18. Progress of Glencore's tasks – Hans' presentation
- 2016-19. Discussion and proposition for further work
- 2016-20. Progress of Boliden Odda's tasks – Ina's and SINTEF's presentation
- 2016-21. Discussion and proposition for further work 2016-09. October 6th:
- 2016-22. Presentation of Yara by Kari-Anne Leth-Olsen
- 2016-23. Tour of the factory and the new pilot plant

- 2016-13: Welcome**
The agenda was accepted as proposed. Jon Petter headed the meeting.
- 2016-14: Status – Update on economy**
An updated account table was presented. The project is so far within budget. Accounts and budget for 2017 will be addressed at the Steering Committee Meeting later this autumn.
- 2016-15: Seminar in March 2017**
The next yearly seminar is decided to take place at Thon Hotel Area, Lillestrøm, at March 7th and 8th, 2017. IFE will co-arrange it with UiO. The topic will be “From ore to finished product”. Dag presented the list of lecturers. Some has already accepted and some has not been contacted yet. Dag will continue the planning. Ole proposed to give a lecture on laterites as sources for nickel. This was gratefully accepted and included in the schedule.
- 2016-16/17: Progress of Yara’s tasks – presentation by Alessio**
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 series of other extractants has also been tested, but so far no one seems to work at our acidic conditions. Even pure yellow sulphur, S₈, has been tested, but without success. We are promised to get some di-phosphonate acids from Finland, but they have not arrived yet. Tom proposed to use some kind of sulphide-containing extractants and promised to help us acquire some of this material.
- 2016-18/19: 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 so far are solvent extraction and NMR, while Raman/IR will be performed next week. ICP-MS and computational chemistry are methods to be implemented further on. He has got quite a lot of data but it needs to be tied together coherently to better understand the chemistry which is taken place under the high concentration regimes he is studying. Using NMR and spectroscopic methods seems very promising in helping to perform a more exact speciation.
- 2016-20/21 Progress of Boliden Odda’s tasks – presentation by Ina**
Ina 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. BET-measurements and gravimetric analyses were also presented. At NTNU they have the possibility to give undergraduate students small research assignments. Ina has used this opportunity to perform a studies under a wide range of parameters.
- 2016-22: Presentation of Yara**
Kari-Anne Leth-Olsen gave a presentation of Yara as an international company and the R&D-department. The participants in the hydrometallurgy course that our project is organizing joined the project meeting for this presentation and the tour (described below).
- 2016-23: Tour of the facilities**
First we visited the new pilot plant for NPK-production. This is an impressive facility

at an impressive price. Then we were taken to the CN (Calcium nitrate) factory and the Prilling tower. The size impressed everyone. The tour was especially valued by our students that discovered that there is quite a large difference between reading about an industry processes and actually seeing the installations "on site".

All presentations will appear at the project home page, www.hydromet.no, under the internal pages (which requires a password login to access).

Yara's hospitality and organization of the project meeting was highly appreciated by everybody – thank you very much!