

# Training and Capacity building Course in Laboratory Quality Control

15-17 June 2013 at RuWatSIP



## Quality Control

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**Project in MRRD covering  
Capacity Building and  
Institutional Cooperation in the  
field of Hydrogeology for Faryab  
Province Afghanistan**



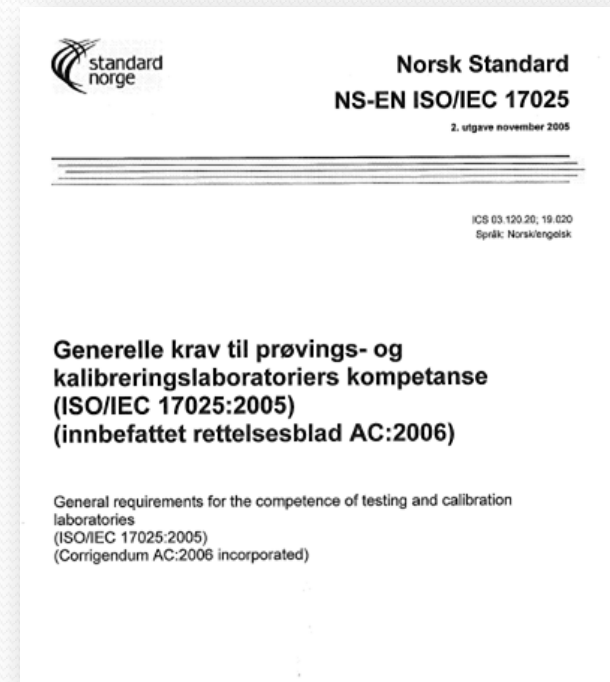
# Quality control?

- Do we make mistakes and what types?
  - Forgetting things?
  - Make mistakes
  - Forget to check
  - Equipment fails?
  - In a rush
  - Have no instruction?
  - Lost information and documentation?
  - More

# Why is QC needed?

- We are all human being and can make mistake and therefore QCs have been developed
- Example:

**ISO/IEC 17025:2005**  
**General requirements for**  
**the competence of testing**  
**and calibration**  
**laboratories**



# What are the principles of international QC?

## Organization

- Legal responsible entity
- All persons working shall have no conflict of interests
- Purpose of management is to oversee quality

Define responsibility for all management /personnel

## Documentaton control

- Must control documentation for managemnet system, regulations, standards, normative documents, tests, calibration methods, drawings, software, speciications, instructions and manuals

# What are the principles of international QC?

## Control of records

- Must have procedures and full control of analysis and records. Records shall be kept locked and in confidence

## Technical records

- Must keep original records of all tests, calculations, calibration results.
- All tests shall identify responsible personnel for sampling and analysis and who was checking results,

# What are the principles of international QC?

## Measurement traceability

- All work and tests, calibration must be documented and traceable.
- All tests shall adhere to International standards unless methods are validated and proved satisfactory.
- And much more..

# What does QC mean in practice?

- We need to develop procedures for all work.
- Checklists have to be prepared so that all can sign and “tick off” that work is done or systems checked.
- We have to prepare standard report formats for reporting.
- We have to structure regular training of laboratory staff so that only certified and qualified staff performs analysis alone. ( If not certified then they have to work under supervision)



# Training and retraining

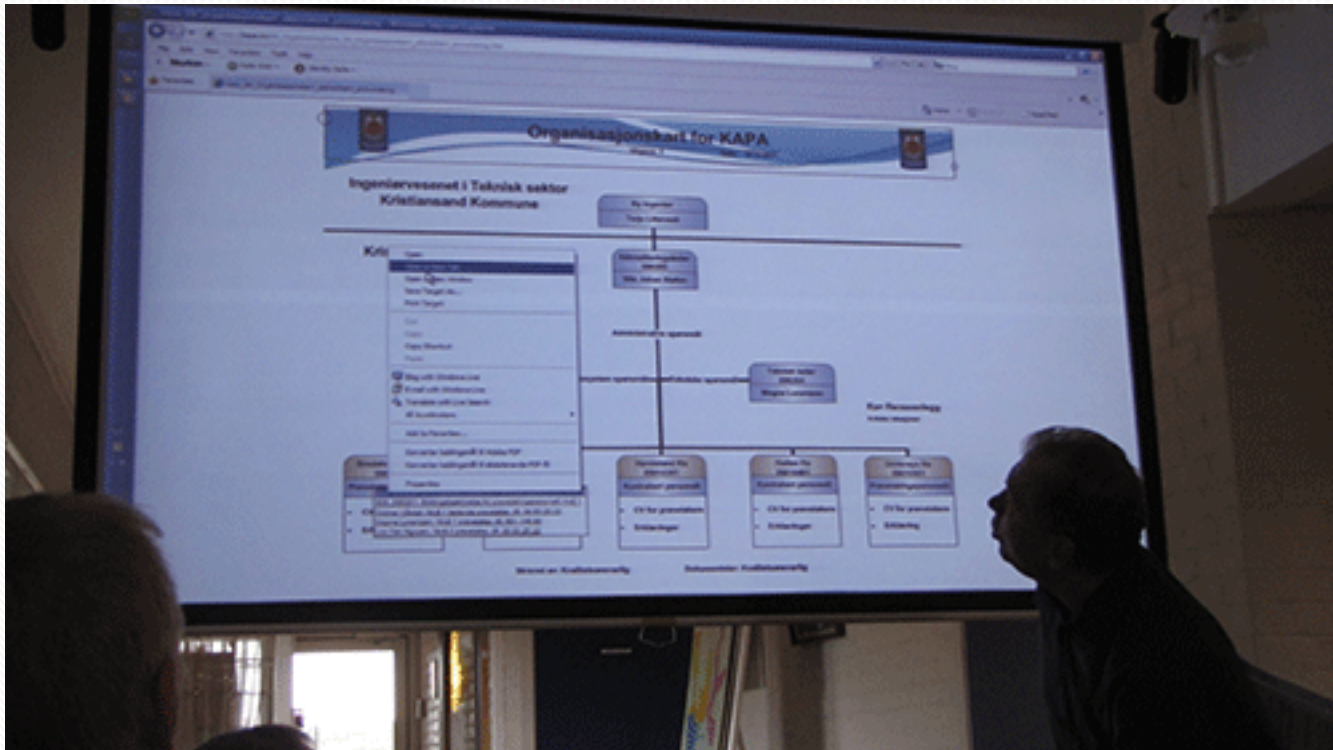
- We need structured training and a training plan and records of who has been trained in what
- We have to check that methods and staff can analyse standards with adequate accuracy
- We can meet regularly with other laboratories to exchange ideas and discuss challenges
- We can participate in ring tests to see that our lab have acceptable accuracy of analysis



# Example: Expression of results

- Are results reported correctly?
  - As normal?
  - As molar?
  - As weight of ion ( $\text{NO}_2$ ), N,  $\text{CaCO}_3$ ??
  - Milli equivalents?
- Do we have problems here?

# Some example from Norway training in QC



# Training session- like here in Kabul



# Basic lab





# Examples for equipment control

- Temperature for sample preservation:

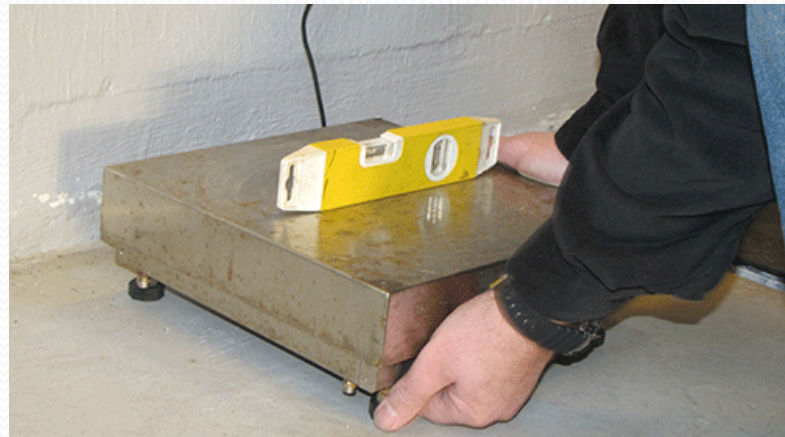


# Checking volume and weights



Balance need to read exactly 10.000 kg, and need adjustment

A balance must also be in level!  
Checked!!



# KAPA



Handeland Renseanlegg i Sirdal




Bredalsholmen renseanlegg i Kristiansand




Odderøya renseanlegg i Kristiansand

Kontakt oss



Test 273



## KAPA


KRISTIANSAND AKKREDITERT  
PRØVETAKING FOR AVLØPSANLEGG

Utgave: 4


Gyldig fra: 16.04.2013

Velkommen til KAPA's kvalitetssystem.  
KAPA er en organisasjon tilknyttet ingeniørvesenet i  
Kristiansand kommune. KAPA gjennomfører  
akkreditert prøvetaking for renseanlegg i Vest Agder.


Klikk her for å komme til  
kvalitetssystemet




Følgende kommuner deltar under KAPA:




Kristiansand



Mandal



Sirdal



Søgne

Godkjent av: Jarle Hille



Granvika renseanlegg i Mandal



Hellen renseanlegg i Søgne

INFORMASJON  
FOR EKSTERNE  
LABORATORIER







# Kvalitetssystem for akkreditert prøvetaking av avløpsanlegg i Vest-Agder



21.04.2010

## Generell informasjon

Organisering

Visjoner, Verdier, Mål og Strategier

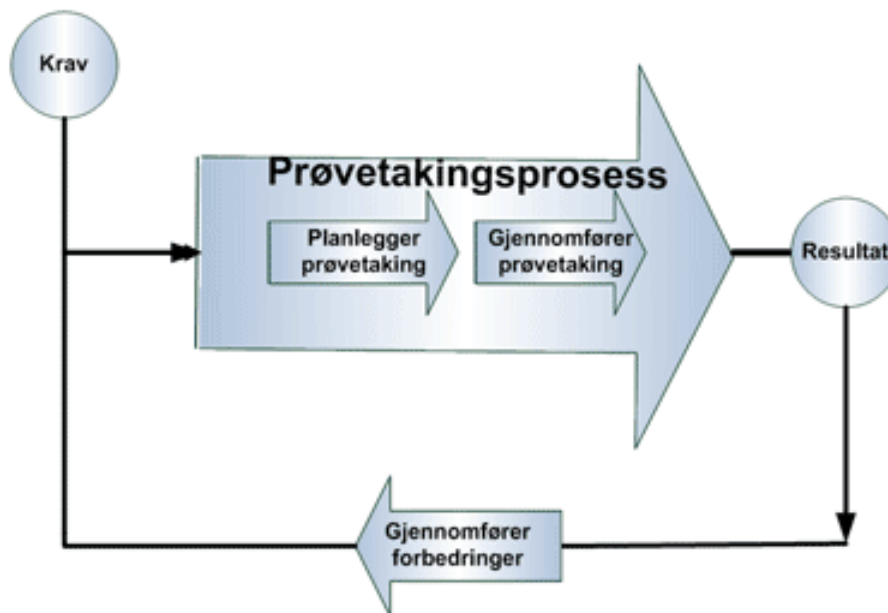
Kontrakter/ Avtaler

Rapporter og statistikker

Kvalitetshåndbok

Møteplaner

Virksomhets plan



## Støtteprosesser

Styrende regelverk

Innkjøp/ økonomi

Opplæring

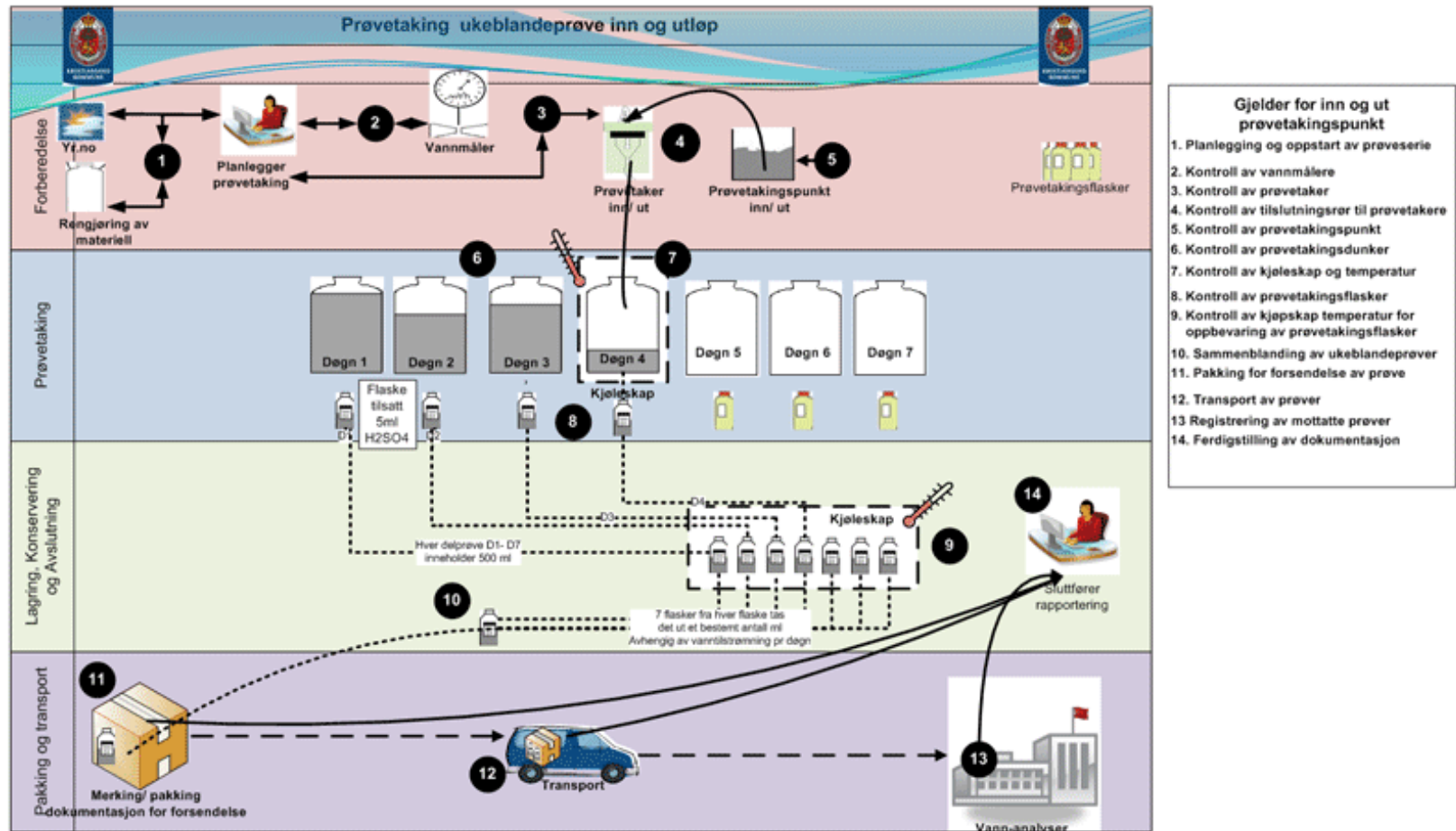
Kvalitets system

Revisjon

Avvik og forbedring

Dokument håndtering

# Example work processes: All activities with supporting procedures and checklists



# Procedures of everything to be sure that everybody do the same test using exactly same method

KAP 4

PROSEDYRE UTTAK AV DEL-PRØVER FOR  
DØGN- OG UKJE BLENDE PRØVER

Utgave: 0.17  
status: Utkast

Godkjent dato: x

Utkast

## 1. Hensikt

Sikrer at uttak av del- prøver for døgn- og ukje blendeprøver blir gjennomført i henhold til krav. NB! KRAV: Prøvetakingsdunk skal være av polypropylen eller polyetylen med gradering på 25-30 liter med stor åpning, og børnehåndtak.


## 2. Beskrivelse

Utføres av	Nr.	Aktivitet	Referansen
Prøvetaker	1	Tar ut prøvetakingsdunk → Tar ut prøvetakingsdunk fra kjøleskap → Plasser prøvetakingsdunk på et stødig og horisontalt sted → Sletter av og rengjør prøvetakingsdunk inn i kjøleskap	a
Prøvetaker	2	Vegvør prøvetakingsdunk → Skal det forlates en døgnblendeprøve? → → Finnenen frem prøvetakingsdunk tilstodt konservering og et målebeger på 1000 ml → Eller skal det forlates en ukje blendeprøve? → → Finnenen frem prøvetakingsdunk tilstodt konservering og et målebeger på 500 ml	a
Prøvetaker	3	Lager fullstodt i prøvetakingsdunk → Finnenen frem prøvetakingsdunk "paddelen" for omrøring i prøvetakingsdunk → Rør kraftig med "paddelen" i prøvetakingsdunk i 10 sekunder (3 tall bevegelse) → Fortsetter på neste punkt ved døgnblendeprøve, eller går til punkt 5	a
Prøvetaker	4	Gjennomfører døgnblendeprøve → Senker umiddelbart 1 liters målebeger på stang ned i dunken til bunnen å ta ut 1 liter prøve → Fyller umiddelbart i 1 liters merket prøvetakingsdunk ca 20% full (uden prøve skal fylles) for døgnblendeprøve → Marker prøvetakingsdunk med innlapp i dato, eller utlapp i dato → Sletter på lokk og plasser i kjøleskap for prøver som skal analyseres for BCS og/eller KCS	a
Prøvetaker	5	Gjennomfører ukje blendeprøve → Senker umiddelbart 500 ml målebeger på stang ned i prøvetakingsdunk → Tømmer umiddelbart ca 500 ml i rengjort 1-liters døgnprøvetakingsdunk merket dag 1, 10 og med 7, i hte hvelv der en har prøvetakingsdunk → Sletter på lokk og plasserer den i kjøleskap	a

Utgave: 0.17, 0.18, 0.19, 0.20, 0.21, 0.22, 0.23, 0.24, 0.25, 0.26, 0.27, 0.28, 0.29, 0.30, 0.31, 0.32, 0.33, 0.34, 0.35, 0.36, 0.37, 0.38, 0.39, 0.40, 0.41, 0.42, 0.43, 0.44, 0.45, 0.46, 0.47, 0.48, 0.49, 0.50, 0.51, 0.52, 0.53, 0.54, 0.55, 0.56, 0.57, 0.58, 0.59, 0.60, 0.61, 0.62, 0.63, 0.64, 0.65, 0.66, 0.67, 0.68, 0.69, 0.70, 0.71, 0.72, 0.73, 0.74, 0.75, 0.76, 0.77, 0.78, 0.79, 0.80, 0.81, 0.82, 0.83, 0.84, 0.85, 0.86, 0.87, 0.88, 0.89, 0.90, 0.91, 0.92, 0.93, 0.94, 0.95, 0.96, 0.97, 0.98, 0.99, 1.00, 1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.25, 1.26, 1.27, 1.28, 1.29, 1.30, 1.31, 1.32, 1.33, 1.34, 1.35, 1.36, 1.37, 1.38, 1.39, 1.40, 1.41, 1.42, 1.43, 1.44, 1.45, 1.46, 1.47, 1.48, 1.49, 1.50, 1.51, 1.52, 1.53, 1.54, 1.55, 1.56, 1.57, 1.58, 1.59, 1.60, 1.61, 1.62, 1.63, 1.64, 1.65, 1.66, 1.67, 1.68, 1.69, 1.70, 1.71, 1.72, 1.73, 1.74, 1.75, 1.76, 1.77, 1.78, 1.79, 1.80, 1.81, 1.82, 1.83, 1.84, 1.85, 1.86, 1.87, 1.88, 1.89, 1.90, 1.91, 1.92, 1.93, 1.94, 1.95, 1.96, 1.97, 1.98, 1.99, 2.00, 2.01, 2.02, 2.03, 2.04, 2.05, 2.06, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, 2.23, 2.24, 2.25, 2.26, 2.27, 2.28, 2.29, 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 2.37, 2.38, 2.39, 2.40, 2.41, 2.42, 2.43, 2.44, 2.45, 2.46, 2.47, 2.48, 2.49, 2.50, 2.51, 2.52, 2.53, 2.54, 2.55, 2.56, 2.57, 2.58, 2.59, 2.60, 2.61, 2.62, 2.63, 2.64, 2.65, 2.66, 2.67, 2.68, 2.69, 2.70, 2.71, 2.72, 2.73, 2.74, 2.75, 2.76, 2.77, 2.78, 2.79, 2.80, 2.81, 2.82, 2.83, 2.84, 2.85, 2.86, 2.87, 2.88, 2.89, 2.90, 2.91, 2.92, 2.93, 2.94, 2.95, 2.96, 2.97, 2.98, 2.99, 3.00, 3.01, 3.02, 3.03, 3.04, 3.05, 3.06, 3.07, 3.08, 3.09, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24, 3.25, 3.26, 3.27, 3.28, 3.29, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.37, 3.38, 3.39, 3.40, 3.41, 3.42, 3.43, 3.44, 3.45, 3.46, 3.47, 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# Checklist for analysis, Always register and sign . Action tracable

**KAPA**


<b>SJ_02010101: SJEKKLISTE FOR AUTOMATISK PRØVETAKING: UKE- DØGNBLANDEPRØVE, RENSEGRAD</b>		Utgave 9	Gyldig fra: 25.04.12	
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T:\02\_Gjennomfører\_prøvetaking\Sjekkliste\SJ\_02010101\_Sjekkliste\_for\_automatisk\_prøvetaking\_uke\_dognblandeprøve\_rensgrad\_V\_9\_120425.docx

<b>RENSEANLEGG:</b>		Prøveserie nr. (og skjema nr.) - PUB - Renseanlegg (nr. 401-402, 404-405)    Prøvetype    År (2011)    Uke slutt nr (uav)																				
Ansvarlig for prøvetaking:		Tlf:	Start dato:																			
<b>Kontroller ved prøvetakingsperiodens start: (bekreftelse ved initialer i relevante ruter*)</b>																						
	Innløp	Utløp	Kommentar																			
Prøvetakingspunkt rengjort																						
Slinger prøvetaker rengjort/nye																						
Prøvetaker rengjort																						
Delvolum / prøvetaker innstilt (ml per delprøve)	(=snitt-inn) <sup>3</sup>	(=snitt-ut) <sup>3</sup>	<table border="1" style="font-size: x-small;"> <tr> <th>Volumtest</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> <tr> <td>Inn (ml)</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Ut (ml)</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Volumtest	1	2	3	4	5	Inn (ml)						Ut (ml)					
Volumtest	1	2	3	4	5																	
Inn (ml)																						
Ut (ml)																						
Temperatur fryseboks	t start:	t slutt:	Kaldere enn -20 °C (KOF/BOF prøver)																			
Temperatur kjøleskap for ukeblendeprøver	t start:	t slutt:	1<temperatur<5 °C (±1.0 °C)																			
Parshall renner kontroll	Hovedmåler 1		Hovedmåler 2																			
Målt (cm) / avlest (m <sup>3</sup> )	til vannspeil cm:    m <sup>3</sup> tabell:		til vannspeil cm:    m <sup>3</sup> tabell:																			
Avlest (m <sup>3</sup> )	Avlest (VM)	Data	Avlest (VM)	Data																		
Kontroll annen vannmåler overløp	Tidsmåler kontroll at denne aktiviseres når føler kommer i kontakt med vann, ok?																					
<b>Under prøvetaking: bruk tabell på baksiden av dette arket(side2)</b>																						
Døgnblendeprøve (Prøver KOF, BOF)	Start dato:	Slutt dato:	Flaske ID (inn):	Flaske ID (ut):																		
Sign:																						
<b>Kontroller ved prøvetakingsperiodens avslutning</b>																						
Kun tilfredsstillende rengjort utstyr ble brukt for håndtering av prøver / delprøver	Inn:	Ut:	Kommentar:																			
Oppslutning, ukeblendeprøve	Dag1	Dag2	Dag3	Dag4																		
Innløp/ Utløp: Volum delprøve til 500 ml ukeblendeprøve (ml)																						
Flaske ID	Inn:	Ut:																				
<b>Avvik rapporter i perioden (Avvik nr.)</b>																						
Prøvetaker signatur (forskriftsmessig gjennomført)	Slutt dato:	Kladdemark brukt? (ja/nei) <sup>4</sup>	Sign:																			

1) Ukenummeret basert på prøveseriens sluttuke.  
 2) Ukeblendeprøve satt sammen volumproporsjonalt for uketilrenning. Bruk beregning i prosedyre PR-020108  
 3) Her føres gjennomsnitt av 5 del-volum: (test 1,2,3,4 og 5) fra prøvetaker målt for prøvestart.  
 4) Kladdemark arkivert på renseanlegget

# Sample registration, Sample preservation method, and analysis to be done on samples

SJ_02020101: SJEKKLISTE FOR TILBEREDING AV FLASKER FRA LABORATORIUM BREDALSHOLMEN - MILJØGIFTER	Utgave 3	Gyldig fra 23.10.12	KAPA	
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I:\02\_Gjennomfører\_provetaking\Sjekkliste\SJ\_02020101\_Sjekkliste\_tilbereding\_av\_prøveflasker\_fra\_laboratorium\_Bredalsholmen\_V\_3\_121023.docx

Prøveflasker fra laboratorium:		Vannlaboratoriet i Kristiansand				Til renseanlegg:		Bredalsholmen					
Ansvarlig laborant (med blokkbokstaver):						Sign:		Dato:		Tlf.:			
Flaske ID Eks: BR - TS - INN - 1 - - 5 BR - TS - INN - uke (PR-020302)	Antall	Kvalitet		Volum		Konserveringsmetode (mengde i ml)			Rengjort i følge prosedyre			Sign (Lab)	Kommentar
		Plast	Glass	500 ml	1000 ml	H <sub>2</sub> SO <sub>4</sub> svovelsyre	HNO <sub>3</sub> salpetersyre	Annet		Prosedyre Nr?	Ny(e) flaske(r)?		
TUNGMETALLER													
BR - T-INN- 1 til 7	7												
BR - T-INN-05-.....	1												
BR - T-UT- 1 til 7	7												
BR - T-UT-06-.....	1												
BR - TS-INN- 1 til 5	5												
BR - TS-INN-07-.....	1												
BR - TS-UT- 1 til 5	5												
BR - TS-UT-08-.....	1												
ORGANISKE MILJØGIFTER													
BR - M-INN- 1 til 7	7												
BR - M-INN-09-.....	2												
BR - M-UT- 1 til 7	7												
BR - M-UT-10-.....	2												
BR - MS-INN- 1 til 5	5												
BR - MS-INN-11-.....	2												
BR - MS-UT- 1 til 5	5												
BR - M S-UT-12-.....	2												
Mottatt på renseanlegget		Antall prøveflasker mottatt:				Prøveflasker uskadet <sup>1</sup> :				Til prøveserie:			
Prøveflasker mottatt av (med blokkbokstaver):						Sign:				Dato:			

1) Er det noe galt med flaskene, skriver mottaker avvik, og returnerer hele serien



# So what can we do

- Prepare good procedures
- Prepare template checklists
- Prepare formats
- Prepare training and certification of analysis
- Follow defined and good practices , and document with agreed standards
- Routinely check standards
- Calibrate daily equipment
- Use only good chemicals etc.

# What more

- Participate in inter-laboratory ring tests.
- Encourage training
- Report problems and make improvement.
- THIS IS A GOOD WAY FORWARD FOR PROFESSIONAL LABORATORIES
- THIS WILL BE THE FUTURE OF CERTIFIED LABS
- IT FEELS GOOD TO HAVE ALL CONFIDENCE IN OWN WORK BUT CONTINUOUSLY CONDUCTING INTERNAL CONTROLS.





THANK YOU