**Task 4.1.2 Optical Sensors**

(\* Please provide a separate sheet for each parameter)

Part b: Calibration

Parameter/measurand\*: Turbidity

Unit of measurement: FNU

Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_*0 - 50\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

Accuracy: \_\_\_\_\_\_\_\_\_\_\_\_\_*0.1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

Precision: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Calibration uncertainty (if available): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 1. How often do you calibrate the sensor/s or sensor system/s you are presently using for the specified parameter/measurand: please list the typical calibration interval/s you are employing; note that if you are calibrating irregularly, kindly specify why and when (e.g. before a deployment, following a malfunction, etc.).

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*1-2 times per year, but control samples are taken more regulary (4-6/year)*

\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

 2. Please provide a brief description of your calibration setup for the specified parameter/ measurand, including a list of the principal equipment, reference material (certified and/or conventionally accepted) and instrumentation involved in a typical calibration operation.

Biological culture

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

 3. Do you employ reference material which are mutable or unstable

(e.g. biological cultures, optically-sensitive pigment extracts, etc.)

to calibrate the sensor/s or sensor system/s you are presently using for

the specified parameter/measurand. **Yes**

(if **Yes**, please list the types of this kind of reference material you are employing; kindly specify also the measures you take to guarantee the reliability of the reference material in terms of batch-to-batch uniformity of characteristics)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

 4. In your view, does your facility ensure an effective traceability chain for the

specified parameter/measurand? **Yes**

 5. Please provide a brief description of the procedures employed to ensure adherence of the performances of the principal equipment and reference instrumentation of the calibration setup to factory specifications (in-house monitoring of performance, in loco re-calibration, servicing by the manufacturer, etc.).

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

 6. Does your facility maintain a Manual with a description of the calibration method

and the measuring procedures, together with details of sample treatment and

preparation when these steps are present? **Yes**

(If **Yes**, kindly attach a copy to the completed questionnaire, otherwise please provide a short, description below)

Contact NIVA

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

 7. In your view, is regular factory calibration/servicing necessary to obtain

optimal performances from your sensors/instrumentation for the

specified parameter/measurand in the field? **Yes**

(If **Yes**, please provide details of the sensors/instrumentation, indicating also the intervals you recommend for factory calibration/servicing, below)

This will very much depend on the applications and expectations

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

 8. Do you perform field calibrations for the specified parameter/measurand? **Yes**

(If **Yes**, please provide a brief description of the method and procedures)

Biological culture and/or control measurements with prisme (if applicable)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

 9. Does your facility perform:

* internal quality audits to monitor and assess its

 calibration system for the specified parameter? **Yes**

 - independent quality audits to monitor and assess its

 calibration system for the specified parameter? **Yes**

(If **Yes** to any of the above, please provide a brief description of the procedure/s applied, including a list of the principal equipment and instrumentation involved)

Data validation provides quality control of the parameter. Increasing or unexpected variation are the source for additional assessments

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

10. Does your facility actively maintain an archive containing issued calibration

reports/certificates for the specified parameter/measurand? **Yes**

(If **Yes**, please specify the document retention time/s)

Longer than the lifetime of the sensor within the organization

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. Do you have any suggestions or ideas for improving the quality of your

calibrations for any particular sensor/sensor system you are presently using

for the specified parameter/measurand (e.g. innovative reference material,

modifications to existing methodologies or new methodologies

you have developed, etc.)? **No**

(if **Yes**, please provide a brief description of your ideas and/or suggestions, including the details of the sensor/s or sensor system/s)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

12. Do you have any suggestions or ideas for improving the general quality

of the calibration of sensors or instruments for measuring the specified

parameter/measurand (e.g. testing and promoting the use of new

reference material, development of new methodologies, etc.)? **Yes**

(if **Yes**, please provide a brief description of your ideas and/or suggestions)

Lack of approved and applied general standard procedures \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Add lines as necessary)

Submitted on: 01/10/2012

 (Date)

Compiled by: Kai Sørensen

 (Name of respondent)