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English only

Third Meeting of the Regional Working Group for the Pollution Component
Dandong, China, 4 - 7 September 2006

2006 Completed and On-going Activities Of the Pollution Component

1. During 2006, the Pollution Component of the Project witnessed the accomplishment of various activities, and the initiation of new activities, some of which are still on-going. Both kinds of activities are described below.

Agenda 5.2.1
Inter-calibration exercises for nutrients in seawater

2. Through the assistance of the Chairperson of the Korean NWG-P, the Queensland Health Scientific Services (QHSS) was identified and contracted to implement the first round of this activity. The Nutrients Unit of QHSS took care of the entire activity, from providing the standard reference materials (SRM), to analysing the results submitted by participating labs.

3. QHSS provided SRMs to 5 labs each in China and Republic of Korea for analysis of dissolved nutrients (Ammonia [NH_3], Nitrate + Nitrite [NO_X], Filterable Reactive Phosphorus [FRP]) and Silicates (Si) in filtered (pristine and environmentally impacted) marine waters. Each lab was sent 8 frozen samples packaged in dry ice on 9th January 2006. All the samples supplied were natural saline water samples selected for varying characteristics representative of the range of sample types commonly encountered for nutrient measurement. The intention was to supply samples with a diverse range of nutrient concentrations typically encountered in the Yellow Sea. Table 1 provides background information on the samples used.

4. Of the 10 laboratories that were sent SRMs, 7 labs returned results for analysis. The summary of analysis is detailed in the final report, and is attached as Appendix 1. The final report also contains a guide for each lab to assess its overall performance, and recommendations with which each lab may follow to rectify its analytical procedures during Round 2.

Table 1. Types of samples sent to all labs for Inter-calibration Exercise, Round 1.

Bottle No	Sample Source	Conductivity (µS/cm at 25°C)	Turbidity (NTU)	TSS (mg/L)
Bottle 1 and 2	Estuary Sample	40000	6.4	6
Bottle 3 and 4	Aquaculture Discharge	40000	28	145
Bottle 5 and 6	Estuary Sample	29000	5	5
Bottle 7 and 8	Aquaculture Discharge	31900	50	15

Notes: Bottles 1, 3, 5 & 7 are the portions of the source waters filtered through 0.45µm filters.

5. Round 2 of this activity was again contracted to QHSS in June 2006. The 7 labs that participated in Round 1 will receive a different set of SRMs, and carry out the analysis between August and September 2006. Labs that did not submit results in Round 1 were not eligible to participate in Round 2.

Agenda 5.2.2
Expert Workshop on Fate and Transport of Pollutants

6. This workshop was held immediately prior to the 3rd RWG-P Meeting. The objectives were to:

   - Review the pollution data and information collected from China and Korea.
   - Discuss and compare the available data, current understanding, and known procedures to analyse fate and transport of pollutants.
   - Contribute outcomes of the workshop to the "Yellow Sea Strategic Action Programme" (SAP).

7. The tangible outcome of the workshop was a summary table showing current pollution problems in the Yellow Sea; types and amounts of pollutant inputs; known impacts of these pollutants; and recommended actions for inclusion into SAP. As the workshop ended one day before the beginning of the 3rd RWG-P Meeting, the outcome table and draft executive summary is not included with this document, but will be available some time during the Meeting.

Agenda 5.2.3
Co-operative study cruises

8. From 2005 to 2006, extensive discussions took place regarding the co-operative study cruises. All together, three technical meetings were held for all cruise leaders to discuss and finalise arrangements for the winter and spring cruise. Both technical and logistical issues for the Pollution Group were agreed and finalized for the Spring Cruise in June 2006.

9. At the time that this document was prepared, the Winter Cruise had been postponed from 2006 to 2007; the Spring Cruise was scheduled for September 2006, but no formal approval had been obtained yet. During the meeting, updates about the Spring Cruise will be provided.

Agenda 5.2.4
Visiting Scientist Programme

10. This activity was recommended for implementation during the 2nd RWG-P Meeting. One reason it has not been initiated is because it is partially tied to the co-operative study cruise. One option for the visiting scientist is to jointly analyse the cruise samples with the foreign-host lab. Another option that has been proposed is for the visiting scientist to work on standardized data analysis methods.

11. Keeping in mind the result of the joint cruise approval process, during this agenda item, *participants should discuss the objective of the activity, the responsibilities of the scientist and host lab, timeline for the activity, and the direction of the visit.* The TOR for the activity, based on a Chinese Scientist visiting Korea for post-cruise analysis is attached as Appendix 2 for reference.

Agenda 5.2.5
Regional pollution monitoring guidelines

12. A consultant began preparing the guidelines in 2005, and presented his progress report at the 2nd RWG-P Meeting. Participants of that meeting gave some suggestions for additional information to include in the final version of the guidelines. The guidelines will contribute to the SAP as one of the methods needed for keeping track of pollutants in the Yellow Sea.

13. The draft final report is attached as Appendix 3, and the consultant will present his report to the meeting.

Agenda 5.2.6
EAS Congress 2006

14. During the First Project Steering Committee (PSC) Meeting in March 2005, the PEMSEA Director alerted the Project to PEMSEA's biennial activity – the EAS Congress. Following the spirit of regional co-operation and approval by PSC to participate in this activity, the Project has decided to collaborate with PEMSEA at the Congress.

15. The Project will organise a session on the "Yellow Sea Partnership," focusing on the partner's public awareness activities. The session will showcase how a partnership can reach out to a wider stakeholdership through co-operative efforts in public awareness activities. The session will serve as an example to the Congress of one mechanism that international projects may consider in order to spread public awareness activities and messages to a wide range of stakeholders. The session will also invite interested organisations to consider joining the partnership, and allow current partners to meet and discuss activities in which they would like to collaborate with each other.

16. The Project will also display an Exhibition Booth that will illustrate the Project's objectives, achievements-to-date, and future actions. The outline of the topics to display at the exhibition is attached as Appendix 4. *Participants are invited to suggest some items to display.*

17. Finally, the Project has been invited to participate at other Congress sessions, such as giving a presentation at the eco-labelling session and the data and information session.

SUMMARY REPORT
UNOPS INTERLABORATORY TRIAL
FOR NUTRIENTS IN SEAWATER
China and Korea
January 2006 – March 2006

Funded By:
UNDP/GEF Project on Reducing Environment Stress
in the Yellow Sea Large Marine Ecosystem

Yellow Sea

Queensland Health
Pathology and Scientific Services
Queensland Government

SUMMARY REPORT

UNOPS INTERLABORATORY TRIAL FOR NUTRIENTS IN SEAWATER China and Korea

January 2006 – March 2006

This Collaborative Trial has been conducted under NATA's Requirements for the approval of Providers of Accredited Proficiency Testing Schemes, in accordance with ILAC Guide 13:2000 "Guidelines for the Requirements for the Competence of Providers of Proficiency Testing Schemes".

QHSS is NATA accredited to ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" in the supply of Certified Reference Materials.

Organised By: UNDP/GEF Yellow Sea Project

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Queensland Health
Pathology and Scientific Services
Queensland Government

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1. INTRODUCTION

1.1. Background

In the approved Implementation Plan of the UNDP/GEF Yellow Sea Project, "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem", one of the activities of the Pollution Component is a regional inter-calibration exercise between select laboratories that monitor and analyse pollution in the Yellow Sea. The parameters for inter-calibration were agreed by the members of the Regional Working Group-Pollution (RWG-P) at its first meeting (Qingdao, China, 6-9 April 2005). At the Second RWG-P Meeting, members revised their priority parameters for the inter-calibration exercise, which is attached as Appendix I.

1.2. Aims of the Trial

- To provide an inter-laboratory comparison for the analysis of dissolved nutrients (Ammonia [NH_3], Nitrate + Nitrite [NO_X], Filterable Reactive Phosphorus [FRP]) and Silicates (Si) in filtered (pristine and environmentally impacted) marine waters.
- To provide an inter-laboratory comparison for the analysis of Total Phosphorus (TP) and Total Nitrogen (TN) in natural (pristine and environmentally impacted) marine waters. These samples were provided to participants for "informative" purposes to assist those laboratories with this capability.

1.3. Sample Collection and Distribution

Ten (10) laboratories from China and Korea were each sent 8 frozen samples packaged in dry ice on 9th January 2006. All IATA's requirements for shipment were complied with.

All the samples supplied were natural saline water samples selected for varying characteristics representative of the range of sample types commonly encountered for nutrient measurement. The intention was to supply samples with a diverse range of nutrient concentrations typically encountered in the Yellow Sea.

The samples were sourced from Rounds 9 and 10 of the National Low Level Nutrient Collaboration Trial (NLLNCT), an Australian based proficiency testing program.

Table 1 provides background information on the samples used.

The Certified Values and Ranges cited are derived from the relevant NLLNCT.

See Appendix 2 – Statistical Calculations for procedures used to calculate the Interquartile Range (IQR), z-score, the Certified Value and the Certified Ranges.

Table 1 Sample background information

Bottle No	Sample Source	Conductivity (µS/cm at 25°C)	Turbidity (NTU)	TSS (mg/L)
Bottle 1 and 2	Estuary Sample	40000	6.4	6
Bottle 3 and 4	Aquaculture Discharge	40000	28	145
Bottle 5 and 6	Estuary Sample	29000	5	5
Bottle 7 and 8	Aquaculture Discharge	31900	50	15

Notes: Bottles 1, 3, 5 & 7 are the portions of the source waters filtered through 0.45µm filters.

QHSS performed homogeneity and stability testing on all samples used in this trial. Based on these results, any outlying data should not be attributed to lack of homogeneity or instability of samples.

1.4. Processing of Laboratory Results

Results were obtained from seven laboratories. Two laboratories submitted 2 sets of results for some parameters where they used different methods to obtain results.

QHSS issued all laboratories with confidential Identification Numbers on receipt of registration. QHSS contributed to the data set for all the parameters evaluated. QHSS's Lab ID is 800.

When reviewing the data, there are a few pertinent points which impinge on the evaluation of the data:

- Because of the small data set, it was not possible to solely use robust statistics to adequately evaluate the performance of participating laboratories. The mean, interquartile range and z-scores are provided for information purposes only.
- In addition to the data derived from the robust statistics, a visual inspection of results relative to the QHSS result (March 2006) and the Certified Value and Range was made based on our experience and knowledge of what should be realistically possible.
- All results obtained by QHSS (March 2006) were within QHSS's uncertainty of measurement of the certified value and its upper and lower ranges for each of the samples supplied.
- The Certified Values and Ranges of the samples supplied were derived from results obtained in the National Low Level Nutrient Collaborative Trials (NLLNCT) - Rounds 9 & 10 program. These results are based on the data supplied by all the participating laboratories in those trials. All procedures for calculating the Certified Value and Ranges are in accordance with ISO Guide 34 and ISO Guide 35.

All the results provided in the following tables are expressed in mg/L.

2. DISSOLVED (SOLUBLE) NUTRIENT SAMPLES

2.1. Ammonia

Only five laboratories submitted results for the analysis of ammonia. From experience gained in the NLLNCTs, ammonia is the most difficult nutrient parameter to analyse and this was also the case for this intercalibration exercise. The problems associated with analysis of ammonia are mainly related to:

Contamination – Glassware use and its cleaning, sample handling, storage, hygiene, atmospheric influences (make-up air for lab), etc, etc can all contribute to contamination.

Methodology – There are two different chemistries used to measure ammonia. These are phenate and salicylate. Experience indicates the salicylate procedure can hydrolyse weak organic acids, enhancing the apparent ammonium concentration compared to the phenate method. This was not the case in this instance.

A summary of the methodologies used are tabulated in Table 2.

Table 2 - Summary of Ammonia Methodologies

Lab ID	Chemistry	Instrument	Reporting Limits (mgN/L)
800	Phenate	FIA	0.002
801	Other	Discrete	0.002
804	Salicylate	SFA	0.002
806	Phenate	FIA	0.002
808	Phenate	FIA	0.002
810	Phenate	Manual	Not Provided

A summary of the ammonia results are tabulated in Table 3.

Table 3 - Summary of Ammonia Results

	Bottle 1	Bottle 3	Bottle 5	Bottle 7
median	**0.0055**	**1.0918**	**0.0258**	**0.5428**
adj IQR	**0.0027**	**0.1421**	**0.0066**	**0.2749**
Robust CV	**49.7%**	**13.0%**	**25.8%**	**50.7%**
Certified Value	**0.0034**	**1.2249**	**0.0259**	**0.6058**
Certified Range (lower)	**0.0023**	**1.1896**	**0.0243**	**0.5956**
Certified Range (upper)	**0.0044**	**1.2602**	**0.0275**	**0.6161**

Some observations relating to the analysis of ammonia follow:

- Results are generally pleasing, however for each sample type analysed there was at least one laboratory with unacceptable results.
- Most laboratories used the phenate chemistry.
- Laboratories using Flow Injection Analysis (FIA) techniques had acceptable results for all sample types.
- The one laboratory using Segmented Flow Analysis (SFA) instrumentation and salicylate chemistries had acceptable results for all samples except for Bottle 7.
- The laboratory using a discrete analyser had difficulties analysing most samples.
- The one laboratory using manual techniques had consistently high results for all samples.
- Bottle 7 had a particularly high IQR of 0.27mgN/L compared to a median concentration of 0.54mgN/L.

Figure 1 – Ammonia Bottle 1 Scattergram

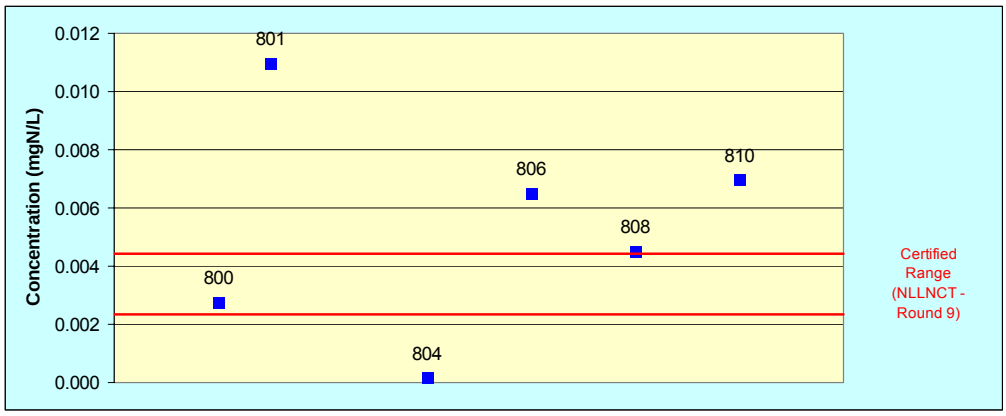


Figure 2 – Ammonia Bottle 3 Scattergram

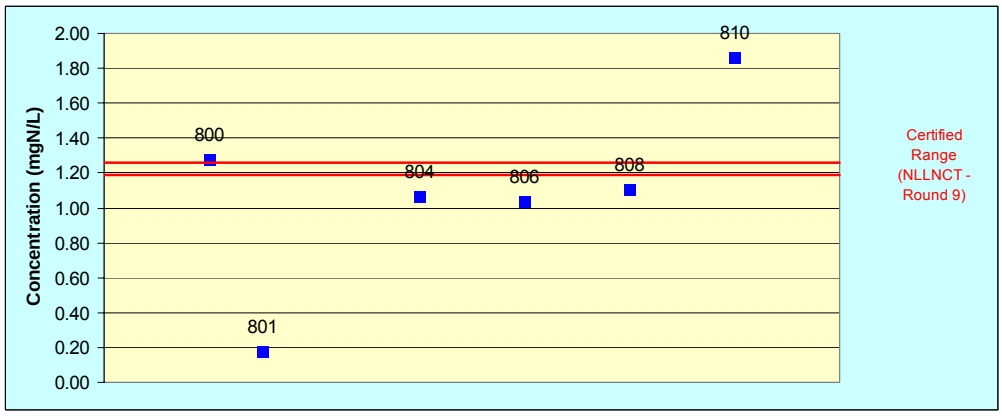


Figure 3 – Ammonia Bottle 5 Scattergram

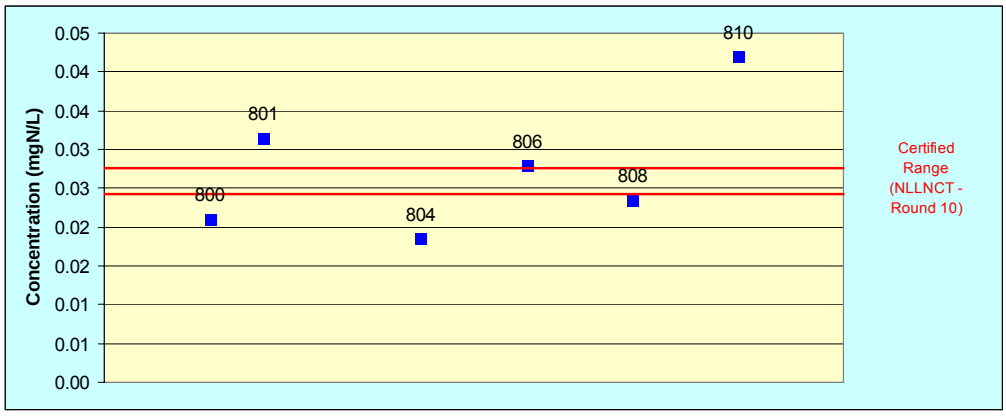
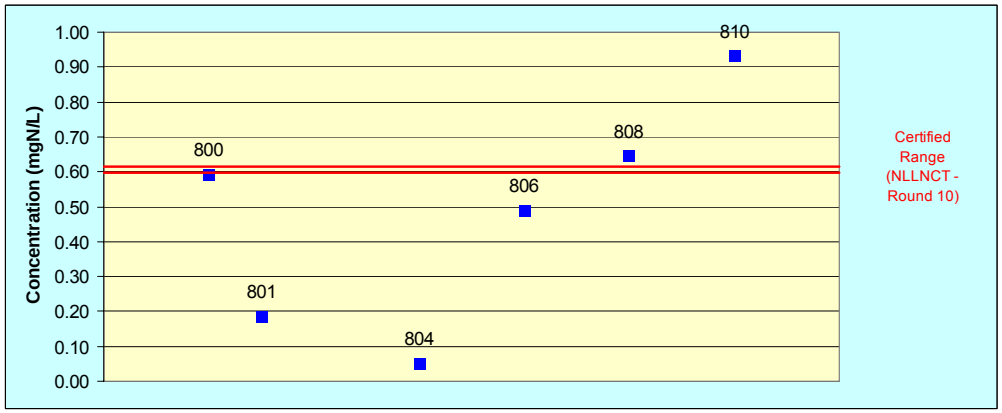


Figure 4 – Ammonia Bottle 7 Scattergram



2.2. Filterable Reactive Phosphorus (FRP)

All participating laboratories provided results for FRP, while two laboratories provided two sets of data using different techniques. The overall results are particularly pleasing and align well with the certified value.

A summary of the methodologies used are tabulated in Table 4.

Table 4 – Summary of FRP Methodologies

Lab ID	Chemistry	Instrument	Reporting Limits (mgN/L)
800	Ascorbic	FIA	0.002
801	Ascorbic	Discrete	0.002
802	Ascorbic	Manual	0.002
802A	Ascorbic	FIA	0.002
803	Ascorbic	Other	0.005
803A	Ascorbic	FIA	0.005
804	Ascorbic	SFA	0.002
806	Ascorbic	FIA	0.002
808	Ascorbic	FIA	0.002
810	Ascorbic	Manual	Not Provided

A summary of FRP results are tabulated in Table 5.

Table 5 – Summary of FRP Results

	Bottle 1	Bottle 3	Bottle 5	Bottle 7
median	**0.0045**	**0.0219**	**0.0228**	**0.0283**
adj IQR	**0.0013**	**0.0025**	**0.0023**	**0.0038**
Robust CV	**28.7%**	**11.3%**	**10.2%**	**13.4%**
Certified Value	**0.0051**	**0.0190**	**0.0218**	**0.0283**
Certified Range (lower)	**0.0040**	**0.0179**	**0.0204**	**0.0269**
Certified Range (upper)	**0.0061**	**0.0201**	**0.0233**	**0.0296**

Some observations relating to the analysis of FRP follow:

- All laboratories used the ascorbic acid method of analysis.
- The laboratories using the SFA and discrete analyzer techniques had consistently high results for all samples.

Figure 5 – FRP Bottle 1 Scattergram

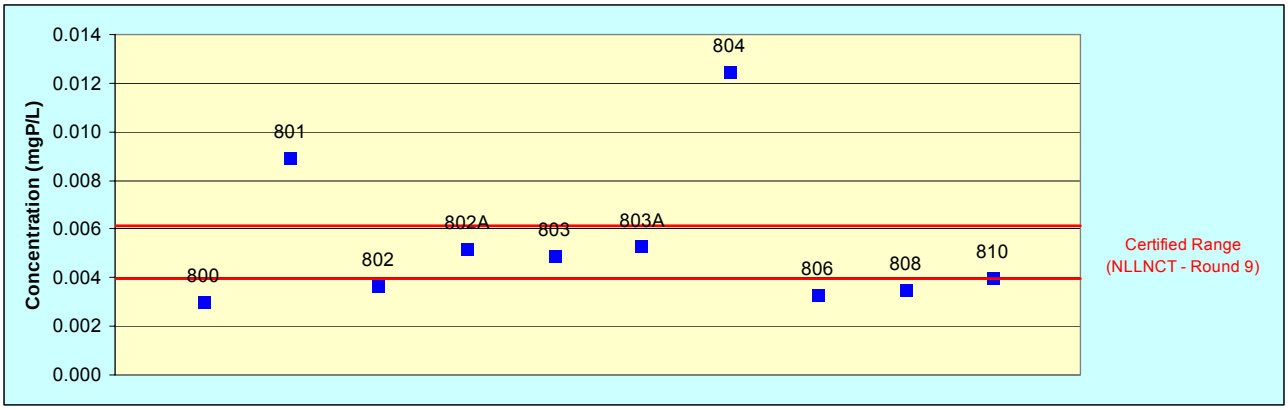


Figure 6 – FRP Bottle 3 Scattergram

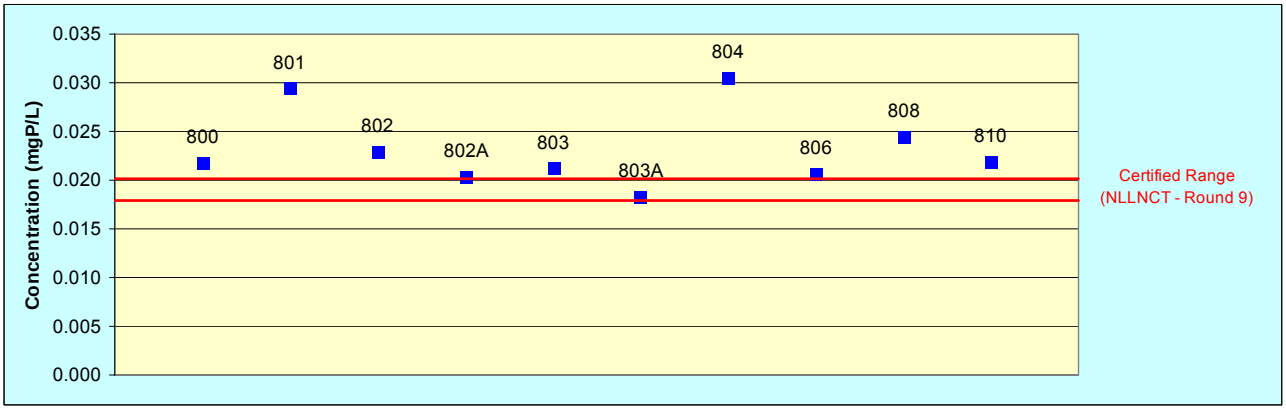


Figure 7 – FRP Bottle 5 Scattergram

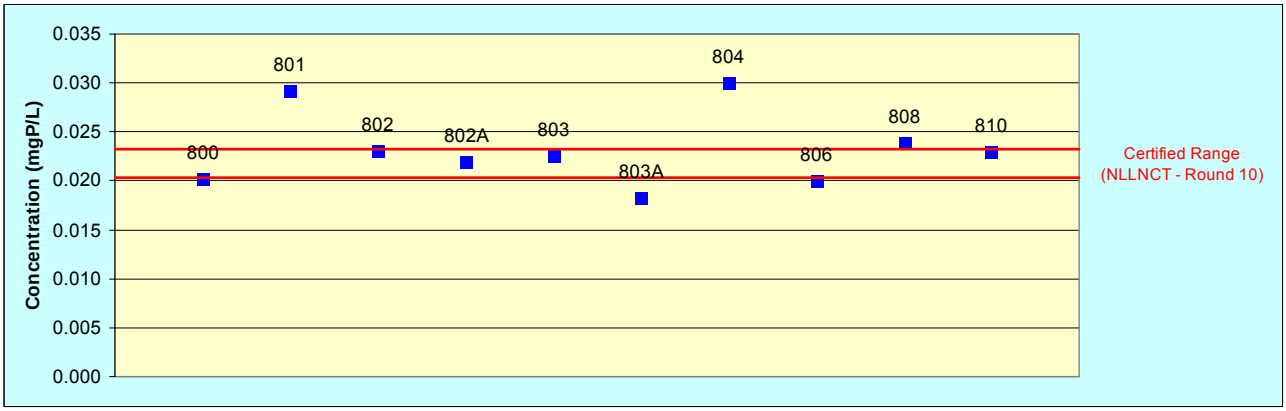
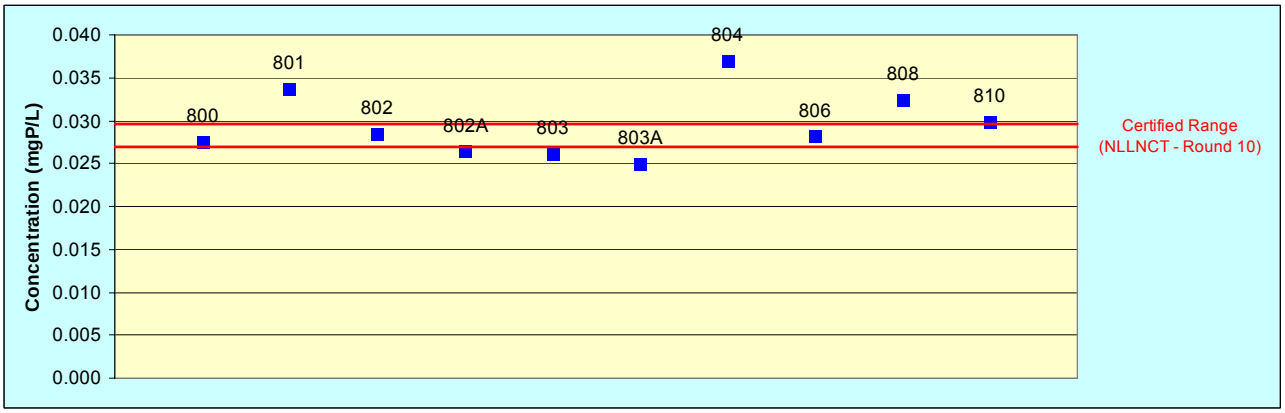


Figure 8 – FRP Bottle 7 Scattergram



2.3. Nitrate + Nitrite (NOx)

All participating laboratories submitted results for NOx, with one laboratory submitting results obtained using a second technique. The overall results are particularly pleasing and align well with the certified value. Quite amazingly, all laboratories quoted a Reporting Limit of 0.002mgN/L and the IQR for all the sample types was less than 0.002mgN/L.

A summary of the methodologies used are tabulated in Table 6.

Table 6 - Summary of NOx Methodologies

Lab ID	Chemistry	Instrument	Reporting Limits (mgN/L)
800	Cd reduction	FIA	0.002
801	Cd reduction	Discrete	0.002
802	Cd reduction	Manual	0.002
802A	Cd reduction	FIA	0.002
803	Cd reduction	Other	0.002
804	Cd reduction	SFA	0.002
806	Cd reduction	FIA	0.002
808	Cd reduction	FIA	0.002
810	Cd reduction	Manual	N/P

A summary of NOx results are tabulated in Table 7.

Table 7 - Summary of NOx Results

	Bottle 1	Bottle 3	Bottle 5	Bottle 7
median	0.0014	0.0680	0.0125	0.0837
adj IQR	0.0015	0.0017	0.0019	0.0015
Robust CV	105.9%	2.5%	15.5%	1.8%
Certified Value	0.0019	0.0671	0.0114	0.0820
Certified Range (lower)	0.0011	0.0656	0.0106	0.0797
Certified Range (upper)	0.0027	0.0687	0.0122	0.0843

Some observations relating to the analysis of NOx follow:

- All laboratories used Cadmium reduction for converting nitrate to nitrite.
- The lab using the discrete analyser had consistently high results.

Figure 9 – NOx Bottle 1 Scattergram

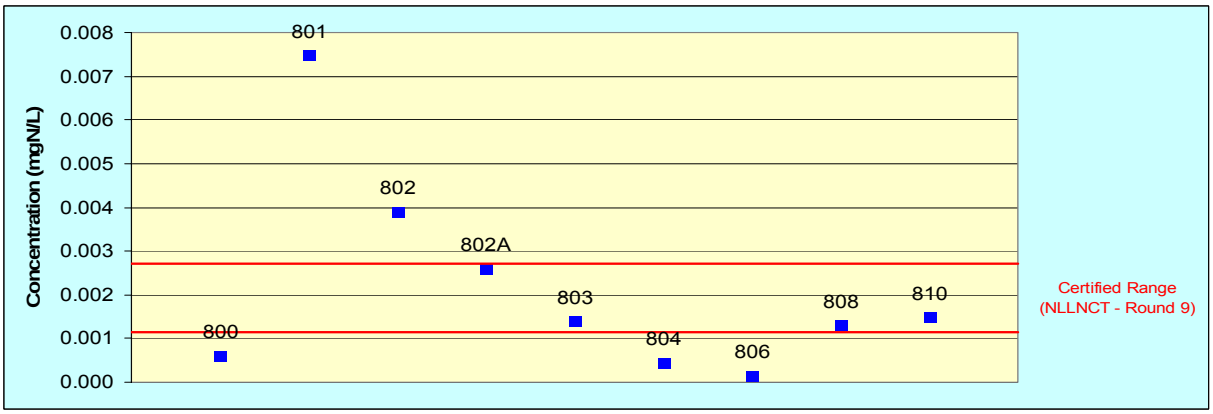


Figure 10 – NOx Bottle 3 Scattergram

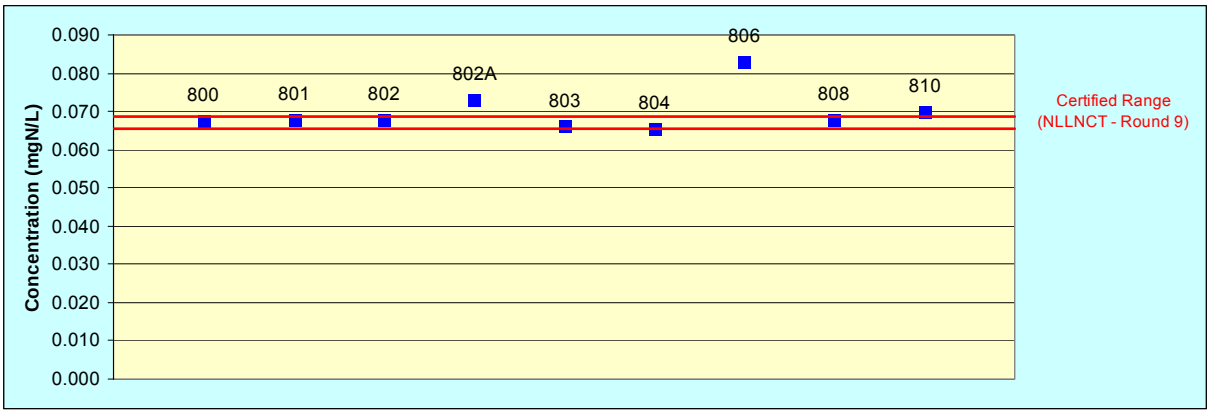


Figure 11 – NOx Bottle 5 Scattergram

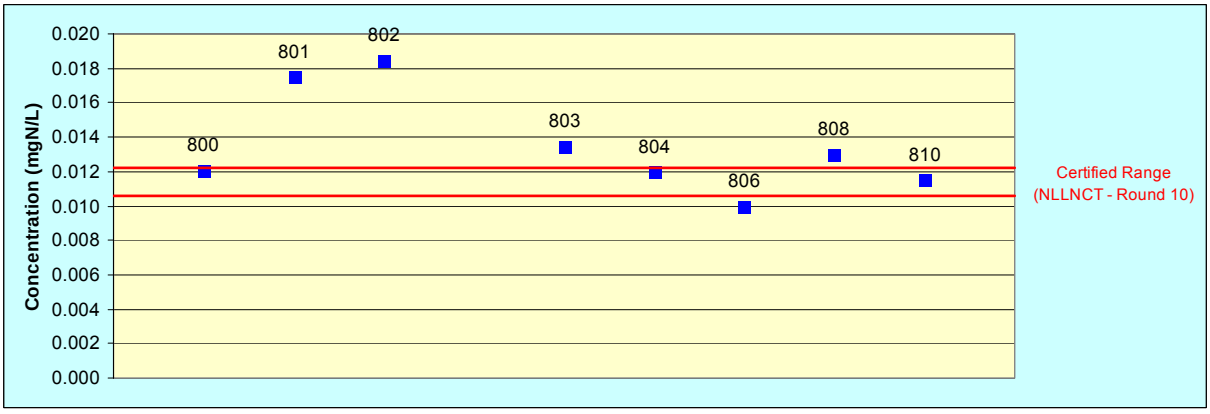
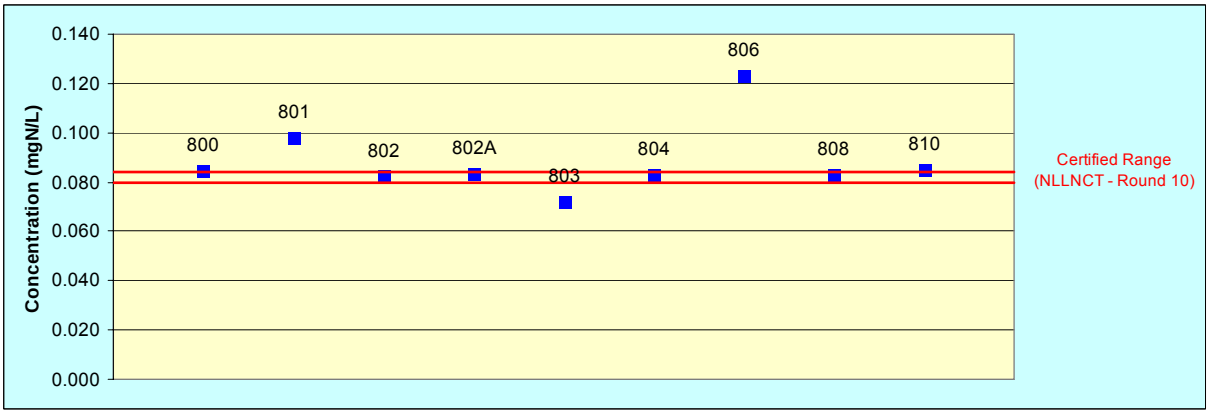


Figure 12 – NOx Bottle 7 Scattergram



2.4. Silicates (Si)

As with the NLLNCT, the analysis of silica was not as tight as that obtained for NOx and FRP. Both the IQR and %CV are much higher for silica.

Experience with the measurement of silica indicates equilibrium issues when samples are frozen at -20°C and especially at -78°C (dry-ice). Experiments with the NLLNCT indicates it can take several days after thawing before silica samples reach equilibrium. It is recommended that silica samples are not frozen prior to analysis. However for convenience purposes of this intercalibration exercise a single sample was supplied. However, instructions on the Information Sheet were explicit in recommending silica samples be kept at ambient temperatures for at least 3 days before analysis.

A summary of the methodologies used are tabulated in Table 8.

Table 8 - Summary of Silicate Methodologies

Lab ID	Chemistry	Instrument	Reporting Limits (mgSi/L)
800	Moly / React	FIA	0.01
801	Moly / React	Discrete	0.002
802	Moly / React	Manual	0.05
802A	Moly / React	FIA	0.05
803	Moly / React	Other	0.10
804	Moly / React	SFA	0.002
806	Moly / React	FIA	0.002
808	Moly / React	FIA	0.002
810	Moly / React	Manual	Not Provided

A summary of silicate results are tabulated in Table 9.

Table 9 - Summary of Silicate Results

	Bottle 1	Bottle 3	Bottle 5	Bottle 7
median	**0.1155**	**0.8285**	**1.1000**	**0.7595**
adj IQR	**0.0274**	**0.1056**	**0.0697**	**0.1527**
Robust CV	**23.7%**	**12.8%**	**6.3%**	**20.1%**
Certified Value	**0.1254**	**0.8120**	**1.0880**	**0.7366**
Certified Range (lower)	**0.1053**	**0.7741**	**1.0451**	**0.6973**
Certified Range (upper)	**0.1455**	**0.8498**	**1.1309**	**0.7759**

Some observations relating to the analysis of NOx follow:

- All laboratories used the molybdate Reactive chemistry for the measurement of silica

Figure 13 – Silicate Bottle 1 Scattergram

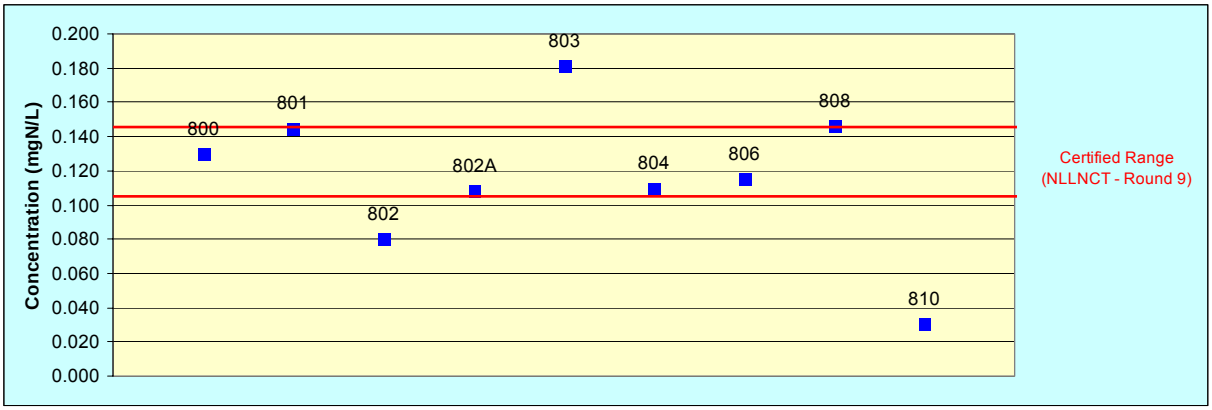


Figure 14 – Silicate Bottle 3 Scattergram

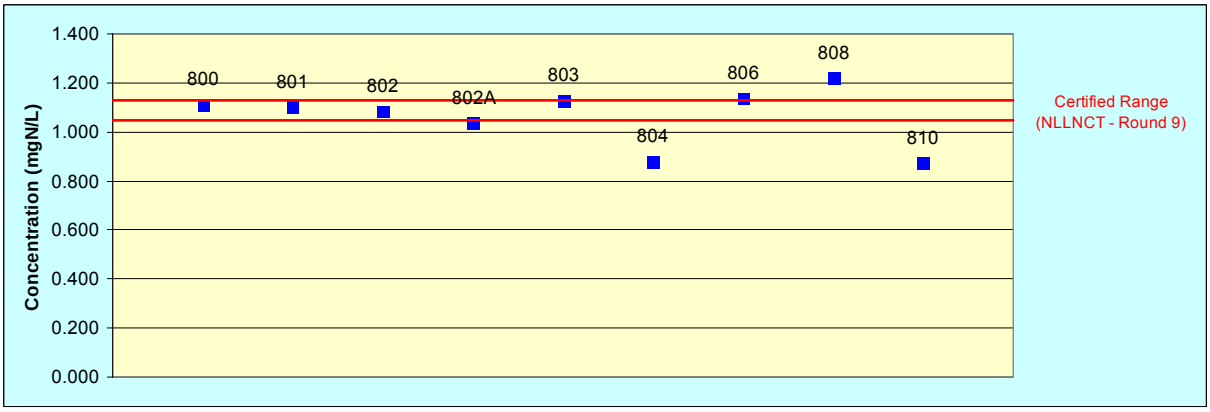


Figure 15 – Silicate Bottle 5 Scattergram

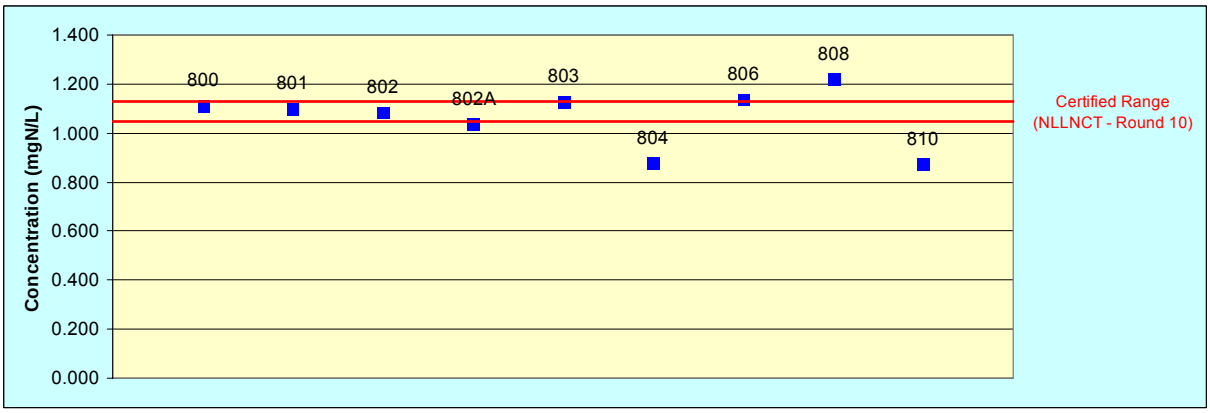
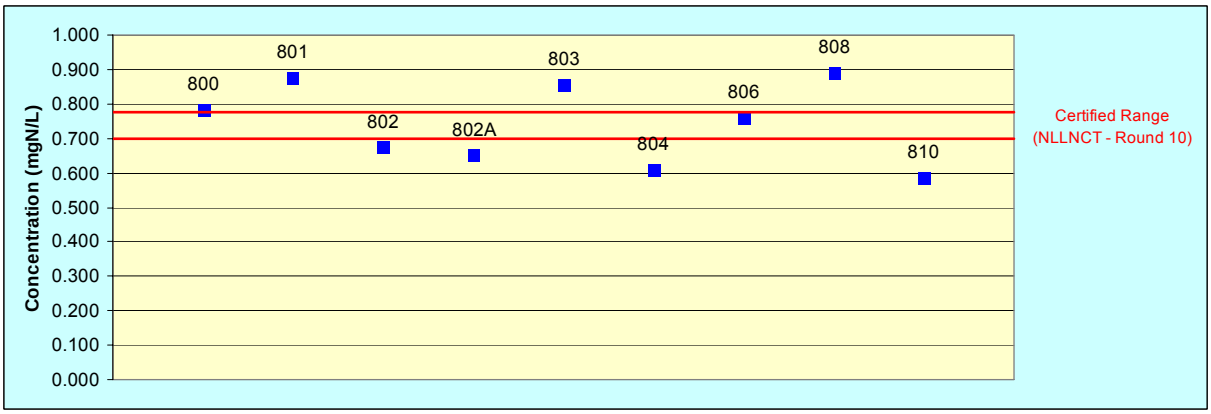


Figure 16 – Silicate Bottle 7 Scattergram



3. TOTAL NUTRIENT SAMPLES

Only three laboratories submitted data for Total Nitrogen and Total Phosphorus (TP) as Total Nutrients are not considered to be a high priority for the UNDP/GEF project in reducing environmental stress in the Yellow Sea large marine ecosystem. The total nutrient samples were provided to participants for information purposes to assist laboratories with that analytical capability. It is not possible to make any real judgement on the results obtained in this exercise.

3.1. Notes on Total Nutrient Samples

Results for total nutrient analytes are dependent on two factors:

a) the digestion process

b) the analysis of the digestion end products. That is, poor results from the analysis of soluble nutrient analytes (the digestion by-products) may contribute to the poor reporting of total nutrient levels.

Glossary of digestion abbreviations:

Pers (B/A) = Simultaneous Persulfate Digestion (Basic and Acidic)

Pers (B) = Basic Persulfate Digestion

Pers (A) = Acidic Persulfate Digestion

3.2. Total Nitrogen (TN)

A summary of the methodologies used are tabulated in Table 10.

Table 10 – Summary of TN Methodologies

Lab ID	Digestion Technique	Digestion Heating Method	Chemistry	Instrument	Reporting Limits (mgN/L)
800	Pers (B/A)	Autoclave	Cd Reduction	FIA	0.005
801	Not Provided	Not Provided	Not Provided	Not Provided	0.002
806	Pers (B)	Autoclave	Cd Reduction	FIA	0.002
808	Pers (B)	Autoclave	Cd Reduction	FIA	0.002

A summary of TN results are tabulated in Table 11.

Table 11 – Summary of TN Results

	Bottle 2	Bottle 4	Bottle 6	Bottle 8
median	0.1848	2.5758	0.2638	1.5085
adj IQR	0.0272	0.2018	0.0205	0.0823
Robust CV	14.7%	7.8%	7.8%	5.5%
Certified Value	0.2661	2.5579	0.3542	1.5857
Certified Range (lower)	0.2489	2.5143	0.3278	1.5492
Certified Range (upper)	0.2832	2.6016	0.3807	1.6222

Some observations relating to the analysis of TN follow:

- Except for Bottle 4, the median result for participating laboratories is less than the Certified Range.

Figure 17 – TN Bottle 2 Scattergram

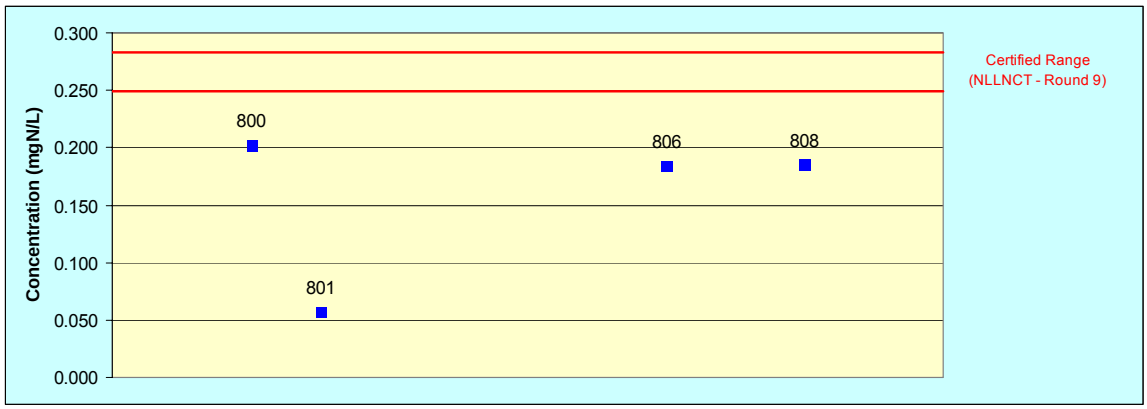


Figure 18 – TN Bottle 4 Scattergram

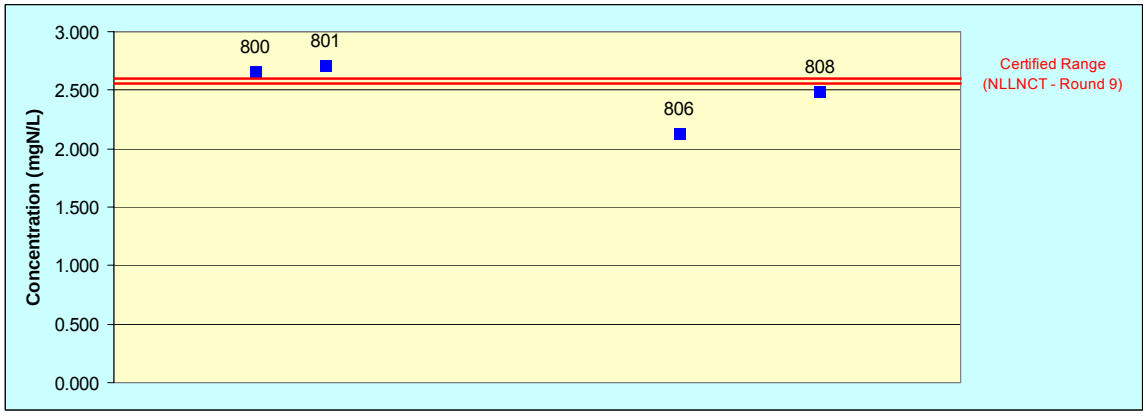


Figure 19 – TN Bottle 6 Scattergram

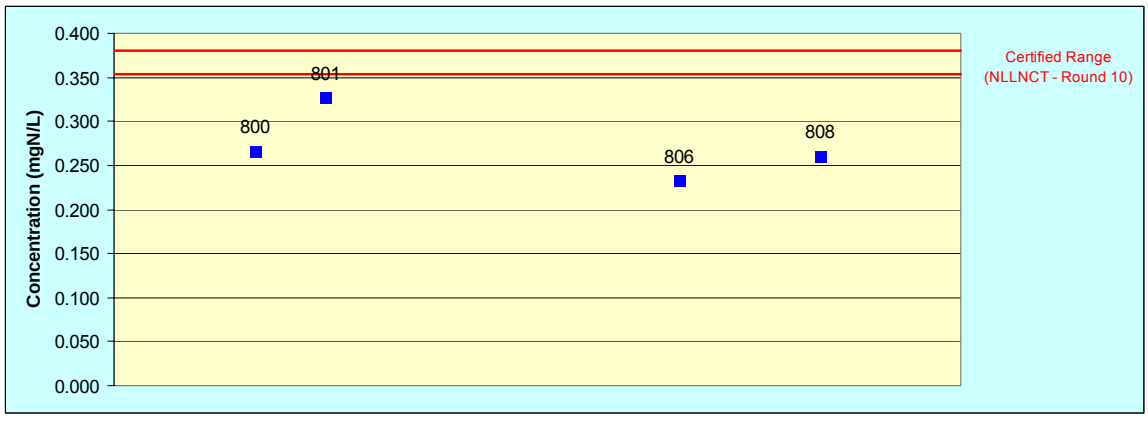
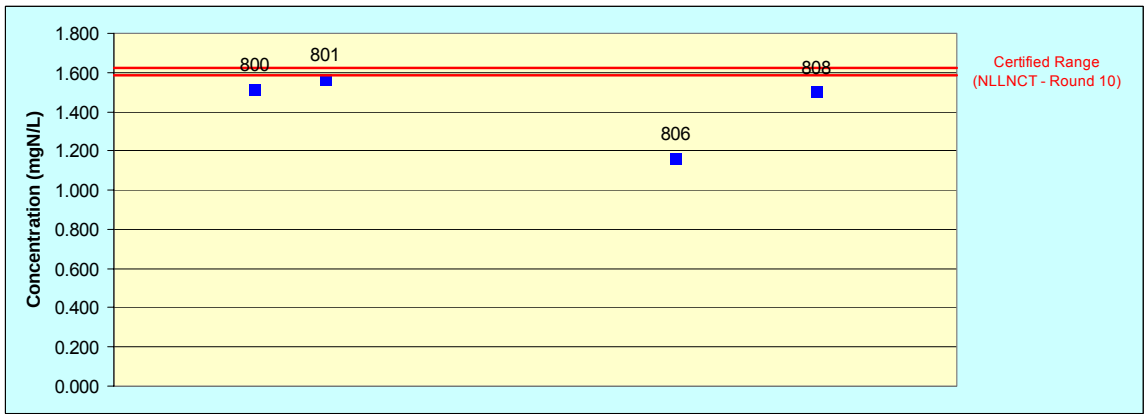


Figure 20 – TN Bottle 8 Scattergram



3.3. Total Phosphorus (TP)

A summary of the methodologies used are tabulated in Table 12.

Table 12 – Summary of TP Methodologies

Lab ID	Digestion Technique	Digestion Heating Method	Chemistry	Instrument	Reporting Limits (mgP/L)
800	Pers (B/A)	Autoclave	Ascorbic	FIA	0.002
801	Not Provided	Not Provided	Not Provided	Not Provided	0.002
806	Pers (B/A)	Autoclave	Ascorbic	FIA	0.002
808	Pers (A)	Autoclave	Ascorbic	FIA	0.002

A summary of TP results are tabulated in Table 13.

Table 13 – Summary of TP Results

	Bottle 2	Bottle 4	Bottle 6	Bottle 8
median	**0.0250**	**0.2703**	**0.0525**	**0.1115**
adj IQR	**0.0017**	**0.0379**	**0.0048**	**0.0044**
Robust CV	**6.9%**	**14.0%**	**9.1%**	**3.9%**
Certified Value	**0.0300**	**0.2583**	**0.0515**	**0.1158**
Certified Range (lower)	**0.0275**	**0.2465**	**0.0485**	**0.1129**
Certified Range (upper)	**0.0324**	**0.2700**	**0.0546**	**0.1187**

Figure 21 – TP Bottle 2 Scattergram

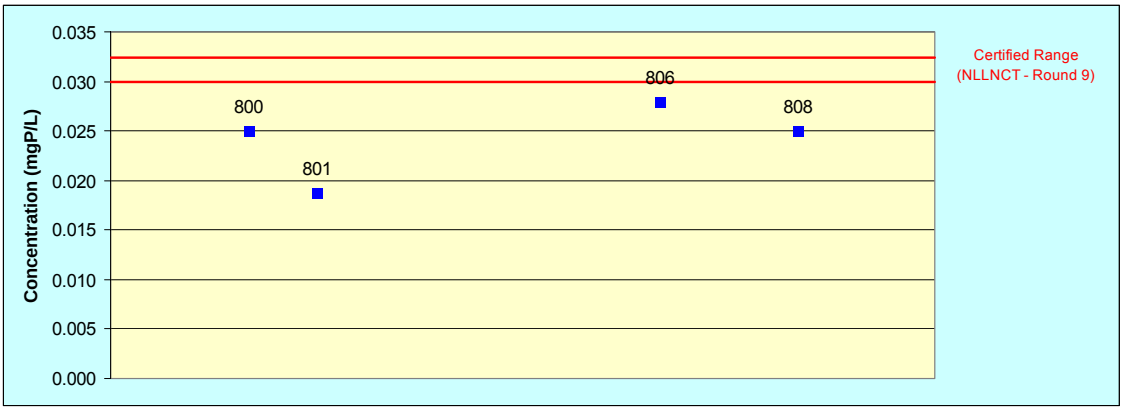


Figure 22 – TP Bottle 4 Scattergram

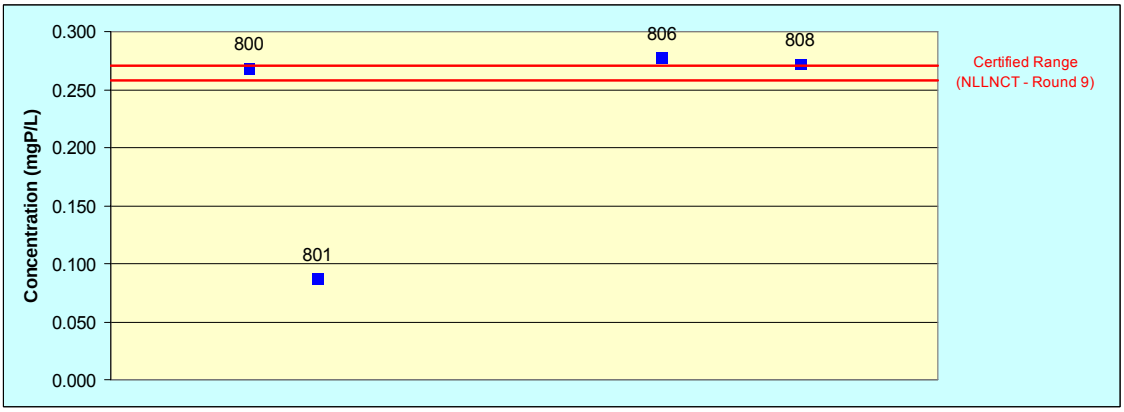


Figure 23 – TP Bottle 6 Scattergram

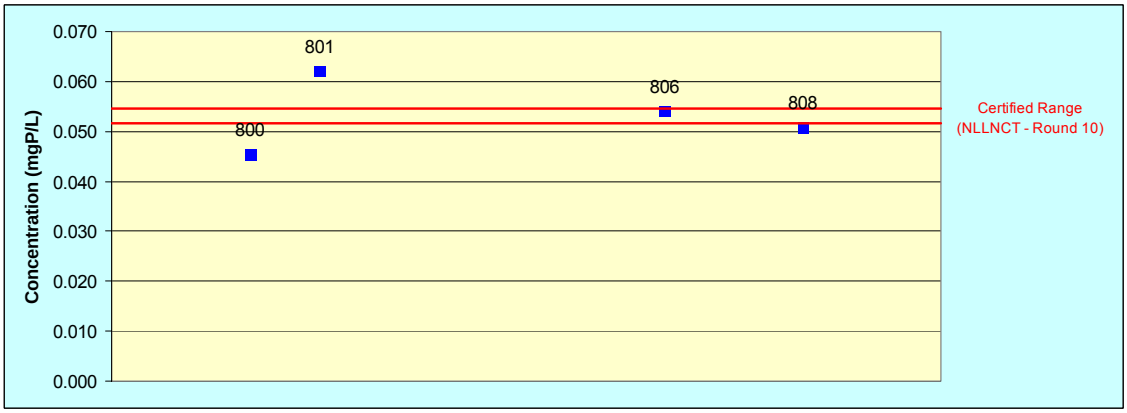
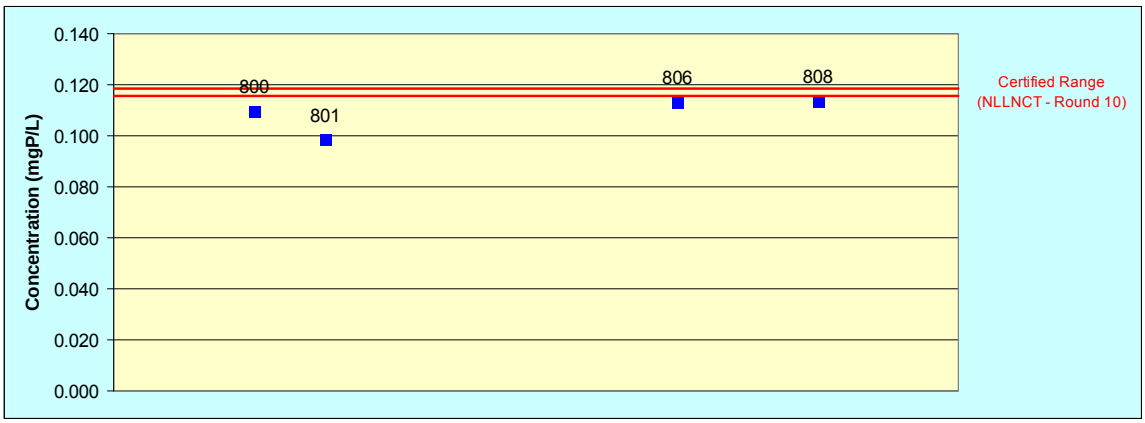


Figure 24 – TP Bottle 8 Scattergram



4. OVERALL COMMENTS AND CONCLUSIONS

For the soluble nutrient parameters the median results are all close to or within the Certified Value for the different sample types provided in the intercalibration exercise. This is particularly pleasing from several points of view and should provide a high degree of confidence in the data produced by these laboratories, especially in the measurement of nitrogen oxides and filtered reactive phosphorus. For ammonia and silica there is considerable room for improvement and further intercalibration rounds will be required to monitor possible improvements.

The Summary Page from the Interim Report provides participants an opportunity to review their individual performance relative to that of their peers. The normally accepted criteria for acknowledging the technical competence of a laboratory is based on the z-score for each individual parameter where:

Z Score ≤ 1	is Optimal
Z Score ≤ 2	is Satisfactory
Z Score ≥ 2 but ≤3	is Questionable
Z Score ≥ 3	is Unsatisfactory

However, due to the small number of participating laboratories it is possible to introduce bias errors into the data set and it is recommended that participants also use the Certified Values to assist them in making judgment on their own performance.

It is recommended that laboratories that had a z-score of greater than 2 for any parameter undertake corrective action to identify areas that require improvement.

Congratulations must go to laboratory 808 as their results are excellent.

5. Appendix 1 - Parameters for intercalibration exercises

Medium	Target Pollutants	
Water	NO2	*
	NO3	*
	NH3	*
	Phosphate	*
	Silicates	*

6. Appendix 2 – Statistical Calculations

Robust Statistics

$$\text{Interquartile range (IQR)} = \text{3rd Quartile} - \text{1st Quartile}$$

$$\text{Adjusted IQR (Adj IQR)} = \text{IQR} \times 0.7413$$

$$Z \text{ score} = \frac{x - X}{\text{Adj IQR}}$$

$$\text{where} \qquad x = \text{lab result (average)}$$

$$\text{X} = \text{median result}$$

Certified Values and Ranges

Notes:

1. Every result from the NLLNCT is assigned a z score (not the average).
2. Each individual result with z > 2 is removed.
3. *x* is then the lab's average result.
4. *n* is the number of lab's (not individual results).

$$\text{Certified Value } (\bar{x}) = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$\text{Certified Range} = \bar{x} \pm (t_{95\%,n-1} \times \sqrt{v})$$

$$\text{where:} \quad \text{variance } (v) = \frac{\sum_{i=1}^{n} \left[\left(x_i - \bar{x} \right)^2 \right]}{n \times (n-1)}$$

Appendix 2

Visiting Scientist Programme 2006 - Pollution Component

1. Background

After one year of implementing the UNDP/GEF Yellow Sea Project, "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem," the Regional Working Group–Pollution has deemed it necessary to include a "Visiting Scientist Programme" under the Component's activities. The Programme aims to allow exchange of ideas between scientists in China and Republic of Korea, and also will contribute to capacity building, as the visiting scientist is expected to learn new and different methods for conducting pollutant analysis in the Yellow Sea. The Programme will also provide the opportunity for improved calibration and exchange and comparison of data, as any differences in sampling and analytical methods will be examined and possible standardised or comparable methods will be agreed for future usage. Ultimately, the two countries' data of pollutants in the Yellow Sea should be easily comparable and a regional picture may be provided for a more complete picture of pollutants in the Yellow Sea.

Geographic Scope: The Yellow Sea large Marine Ecosystem is defined in the Project Document as the body of water delineated at the south, by a line connecting the north bank of the mouth of the Chang Jiang (Yangtze River) to the south side of Cheju; at the east, by a line connecting Cheju Island to Jindo Island along the coast of the Republic of Korea; and to the north, a line connecting Dalian to Penglai (on the Shandong Peninsula). This latter line separates the Bohai Sea from the Yellow Sea and as a result is not included in this study.

2. Description of Required Services

During the first year of the programme, a research scientist from **China** will be chosen as the Visiting Scientist to visit **South Sea Institute, KORDI, Goeje Island, Republic of Korea**, for two weeks. The Visiting Scientist will:

1) Assist the host lab with analysis of marine organic pollutants, particularly samples taken from the Joint Co-operative Study Cruise;
2) Acquire skills in organic pollutant analysis which can be applied to his/her current research projects;
3) Hold discussions with scientists and lab technicians on calibrating analytical methods, comparable data presentation formats, and comparable data exchange mechanisms; and
4) Prepare a written report summarising the achievements and outputs of the Programme (see Section 5 for report chapters).

<u>Qualifications:</u>

The Visiting Scientist should have the following qualifications:

- At least 5 years proven track record in the area of Yellow Sea coastal and marine organic pollution research.
- Strong analytical laboratory skills.
- Initiative to provide ideas and engage in analytical methods discussions.
- Good interpersonal skills and ability to work both as a team and individually in a laboratory setting.

- Proficiency in English and one of the languages of the region.

3. Deliverables and Deadlines

The Visiting Scientist Programme will take place for a two-week period, any time between June to December 2006, according to the schedule below, and preferably within one month after the Spring Cruise:

Task	Deadline
Provide workplan to PMO and Supervising Scientist at host lab	At least 2 weeks before arriving at host lab
Work at host lab	2 weeks
Submit final report to PMO	Within one month after departure from host lab

4. Monitoring/Progress Control

The Project Management Office (PMO) will assume overall supervision and co-ordination of this task. Programmatic guidance should be sought from the Project Manager, Mr. Yihang Jiang (yihang@yslme.org), copied to Ms. Connie Chiang (connie@yslme.org) at the Yellow Sea PMO.

The Visiting Scientist is expected to submit a workplan at the onset of the activity, and a final report after the conclusion of the activity. All deliverables should be submitted to Ms. Connie Chiang, via e-mail.

5. Expected Outputs/Results

The final product should be a report following the suggested table of contents format listed below.

I. Background of assignment
II. Methods used to carry out assignment
III. Achievements
IV. Discussions and conclusions
V. Persons / institutions visited

BREAKDOWN OF COSTS (USD)

Item	Unit Cost (USD)	# of Units	Total Cost (USD)
International Travel			
Domestic Travel, if relevant			
Accommodation			
Subsistence Allowance			
Co-financing from host institute			
TOTAL AMOUNT REQUESTED			

Appendix 3

“Pollution Regional Monitoring Guidelines” Draft Final Report

Appendix 4

Outline of EAS Congress Exhibition

Proposed title: **YELLOW SEA**

1. INTRODUCTION

- Project poster
- Natural environment of Yellow Sea
- Problems faced by Yellow Sea
- Status and trends of YS ecosystem

2. DIAGNOSIS

Problem:

- Intro sheet on detecting YS problems
- Data & Information Collection Activity
- Regional Data Synthesis
- Fisheries Stock Assessment results; Effect of primary productivity on fisheries

Trend:

- CPUE vs. stocks; FAO mariculture stats table
- display maps & graphs, YSEPP Fact Sheet, WI habitat map
- Pollutant inputs
- New Findings from the Project

Analysis:

- Valuation

3. CURRENT EFFORTS

- Intro sheet showing more than science is needed to solve the problems
- Governance analysis – display GA results
- Economic valuation – display the approach
- Public Awareness – Parliament Seminar, Youth Camp, Korea NGO Workshop
- Regional co-operation – cruise results
- WWF critical habitats
- WI shorebirds
- UNDP Yancheng Project

TDA PROCESS

4. MANAGEMENT APPROACHES

- Scientific research – monitoring pollution & ecosystem; CPR results; remote sensing maps
- Public Awareness – YS Partnership, show e-discussion group, website, joint achievements; SGP; highlight future activities
- Legislation – regional agreements, regional strategies – fish & mariculture, conservation areas, pollution control; harmonization of current laws
- Enhance national infrastructure, institutional rearrangements

5. IMPLEMENTING MANAGEMENT ACTIONS

<u>Demonstration and pilot activities for:</u>

- Alternative livelihood opportunities – fisheries
- Investments – pollution control infrastructure, reduction of ecosystem stress
- Sustainable area use management

DISPLAY TABLE

- Project brochure
- Project publications
- Promotional items
- Partner's products that don't fit into the topics