

# Report training Basics of Wastewater Treatment @EWS

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November 2012  
Agnes Maenhout



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## 1. Centre of Expertise, Showcase 1-4

The Centre of Expertise (CoE) aims to establish a Netherlands-Southern African 'Centre of Expertise' for drinking water supply and sanitation, hosted at eThekweni Water & Sanitation. A two step approach by dividing into a distinct 'inception' phase, and a subsequent 'implementation' phase, is chosen to balance ambition and precariousness. During 2012 4 showcases are executed, being a first step, setting an example and give some experience for the development of a joint business case.

The envisioned 'Centre of Expertise' will assist to potentially transform aid into mutual beneficial trade. Additional local business development should be a spin-off of this transition. The envisioned 'Centre of Expertise' will be instrumental in unlocking the added value of the Dutch water sector in a win-win approach with the Southern African Partners. eThekweni Water & Sanitation will, in many cases, be the 'launch pad' for these new technologies, best practices and/or innovations.

The design, development and delivery of practical training courses "for professionals by professionals" is an example of best practice in the Netherlands. Wateropleidingen/ World Water Academy is a self-sustainable training organization, set up by the water sector. Focus is on the job training and life long learning for all vocational levels. Every training is customized for the target group.

## 2. Training Need Analysis & Design

The Training Need Analysis is the process to define the target group, the training needs and the demands of the EWS. Agnes Maenhout had 2 meetings in Durban on March 12<sup>th</sup> and April 12<sup>th</sup> of 2012 and in an iterative process the set up of the course is finalized. The summary is given in the fact sheet.

(2012/03/05) Speedy Moodliar - Courses for Training

Page 1

From: Mohammed Dildar  
To: Speedy Moodliar  
Date: 2012/03/05 11:13 AM  
Subject: Courses for Training

1. Anaerobic digester and gas handling
2. Biological nutrient removal (nitrates and phosphates)
3. Sludge disposal (incineration, composting, drying)
4. Operator training: basic biochemistry and microbiology of wastewater treatment
5. Operator training: screening and dewatering processes

↳ Bill / Gordon D.O.S.

Notes

1. Leaks ~~Test~~ Detection
2. Valve Packing
3. Basic Hydraulics for Senior Water distribution officers.

approved by Neil

Meeting@EWS  
March 6<sup>th</sup> 2012

Mile

Meeting@EWS April  
13<sup>th</sup> 2012

The input of the management of EWS was incorporated and the choice for the course topic was made: Wastewater Treatment for (senior) operators. The course was designed with the aid of interviews and job descriptions of EWS and the existing courses of Wateropleidingen. The result was agreed with the managers and presented @Wisa 2012. The course Wastewater Treatment (WWT) consists of 4 modules, of which module 1: Basics of Wastewater Treatment (BWWT) is developed, customized for EWS and delivered by EWS professional trainers.

### 3. CoE, Showcase 4: Course Wastewater Treatment eThekweni

Showcase 4:  
Course Wastewater Treatment eThekweni



EWS needs well trained staff (both on knowledge and skills) to deal with the great task at hand. Wateropleidingen, the Dutch training institute for water management, is the lead partner in Showcase 4. A course about waste water treatment will be designed, developed and delivered, according to the ISO 9001 certified procedures of Wateropleidingen. The course is custom made on the needs of the operators of eThekweni and will consist of 4 modules. Main goal of the course is to develop the level of technical skills off the staff responsible for the operating and maintenance of the treatment plants. These professionals from eThekweni will be trained as trainers during this showcase, these professionals will deliver the first training module together with Dutch professionals. The first delivery is expected in July.

**Course overview**

Target group	Operators grade 10/12 and senior operators
Data	May – December 2012
Location	Durban
More information	<a href="http://www.wateropleidingen.nl">www.wateropleidingen.nl</a> or <a href="mailto:info@wateropleidingen.nl">info@wateropleidingen.nl</a>

**1. Module Basics of waste water treatment (2 days)**

- Water cycle
- Green drop requirements
- Basics of chemistry, microbiology and hydraulics
- Domestic and industrial waste water
- Process of a treatment plant
- Basics of process control

**3. Module Sludge (2 days)**

- Sludge processing and techniques
- Anaerobic digestion and gas handling
- Sludge disposal
- Sludge analysis

**2. Module Waste water treatment techniques (3 days)**

- Mechanical separation techniques
- Chemical and physical treatment
- Biological treatment techniques
- Activated sludge
- Removal of nitrates and phosphates
- Polishing

**4. Module Operating and maintenance (3 days)**

- Asset management
- Mechanical and electrical equipment
- Instrumentation and measurements
- Metering and sampling
- Unit operations & maintenance
- Performance indicators & compliance
- Trouble shooting

**The design, development and delivery of a course**  
The following model is used in the design, development and delivery of the course in eThekweni



Design

From topics to learning goals:

- Actual knowledge participants
- Wishes
- Motivation
- Learning levels (knowledge, skills, attitude)
- Time available



Development

Development:

- Schedule (content, trainers)
- Teaching methods
- Construct learning materials
- Write course book
- Construct assessment methods



Delivery

Delivery of the course:

- Course schedule and course location
- PR and communication
- Registration of participants
- Reproduction of course materials
- Evaluation

[www.coe.org.za](http://www.coe.org.za)





### 4. Training of Trainers (ToT)

The main part of the best practice is the training concept of “for professionals by professionals”. Thus, part of this showcase was to select EWS staff members with trainers competences who are able and willing to be trained as a trainers and who will become –part time- trainer to train the operators.

A professional trainer is an expert in one or more topics of the course. He/she is working as a professional in the water industry in South Africa. He/she is passionate about his job and he/she is

able to translate his knowledge or skills to the participants, using different interactive teaching methods. He is able to inspire his peers.

Needed qualifications for a professional trainer:

- Is an expert on his topic (theoretical and practical)
- Is passionate about his topic/ experience
- Willing to exchange his knowledge and skills
- Able to adjust the level of his teaching to the level of the participants
- Able to use different interactive teaching methods or to be coached in using these methods
- Fluid communication, in the English language and Zulu
- Extrovert attitude

Four staff members of EWS were selected to become a trainer:

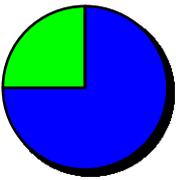
Name	Position
1. Ms. Shenelle Emmanuel	Chemical engineer
2. Mr. Mduzuzi Dlamini Junior	Chemical Technician
3. Ms. Preshine Govender	Education Officer
4. Mr. Paul Nortcutt	Education staff (worked in lab as a microbiologist)

The ToT was delivered on 10 + 12 July 2012. The ToT was delivered at the Wastewater Education Awareness Classroom at Northern Treatment Works in Durban. This venue reflects the practical environment. The schedule and the course book are in Chapter 8. Trainers were Agnes Maenhout and Johan Oost (WWA) and Kees de Korte (Waternet). The feedback of the participants of the ToT course was expressed as: giving structure, enthusiasm, motivation, practical and inspiring. A brief report is given in appendix 1 .

**EVALUATION TOT EWS 10+12 July 2012**

**11. What is your opinion on the course as a whole?**

excellent	3	75%
good	1	25%
could be better	-	0%
bad	-	0%
very bad	-	0%
total	4	100%



**12. What are in your opinion the best points of the course?**

the aim of the course is the development of the process controllers  
learning objectives  
learning styles  
making of a script  
group exercises  
practical examples  
the way in which the contents was simplified  
the help in putting the lesson together and what to do and what not to do  
constructive criticism from everyone to learn and improve  
the course materials were impressive and easy to understand, concise  
the charisma and dedication of all three Dutch trainers

**13. Did you miss certain subjects? If yes, which ones?**

no (3)

**14. Have you got suggestions for improvement?**

more time on chemistry and microbiology especially if it is not the participants field of expertise  
no (3)

**15. Do you have other remarks of suggestions?**

To incorporate more Ethekewini trainers in further development opportunities  
within the Centre of Expertise and the World Water Academy  
no (3)

## 5. Development

The module Basics of Wastewater Treatment (BWWT) was designed by the staff of World Water Academy according to the target group and objectives of EWS. Result of the design phase was an overview of objectives and learning goals. These objectives were clustered in a programme with topics, goals and teaching methods. This schedule is finalized on 11+13 July 2012. The different topics of the course were specified and concluded in a script; also the presentations were prepared in powerpoint. The activities were a joint activity of 2 groups, each consisted of 2 EWS trainers, assisted by 1 Dutch staff member. The input from the World Water Academy was a mixture between contents (Kees de Korte) and didactical expertise (Johan Oost). The process manager was Agnes Maenhout. At the end of July 13<sup>th</sup>, the majority of the course materials were ready:

- Draft schedule for the pilot course
- PPT's
- Assignments
- "shopping list" for other course materials
- Input for the text book
- Structured dropbox "directory" to exchange the latest version of the materials

WWA made the final textbook. This text book is a brief overview of the contents of the course, illustrated by pictures of EWS.

## 6. Pilot delivery

The pilot delivery of the module BWWT was delivered on 9 – 10 October 2012. The participants were 10 (senior) process operators of different treatment plants of EWS. The four professional trainers were all scheduled to take part in the delivery. The schedule and the course book are given in chapter 8. The trainers were well prepared, using presentations and assignments prepared before. The trainers were coached by Kees de Korte and Agnes Maenhout. After the first day the group was asked to give a first idea upon the course so far.

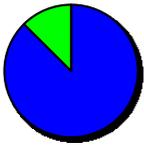
The mentioned informative, interesting, unique and different. This feedback inspired the trainers to be prepared for the second day.





The participants felt honored because they could exchange their knowledge to colleagues. The opening and closure by the manager Mr Melvin ... was appreciated very much. Main feeling of the participants was that they have learned a lot; they were all expressing to have more trainings like this. They expressed that the shift assistants would show big improvement after a training like this.



EVALUATION PILOT BWWT EWS 9+10 October 2012		
<b>11. What is your opinion on the course as a whole?</b>		
excellent	7	88%
good	1	13%
could be better	-	0%
bad	-	0%
very bad	-	0%
total	8	100%
		
<b>12. What are in your opinion the best points of the course?</b>		
everything that was taught was educational and interesting		2*
it was very interesting and knowledgeable		
it helped us to understand the various processes better and has gives us more knowledge about the treatment process		
practical parts and excursio to get good understanding		
it should be 100%		
calculations		
the technical process how it is of relevance to our plants		
actually 99,9% because the training was only given once, but if they keep on then I will rate them more than this		
course is good, but 2 days is not enough		
<b>13. Did you miss certain subjects? If yes, which ones?</b>		
no		7*
the course covers everything on what we are doing		
<b>14. Have you got suggestions for improvement?</b>		
more tuitions and time on calculations		5*
course must cover scada to be able to interprete and analyse the information of the scada		
more than 2 days		
<b>15. Do you have other remarks of suggestions?</b>		
I wish all the staff could be trained in he course provided, esp. shift assistants for better knowledge and understanding		
more knowledgeable shift assistants will make the handling, treatment and functioning of purification much easy for all		
no		
it would be perfect to run more of these courses over the years to broathen our knowledge if needed		
we require more courses like this		
if we can get more time in good learnership like this one we will achieve green drop in our plant		
if the Dutch support staff can please keep on running the sort of training(s) like this one everything will run smooth		
very well organized and presented		
if guys can also visit us in our plants and give some extra training		
course was good and we got something new we never done before		

## 7. Recommendations

After the pilot training, the delivery was evaluated with the trainers and the coaches. The evaluation focused as well on the ideas of the trainers as to the results of the evaluation of the participants.

Their general idea & feeling of the trainers about the pilot was positive. The pilot was felt as a huge success, they liked the training, they enjoyed being a trainer and felt that it is quite difficult to teach the things you know. They mentioned that the preparation, the ToT, the methods and way how to initiate the interaction in the group was inspiring for them as well for the participants. The feedback of the participants: "we want more trainings like this, we've learned a lot, please train our shift assistant too" really felt rewarding. The coaches gave very positive. Just brief recommendations were made like: pay some more time and attention to the summary at the end of the day and make an introduction not too short. And also, don't speak too fast, give the participants some time and silence

to think and reflect. The participants and the coaches made an inventory of do's and don'ts for the trainers, as observed during this pilot. The summary of these do's and don'ts will form a EWS-trainers-checklist.

The schedule is adapted after the delivery. The schedule is spoken through step by step; f.i. the calculation part ins lengthened a bit (chapter 8).

The logistic arrangement was felt to be very time-consuming. A checklist from the Wolrd Water Academy was very helpful. The logistics cover the following items:

- The participants (selecting, inform and invite them, inform the manager)
- The trainers (who will be in charge for which part)
- The venue (beamer, computer, flipcharts, pencils etc, coffee and tea) and bus transport for the final excursion
- Materials for the assignments

It is recommended that the course is planned and organized by a team instead of the trainers. Such a team will consist of a course coordinator and a secretary.

The design of the module BWWT took approx. 5 days from WWA and 2,5 day from EWS/experts

The development of the module BWWT took a lot of time and rewarded in the good result. Besides the development in the ToT week (2,5 day for each trainer=10), it took 10 days to finalize and prepare all lessons. The preparation was disturbed by the lack of computers. The dropbox was helpful for the intercontinental communication and had a clear structure.

The experience of the trainers will result in a slightly smaller amount of development time for the next modules. It is expected to be 12 days preparation for a 2 days course and 6 days for coaching didactically and for the contents.

For the next delivery the trainers have to prepare again. They thought that approx. 2 hrs of preparation time will be needed for 1 hour of lessons. This means that the next BWWT will take 6 days of trainers-time besides the organization time mentioned above.

The course book covers the high lights of the course. The book is compiled by Wateropleidingen; it could only be finalized after the lessons were ready. It is recommended that the presentations and assignments are finalized in a joint work meeting between EWS and WWA.

Recommendations for next delivery:

- A coordinating team will do all logistic organizations
  - A course coordinator (1 month, 1 hr/day, makes 20 hours)
  - A secretary (1 month, 1 hr/day, makes 20 hours)
- Venue, a wastewater treatment plant.
- In 6 weeks after the pilot
- Group size do not exceed 16 participants
- 4 trainers, each for his /her part. 1 trainer to be moderator and keep the overview
- Schedule, presentations and course book adapted.

## **8. Deliverables**

1. Professional trainers of EWS (4); they attended a ToT, prepared their lessons, delivered a pilot and adapted the lessons
2. A ToT course
  - a. ToT programme & presentations and assignments
  - b. ToT course book
3. The module BWWT
  - a. BWWT schedule & presentations and assignments
  - b. BWWT course book

# Communique 106



## EWS CAPACITY BUILDING WITH WATEROPLEIDINGEN

17 JULY 2012



L-R: Preshine Govender, Paul Notcutt, Nduduzi Dlamini and Shenelle Emmanuel from EWS receiving their certificates from Agnes Maenhout Managing Director/CEO Wateropleidingen



L: Neil Macleod : Head of EWS with management and the Dutch training team

L-R: Johan Oost : Project Officer from Wateropleidingen and Kees Kort: Senior Advisor Wastewater Management from Waternet

L-R: Mohammed Dildar: Manager Works, Simon Scruton: Manager Non-Revenue and Agnes Maenhout: Managing Director/CEO Wateropleidingen

Wateropleidingen also known as Water World Academy are a leading training institute in the water sector for the Netherlands. They were established in 1993 specifically to improve the practical knowledge and quality of their employees on water issues. They offer courses for all water related topics in both the Netherlands and abroad.

eThekweni Water & Sanitation and Wateropleidingen are developing a training course for wastewater works process controllers. Special training sessions were carried out by Agnes Maenhout: Managing Director and Johan Oost: Project Officer from Wateropleidingen and Kees Kort: Senior Advisor Wastewater Management from Waternet. The course module is called Basic Wastewater Treatment. This course is a showcase project for a proposed Centre of Expertise to be based in EWS. The first step is called Train the Trainer. Four of our EWS staff have been trained as trainers. They are Preshine Govender and Paul Notcutt from Customer Services while Nduduzi Dlamini and Shenelle Emmanuel are from Works Branch. These trainers will roll out training to our process controllers as well as those from other municipalities in order to build capacity in the wastewater treatment sector. The second step involves developing the course material. This is being finalised. The final step is to roll out the training later this year.

This training will also support and sustain our Green Drop programme. "This is yet another



## Appendix 1: 'Training the trainer on the job in eThekweni'

eThekweni Metropolitan Municipality is one of the largest metropolitan areas in South Africa. The metropolis has more than three million inhabitants with Durban as most important city. eThekweni Water and Sanitation (EWS) an innovative utility for drink water production and wastewater treatment and one of the most important in South Africa.

At 8<sup>th</sup> of May 2012 the Centre of Expertise eThekweni was launched officially during the WISA conference in Cape Town. This is an initiative of EWS, together with Dutch partners: Vitens-Evides International, World Waternet Your Man On Site and the World Water Academy (English name for Wateropleidingen). Showcases will be developed and executed to implement and demonstrate new technologies, based on the latest Dutch technologies. The Centre of Expertise is partly financed by the Dutch government The World Water Academy



*Andre Haspels, de Nederlandse ambassadeur (rechts) en Neil Macleod, Head of eThekweni Water & Sanitation (EWS)*

### **Showcase: training**

The World Water Academy manages and executes one of the first showcases of the Centre of Expertise. This pilot project is the design, development and delivery of the basic training on wastewater treatment. An extensive training of trainers programme is executed parallel of the pilot. Enthusiastic staff members of EWS are selected for this programme. The trained trainers of EWS will deliver the developed training to approximately 300 process controllers of the 28 wastewater treatment plants of EWS.

The design of the course 'Wastewater Treatment' contains four modules. Each module contains two or three days. The first module 'Basics of Wastewater Treatment' contains a brief introduction on the water cycle, the influence of the wastewater and legislation (so called Green Drop) in South Africa. The overview of the process steps and each step in more detail is put in the module.

### **Didactical training and course development**

Between 9<sup>th</sup> and 13<sup>th</sup> of July 2012, Agnes Maenhout and Johan Oost (World Water Academy) and Kees de Korte (World Waternet) went to Durban to train some of the EWS future trainers (Ms Shenelle Emmanuel, Mr. Mduduzi Dlamini Junior, Ms. Preshine Govender en Mr. Paul Nortcutt) in didactics.

Before the mission, the World Water Academy already designed the course layout and developed course material. Based on that, the trainers and participants tailored the course for the South African context. A lot of emphasis was put to adjust the material to knowledge and skills of the target group: process controllers [grade 10/12].



*Didactical training at EWS*

The week was filled in with two excursions, two days of didactical training provided by the World Water Academy and two days of course material development. Agnes gave a presentation on didactics for the management and some interested staff of EWS. After this week, the four participants got a certificate in the presence of the management of EWS.



*The EWS trainers with certificate, together with the management of EWS and Agnes Maenhout, Johan Oost (World Water Academy) and Kees de Korte (World Waternet)*

*Kees de Korte (World Waternet): "I was impressive about the formula of this training. The future trainers were trained didactically and on-the-job they experienced how to prepare a training. And that just in one week! This could only work-out by a fixed schedule. Based on its long experiences, the World Water Academy proved that the organisation is very capable to design and develop*

*trainings with foreign organisations. They give organisations as World Waternet the role to bring-in the knowledge en skills on the right level. I look back on a very inspiring and energizing week for the South African participants, but also for the Dutch trainers."*

The EWS trainers will show the learned knowledge and skills during the first delivery next month. The World Water Academy will supervise the preparations and mentor during the delivery of the two-days module. The trainers will deliver the first module two times more in 2012. The second module 'Waste Water Treatment Techniques' will be developed will be developed and delivered for the first time before 2013.

For more information: Agnes Maenhout and Johan Oost