

Report

TRAINING COURSE FOR “WASTEWATER OPERATORS IN TRA NOC INDUSTRIAL ZONE”

September to November, 2012 in Can Tho City, Vietnam



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1 Introduction

The Industrial Zone Tra Noc has 290 ha and is the largest and most important industrial zone at Can Tho City. There are about 150 enterprises running different kinds of business. About 30.000 people are working in Tra Noc Industrial Zone in different industries, as e.g. aquaculture, beverage industry, animal feeding, processing agricultural products, raticides, producing fertilizer, textile industry, processing metal, producing construction materials and others.

About 40 factories operating decentralized wastewater treatment plants with different technologies and standards to treat their wastewater before discharging into the combined sewer network of the Industrial Zone Infrastructure Company or into the Hau River and surrounding open channels.

To secure the efficiency and sustainable functioning of the whole wastewater system at Tra Noc Industrial Zone, the local investment for a centralized sewage treatment plant of the Industrial Zone (IZ) is accomplished by an integrated wastewater concept, developed by the joint German - Vietnamese Research Project “AKIZ”, which is financed by the German Federal Ministry of Education and Research (BMBF), the German Industry and the Vietnamese Ministry of Science and Technology (MOST).

Within the scope of the integrated wastewater concept, representative factories within and near the IZ Tra Noc are selected, to demonstrate near-to-source measures, like the pre-treatment of wastewaters (e.g. from a pesticide production to remove toxic substances), like the generation of energy from wastewaters (e.g. for a seafood processing company), and like the recuperation of valuable substances and water-reuse from wastewaters (e.g. for a brewery and a biochemical factory).

The sustainable wastewater management within the IZ, under responsibility of Can Tho Export Processing and Industrial Zones Authority (CEPIZA) and Can Tho Industrial Parks and Infrastructure Construction Company (CIPCO) requires capacity building measures for all involved stakeholders.

To cope with this, the AKIZ – Project in conjunction with CEPIZA and Centre for Information and Documentation of Can Tho Department of Science and Technology (DOST) organized a training course for wastewater treatment plant operators in Tra Noc IZ from September – November 2012, supported by GIZ and sponsored by BMZ.

❖ Background of AKIZ - Project

Vietnam has an increasing number of more than 200 industrial zones which are without sustainable wastewater treatment. Within the AKIZ Project (“AKIZ” = “Integriertes Abwasserkonzept für Industriezonen”, “Integrated Wastewater Management for Industrial Zones”), concepts for the Tra Noc Industrial Zone in Can Tho in the Vietnamese Mekong Delta shall be developed to secure the efficiency and sustainable operation of the whole wastewater system including all its technological components and the combination of centralized and decentralized treatment solutions.

Within the frame of six sub-projects, German and Vietnamese research and industrial partners jointly perform the research work and practical application of the pilot systems in Tra Noc together with

relevant local authorities. Furthermore, the project is conducted in cooperation with ODA partners, like GIZ.

The six AKIZ - Sub-projects are

- TP 1: Coordination of the joint research project and development of an integrated management concept
- TP 2: Elimination of toxic substances by chemical and physical treatment
- TP 3: Anaerobic industrial wastewater treatment with energy recovery
- TP 4: Recovery of valuable materials by membrane filtration
- TP 5: Development and operation of a containerized laboratory and monitoring concept
- TP 6: Sewage sludge management concepts

Within the scope of Sub-Project TP 1, capacity building measures as the training course for wastewater treatment plant operators are also one of the main issues to be addressed.



Picture 1:

AKIZ – Project Chemical Lab at Tra Noc IZ



Picture 2:

AKIZ – Project Pilot plant at Tra Noc IZ

❖ Background of the GIZ - Development partnerships with the private sector - Program

Within the Development Partnerships with Vietnamese Enterprises Program the GIZ cooperates with small and medium sized enterprises (SME) and private cooperatives. Under consultation and with financial support of the GIZ, companies implement projects that merge business interests and development goals, directly benefitting the disadvantaged. Since 2003 the GIZ has supported more than 80 projects, mainly in the fields of agriculture, health, vocational training, natural resources and waste management in the scope of this program.

Furthermore, the GIZ promotes Corporate Social Responsibility (CSR) throughout Vietnam. CSR is a management concept that integrates social and environmental concerns in business operations and a company's interactions with its stakeholders. The GIZ fosters capacity building among a network of trainers and finances workshops on the integration of Corporate Social Responsibility into business strategies for SME.

2 Training course on Operation and Maintenance of Wastewater treatment plants

2.1 Time and Venue

Six sessions of the training course were held in 18, 19 of September, 11, 12 of October and 1, 2 of November 2012. The study tour was organized on 15, 16 of October 2012.

The training course was organized at the Meeting hall of Tra Noc 1 Industrial Zone, Can Tho City.

2.2 Participants

The training course attracted the participation of more than 50 trainees in every session. Participants came from a wide variety of agencies, mostly enterprises in the industrial zone, infrastructure companies, academic agencies (universities), etc. Please see annex 6.1 for detailed list of participating agencies.

2.3 Structure and content of the training course

❖ Structure of the training course

The course included six sessions presented in 6 days and 2 days of study tour. Experienced national and international lecturers were invited from various institutions.

The list of trainers as well as the agenda is shown as below:

Session	Trainer	Institution
1 & 2	Mr. Prof. Le Van Cat	Vietnamese Academy of Science, Hanoi
	Mrs. Tran Thi Ngoc Bich	HCM Vocational College of Technology, HCMC
3 & 4	Mr. Prof. Nguyen Phuoc Dan	HCMC University of Technology, Faculty of Environment
	Mr. Dr. Bui Xuan Thanh	HCMC University of Technology, Faculty of Environment
5	Mrs. Nguyen Thi Hanh	Vietnamese Institute of Industry and Commerce, Hanoi
	Mr. Ferdinand Friedrichs	LAR AG, Berlin / Germany
6	Mr. Rene Heinrich	Institute of Environmental Engineering and Management at the University of Witten/Herdecke, Witten / Germany
	Mr. Nguyen Xuan Phuong	Can Tho Water Supply & Sewerage Company – Sewerage Enterprise
Study tour	Mr. Nguyen Phu Tuan	HCM Vocational College of Technology, HCMC

❖ **Content of the training course**

Time	Objectives	Trainer	Institution
Session 1 at 18th September 2012			
07.30 – 08.30 am	Welcome and introduction of course outline	Rene Heinrich	IEEM (AKIZ)
08.30 – 11.30 am	Wastewater and sludge characteristics, legal requirements for wastewater treatment - Introduction	Prof. Le Van Cat / Tran Thi Ngoc Bich	VAST (AKIZ) / HCM Vocational College of Technology
01.00 – 05.00 pm	Wastewater and sludge characteristics	Prof. Le Van Cat / Tran Thi Ngoc Bich	VAST (AKIZ) / HCM Vocational College of Technology
Session 2 at 19th September 2012			
07.30 – 11.30 am	Basics of biology, chemistry, math & hydraulics - Introduction	Prof. Le Van Cat / Tran Thi Ngoc Bich	VAST (AKIZ) / HCM Vocational College of Technology
01.00 – 05.00 pm	Field visit to Western Sai Gon Beer Co. at Tra Noc IZ (Wastewater treatment plant and AKIZ – Pilot plant) and visit AKIZ – Chemical Lab at Tra Noc IZ	Prof. Le Van Cat / Tran Thi Ngoc Bich	VAST (AKIZ) / HCM Vocational College of Technology
Session 3 at 11th October 2012			
07.30 – 11.30 am	Terms and definitions of Wastewater Engineering, Process parameters, Description of treatment processes	Prof. Nguyen Phuoc Dan	HCMC University of Technology
01.00 – 05.00 pm	Physico - Chemical process (Principles of design and operation) / Flocculation - Coagulation / Sedimentation / Flotation / Filtration / Disinfection / Oxidation processes / Heavy metal removal	Prof. Nguyen Phuoc Dan	HCMC University of Technology

Session 4 at 12 th October 2012			
07.30 – 11.30 am	<p>Biological treatment processes: (Principles of design and operation)</p> <p>The following processes were introduced:</p> <ul style="list-style-type: none"> + Activated sludge process (AS) / Trickling filter + UASB / Anaerobic filter + MBR process - Sampling and process monitoring, Assessment of treatment performance of each unit's process 	Dr. Bui Xuan Thanh	HCMC University of Technology
01.00 – 05.00 pm	<p>Process control directives, Trouble shootings, Reporting needs for the operation of a wastewater system and formats – Field visit to Quang Minh Seafood Co. at Tra Noc IZ</p>	Dr. Bui Xuan Thanh	HCMC University of Technology
Study Tour to HCMC at 15 th & 16 th October 2012			
<p>Departure from CT:</p> <p>15th October (morning)</p> <p>Arrival back to CT:</p> <p>16th October (afternoon)</p>	<p>Study tour to industrial WW treatment plants:</p> <ul style="list-style-type: none"> - Visiting three plants of BECAMEX at My Phuoc 3 Industrial Zone, Ben Cat District, Binh Duong Province - Visiting one plant of Tin Nghia Company in Dong Nai Province + Visiting Vocational College of Technology with WW Treatment plant 	Nguyen Phu Tuan	HCM Vocational College of Technology
Session 5 at 1 st November 2012			
07.30 – 11.30 am	Controlling requirements – Waste water monitoring (Sample taking, sample preserving, sample analysis, troubles in analysis, errors in analysis)	Nguyen Thi Hanh / Ferdinand Friedrichs	VIIC (AKIZ) / LAR (AKIZ)
01.00 – 05.00 pm	Controlling requirements – Wastewater monitoring - Practical exercises at Wastewater treatment	Nguyen Thi Hanh / Ferdinand Friedrichs	VIIC (AKIZ) / LAR (AKIZ)

	plant of Bio Vietnam Co. and AKIZ – Chemical Lab at Tra Noc IZ		
Session 6 at 2 nd November 2012			
07.30 – 08.30 am	Cost effectiveness of the operation of wastewater systems	Rene Heinrich	IEEM (AKIZ)
09.00 – 11.00 am	Labor safety – instructions and demonstrations at wastewater system	Rene Heinrich	IEEM (AKIZ)
11.00 – 11.30 am	Written examination to obtain certificate		
01.00 – 03.00 pm	Cleaning of Sewer networks – practical demonstrations with winch / suction vehicle and combined high pressure vacuum truck	Nguyen Xuan Phuong	Can Tho Water Supply & Sewerage Co. - Sewerage Enterprise
03.30 – 5.00 pm	Handover of certificates / Course Evaluation / Closing	Stefanie Reichenbach / Huynh Viet Dung / Rene Heinrich /	GIZ / CEPIZA / IEEM (AKIZ)

2.3.1 Session 1 and 2 by Prof. Le Van Cat and Mrs. Tran Thi Ngoc Bich

On the 18 and 19 of September, the first 2 sessions were presented by Prof. Le Van Cat and Mrs. Tran Thi Ngoc Bich.

First of all, Mr René Heinrich gave the welcoming speech to all the trainers and trainees. He also presented the reasons and purposes of the training course and thanked GIZ, especially Mr. Fabian Schindler as Program Leader for their support. Moreover, structure of the training, schedule and an introduction about the German – Vietnamese Research Project “AKIZ” and the close co-operation with GIZ as sponsor for the training were also provided.

The rest of the first day and the half second day were followed by the presentation of AKIZ – Researcher Prof. Le Van Cat and Mrs. Tran Thi Ngoc Bich about “Wastewater and sludge characteristics, legal requirements for wastewater treatment – Introduction” and “Basics of biology, chemistry, math & hydraulics – Introduction”.

In the afternoon of September 19th, 2012, trainees had a chance to visit the wastewater treatment plant of Western Sai Gon Beer Company and the containerized pilot plant of AKIZ – Sub Project 4 “Recovery of valuable substances by membrane technology”. Then, trainees visited the containerized Chemical Lab of the AKIZ – Project and the experimental container on sludge management – AKIZ – Sub project 6 to have an overview on its activities, equipment and wastewater parameters analysed.

During the time, trainees had discussed with trainers about their own situation at the company, sharing some experience and asking for advice, especially for trouble shootings.



Picture 3: Mr. René Heinrich, AKIZ – Project - Coordinator in Vietnam giving welcoming speech



Picture 4: Prof. Le Van Cat presenting characteristics of wastewater



Picture 5: Mrs. Tran Thi Ngoc Bich of Ho Chi Minh Vocational College of Technology



Picture 6: German student introducing the pilot plant of AKIZ – Sub Project 4

2.3.2 Session 3 and 4 by Prof. Dr. Nguyen Phuoc Dan and Dr. Bui Xuan Thanh

The 3rd and 4rd sessions of the training course were presented on October 11th and 12th, by Prof. Dr. Nguyen Phuoc Dan and Dr. Bui Xuan Thanh of Department of Environment, University of Technology HCMC.

For the first day, Prof. Dr. Nguyen Phuoc Dan introduced to the trainees knowledge about terms and definitions of Wastewater Engineering, Process parameters, Description of treatment processes.

For the second day, Dr. Bui Xuan Thanh explained biological processes, trouble shootings, and ways of assessment of each treatment unit.

In the afternoon, trainees visited the wastewater treatment plant at Quang Minh Seafood Company. Dr. Bui Xuan Thanh did some explanation on site about how to quickly determine the sludge's characteristic, good and weak points of the treatment plant, etc.



Picture 7: Prof. Dr. Nguyen Phuoc Dan presenting terms and definitions wastewater engineering, process parameters



Picture 8: Dr. Bui Xuan Thanh presenting biological process, assessment of each treatment unit and trouble shootings



Pictures 9 – 10: Visiting the treatment plant at Quang Minh Seafood Company

2.3.3 Session 5 and 6 – AKIZ – Researchers Mrs. Nguyen Thi Hanh, Mr. Ferdinand Friedrichs and Mr. René Heinrich

On the 1st of November, Mrs. Nguyen Thi Hanh and Mr. Ferdinand Friedrichs introduced to trainees wastewater monitoring – laboratorial know how and experience sharing.

To begin, Mrs. Hanh gave lectures on basic requirements needed for wastewater monitoring. Ways of sampling, preserving were mentioned in details such as what kind of bottles can be used to keep samples with heavy metals, etc. Mr. Ferdinand Friedrichs followed with techniques in the lab, common errors when analyzing water sample. In the afternoon, the trainers gave practical explanations when taking the class to Bio Vietnam Company at Tra Noc IZ to take samples and performed analytical protocols at AKIZ – Project – Office and Chemical Lab for demonstrations.

On the second day, Mr. René Heinrich presented about cost and energy efficiency of wastewater treatment systems. Trainees had chances to get to know what they haven't thought of when dealing with costs and energy in wastewater treatment. Moreover, a representative – student from Can Tho University presented her research on the cost efficiency of some wastewater treatment systems inside Tra Noc Industrial Zone. The presentation showed study cases of two students to seafood processing companies at Tra Noc IZ. By collecting data from companies and information from the AKIZ - Project, they came to conclude on the effectiveness of the treatment system at each company and the proposal.

To follow, Mr. René Heinrich presented aspects of labour safety at waste water treatment systems. Clear instructions and demonstrations were given to the trainees as operators and supervisors.

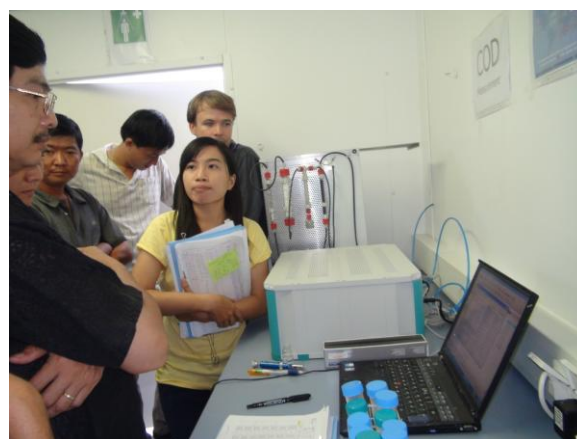
The morning session was ended by the final examination with 10 multiple choice questions regarding contents of six previous sessions. In the afternoon, trainees and Tra Noc IZ – Infrastructure Company followed the performance of sewer network cleaning done by Can Tho Water Supply and Sewerage Company. Sewer network cleaning was carried out by advanced technologies such as winch / suction vehicle and combined high pressure vacuum truck in a systematic way.



Picture 11: Mrs. Nguyen Thi Hanh demonstrating sample taking at treatment plant



Picture 12: Mr. Ferdinand Friedrichs and AKIZ – Team presenting sample taking tools



Pictures 13 – 14: Demonstrations at Bio Viet Nam Company and analysis in AKIZ – Chemical Lab



Picture 15: Mr. René Heinrich presenting Occupational Safety and Health



Picture 16: Student from Can Tho University presenting case studies on cost efficiency



Pictures 17 – 18: Demonstrating Cleaning of sewer network at IZ Tra Noc by Can Tho Water Supply & Sewerage Company

2.4 The Study tour

The Study tour started in the morning of October 15th in Can Tho and reached Binh Duong in the afternoon.

In Binh Duong Province, the delegation visited three wastewater treatment plants of **My Phuoc 3 Industrial Zone** of BECAMEX Company, Ben Cat District. Each wastewater treatment plant has the capacity of 4,000 m³/day, using different treatment technologies.

On the second day, trainees visited **Ho Chi Minh Vocational College of Technology**. The college was founded in 1978 and was named as Ho Chi Minh Vocational College of Technology in 2007. The school is special because it offers training of many professions including network management, computer fixing techniques, welding, business accounting, industrial electronics, industrial electricity, civil electricity, metal cutting, etc. and esp. wastewater management. Colleges offering wastewater treatment are still limited in Viet Nam. The school has its own wastewater treatment plant with the capacity of 120m³/day for teaching purposes and treating its own domestic wastewater. Moreover, it is also well equipped with materials and equipment for other professions such as welding, mechanics, etc.

Finally, the delegation came to **Tam Phuoc Industrial Zone** which is managed by Tin Nghia Infrastructure Company. The treatment plant of Tam Phuoc Industrial Zone has the capacity of 3,000m³/day after two construction phases. The 3rd phase with 4,000m³/day will be operated by the end of 2012.

Wastewater is automatically monitored and data are continuously reported to responsible agencies.

The study tour ended in the afternoon of October 16th in Can Tho.



Pictures 19 – 20: Visiting Wastewater treatment plants of My Phuoc 3 Industrial Zone



Pictures 21 – 22: Visiting Ho Chi Minh Vocational College of Technology



Pictures 23 – 24: Visiting Tam Phuoc Industrial Zone of Tin Nghia Company

2.5 Presentations

During the training course, trainees received lessons as presentation – handouts at every start of the two sessions. Title pages of all the presentations will be found in Annex 6.6

3 Closing and Handover of certificates

In the afternoon of November 2nd, 2012, the training course was closed with the presence of Ms. Stefanie Reichenbach – Representative of GIZ, Mr. Huynh Viet Dung – Vice Chairman of CEPIZA, and Mr. René Heinrich – AKIZ - Project – Coordinator in Vietnam.

Mr. Huynh Viet Dung expressed his high appreciation on the fruitful and successful implementation of the training course. He also presented about the current environmental management of Can Tho Industrial zones, real status and difficulties. As the closing words, Mr. Dung stated his desire to have the similar training course on different environmental topics for enterprises inside the industrial zones in the next years as well as the follow up on training for wastewater management.

Ms. Stefanie Reichenbach, from GIZ gave thanks to the organization board and AKIZ – Project and expressed her delight on the result of the training.

Finally, Mr. René Heinrich stated the importance of the course as well as his appreciation to the sponsor – GIZ and the organizers – Centre of Information and Documentation of Department of Science and Technology (DOST) of Can Tho City.

As a result, all of the trainees passed the final exam and received the certificates of completion from the sponsor and organizers.



Pictures 25 – 28: Distinguished guests giving closing speeches and handing over certificates

4 Media Interest

All parts of the training were reported and posted to the web page of the Centre of Information and Documentation. Especially, there were representatives of the local press and of the local TV-Station in Can Tho City on October 11th to report about this program.

All the press articles can be found in Annex 6.2 – 6.5. The television report was shown on October 11th, 2012 on local TV channel.

5 Conclusion and Outlook

In a nutshell, the Training course was successful and brought fruitful results in terms of:

- Increased interest of participants in the topic (High number of attendants),
- Active platform for communication of participants from different interest groups,
- Increased awareness of participants on environmental protection,
- Increased knowledge of participants with regard to waste water management and
- Detailed feedback of participants for the design of further capacity development measures.

By the end of every two sessions, trainees always had a chance to give comments on the quality of the course and their recommendations on the Evaluation sheets. Thanks to that, the space for discussions and field visits / study tour, there were more interactions among trainees and trainers thus helped in improving the training quality.

It is expressed by the majority of the participants that similar training courses should be organized as follow up, focusing on other more in – depth training on wastewater management and other aspects on environmental pollution, such as gas emission, solid waste and so on.

Especially, field visits and study tours should be significantly concerned about because it helps improving knowledge and sharing experiences among other agencies in and out of the Industrial Zone Tra Noc.

6 Annex

6.1 List of participating agencies

No	Name of Agency	Number of participants
1	Vinamilk J.S Company, Can Tho Branch	2
2	Phuong Duy Biochemical joint venture	1
3	Phuong Dong Seafood Company	1
4	Sai Gon Western Beer Company	4
5	Nam Hai Seafood Company	2
6	Southern Seafood Processing Company	3
7	Can Tho Pesticide J.S Company	2
8	Quang Minh Seafood Company	2
9	Sai Gon – Tay Do Beer and Beverages J.S Company	4
10	Bio Vietnam Ltd. Company	2
11	Me Kong Fisheries J.S Company	2
12	Nam Hung Phat Paper Macking Company	1
13	Kwonglung Meko Ltd Company	2
14	CP Viet Nam Animal Feeding Company	2
15	ProConco One member Ltd Company	6
16	Kim Xuan J.S Company	4
17	Pepsico Vietnam, Can Tho Branch	2
18	Pataya Vietnam Ltd. Company	2
19	Duke University, USA	1
20	Can Tho University	2
21	Can Tho Industrial Zone Infrastructure Construction Company (CIPCO)	2
22	Can Tho Water Supply and Sewerage One member Ltd. Company	2
23	Thot Not Industrial Zone Infrastructure Construction Centre	1

6.2 Press article about session 1 and 2 from Centre of Information and Documentation

<http://www.canthostnews.vn/default.aspx?tabid=185&NDID=20875&keyword=Lop-tap-huan-%E2%80%9CVan-hanh-va-bao-tri-he-thong-xu-ly-nuoc-thai%E2%80%9D>

Sự kiện | (Đã ngày 19/9/2012)

Lớp tập huấn “Vận hành và bảo trì hệ thống xử lý nước thải”

[14 ảnh kèm]



Trong khuôn khổ Dự án hợp tác nghiên cứu Việt – Đức gọi tắt là “AKIZ”, trong 2 ngày 18-19/9/2012, tại hội trường Ban quản lý các Khu chế xuất và Công nghiệp Cần Thơ, Trung tâm Thông tin – Tư liệu Cần Thơ phối hợp dự án AKIZ, GIZ và Ban Quản Lý Các Khu Chế xuất và Khu Công nghiệp Cần Thơ (CEPIZA) đã tổ chức lớp tập huấn “Vận hành và bảo trì nhà máy xử lý nước thải”.

Khóa tập huấn đã thu hút hơn 50 học viên là Cán bộ/ nhân viên vận hành nhà máy xử lý nước thải của các nhà máy ở KCN Trà Nóc.

Nội dung khóa tập huấn nhằm giới thiệu về hệ thống xử lý nước thải công nghiệp và việc vận hành các hệ thống này nhằm nâng cao năng lực cho đội ngũ kỹ thuật các công trình xử lý nước thải (cống, bơm, nhà máy xử lý).

Một số hình ảnh khóa tập huấn:



Ông Mr Rene' Heinrich, Điều phối viên dự án AKIZ tại Cần Thơ chào mừng và giới thiệu chương trình



Giáo sư Lê Văn Cát - Viện KH&CN Việt Nam trình bày “Đặc tính nước và bùn thải - Giải thích thực tiễn tại các nhà máy xử lý của KCN Trà Nóc”



Bà Trần Thị Bích - Trường Cao đẳng nghề TP.HCM trình bày về “Yêu cầu pháp lý của việc xử lý nước thải”

ttncac
In bài viết

Training course “Operation and maintenance of Wastewater Treatment Plants”

Within the scope of Vietnamese German Research Project abbreviated as AKIZ, Can Tho centre of information and documentation jointly organized the training course “Operation and maintenance of Wastewater Treatment Plant” with AKIZ Project, GIZ and CEPIZA.

The training course attracted 50 trainees who are staff / operators of wastewater treatment plants in factories in Tra Noc IZ.

The content of the course is introduction of the industrial wastewater treatment system and operation of these systems (sewers, pumps, treatment plant...) in order to develop capacity for the technical staff.

6.3 Press article about session 3 and 4 from Centre of Information and Documentation

Tập huấn Vận hành và bảo trì Hệ thống xử lý nước thải



Tiếp theo chương trình tập huấn đợt I của Dự án hợp tác nghiên cứu Việt – Đức gọi tắt là "AKIZ", trong 2 ngày 10-11/10/2012, tại hội trường Ban quản lý các Khu chế xuất và Công nghiệp Cần Thơ, Trung tâm Thông tin – Tư liệu Cần Thơ phối hợp dự án AKIZ, GIZ và Ban Quản lý Các KCX-KCN (CEPIZA) đã tổ chức đợt 2 tập huấn "Vận hành và bảo trì nhà máy xử lý nước thải".

Khóa tập huấn đợt II đã được các giảng viên nhiều kinh nghiệm giới thiệu về các chuyên đề: công nghệ xử lý chuẩn, trang thiết bị cho công trình nước thải. Đặc biệt trong thời gian tập huấn, các học viên đã tham quan thực tế các nhà máy điển hình tại KCN Trà Nóc.

Để giúp các học viên có dịp trao đổi kinh nghiệm trong quá trình xử lý nước thải tại đơn vị, Ban Quản lý dự án đã tổ chức chuyên tham quan nhà máy xử lý nước thải KCN Mỹ Phước 3, huyện Bến Cát, tỉnh Bình Dương và KCN Tam Phước, TP. Biên Hòa, tỉnh Đồng Nai.

Một số hình ảnh lớp tập huấn và chuyên tham quan tại Bình Dương và Đồng Nai:



Ông PGS.TS Nguyễn Phước Dân trình bày "Thuật ngữ, định nghĩa kỹ thuật nước thải các thông số xử lý, miêu tả các quá trình xử lý và quá trình sinh lý hóa học"



Ông René Heinrich, Điều phối viên dự án AKIZ tại Cần Thơ tặng quà lưu niệm cho nhà máy



Ông TS. Bùi Xuân Thành trình bày "Các quá trình xử lý sinh học và các hướng dẫn kiểm soát quá trình, giải quyết sự cố, báo cáo nhu cầu vận hành của hệ thống nước thải"



Đoàn tham quan thực tế tại Tổng Công ty Đầu tư và Phát triển Công nghiệp - TNHH MTV (KCN Mỹ Phước 3, huyện Bến Cát, tỉnh Bình Dương)



Đoàn tham quan tại Công ty Cổ phần Phát triển Khu công nghiệp Tín Nghĩa (KCN Tam Phước, TP. Biên Hòa, tỉnh Đồng Nai)

<http://www.canthostnews.vn/?tabid=186&NDID=21389&keyword=Tap-huan-%E2%80%9CVan-hanh-va-bao-tri-he-thong-xu-ly-nuoc-thai%E2%80%9D>

Training course on Operation and maintenance of Wastewater treatment system

To follow the first part of the training course of the German – Vietnamese Research Project AKIZ, in the last 2 day 10th and 11th of October, 2012, AKIZ, The training centre, GIZ and CEPIZA jointly organized the second part of the training course about “Operation and Maintenance of Wastewater treatment systems” in the meeting hall of Tra Noc IZ.

Experienced lecturers in the second part introduced topics relating to: standard treatment technology, equipments for wastewater facilities. Especially, trainees had opportunities to go on a field visit to typical factories inside Tra Noc IZ.

In order to help trainees to improve experiences in wastewater treatment process, the organizers held a study tour to wastewater treatment plants in My Phuoc 3 IZ, Ben Cat District, Binh Duong Province and Tam Phuoc IZ, Bien Hoa City, Dong Nai Province.

Some pictures from the training course and the study tour to Binh Duong and Dong Nai.

6.4 Press article about session 3 and 4 from Can Tho Newspaper



Improving professional knowledge, skills for Wastewater treatment plant operators

(CT) – On the 11th of October, 2012, 59 technical staff from the WWTPs of Tra Noc IZ attended the training course “Operating and maintaining Wastewater treatment plants”, organized by the Centre of Information and Documentation of Department of Science and Technology jointly with Vietnamese – German research project AKIZ.

Within 2 days (11th and 12th of October, 2012), technical staff had the chance to learn about processes for industrial wastewater treatment; operations, standard treatments, equipments for wastewater treatment facilities... The training course was aimed to improve the capacity for the technical staff who is managing wastewater facilities, ensuring the efficiency and sustainable functionality of the whole wastewater treatment system in Tra Noc IZ.

Thao Moc

6.5 Press article about session 5, 6 from Centre of Information and Documentation

Tập huấn "Vận hành và bảo trì hệ thống xử lý nước thải"



Trong khuôn khổ chương trình tập huấn của Dự án hợp tác nghiên cứu Việt – Đức gọi tắt là "AKIZ" sau hai đợt tập huấn trong tháng 9 và tháng 10 năm 2012, vào 2 ngày 01-02/11/2012 tại hội trường Ban quản lý các Khu chế xuất và Công nghiệp Cần Thơ, Trung tâm Thông tin – Tư liệu Cần Thơ phối hợp dự án AKIZ, GIZ và Ban Quản lý Các KCX-KCN (CEPIZA) đã tổ chức đợt 3 lớp tập huấn "Vận hành và bảo trì nhà máy xử lý nước thải".

Khóa tập huấn đợt III đã được các giảng viên ở Viện Hóa học Công nghiệp Việt Nam; Viện kỹ thuật và Quản lý môi trường thuộc Trường Đại học Witten/Herdecke gGmbH (IEEM) trình bày các chuyên đề về Yêu cầu kiểm soát - Quan trắc nước thải (lấy mẫu, bảo quản mẫu, phân tích mẫu, các vấn đề phân tích, lỗi trong phân tích); hiệu quả chi phí của việc vận hành hệ thống nước thải và an toàn lao động - các hướng dẫn và giải thích tại hệ thống nước thải. Ngoài ra, sau mỗi chuyên đề các học viên đều được tham quan tại các Công ty của KCN và thực hành thí nghiệm tại văn phòng Đại diện của Akiz.

Kết thúc khóa học các học viên đã được Ông Huỳnh Việt Dũng (Phó trưởng ban quản lý KCN Trà Nóc); Đại diện AKIZ và GIZ trao giấy chứng nhận hoàn thành khóa học.

Một số hình ảnh khóa tập huấn:



Cô Nguyễn Thị Hạnh (Viện Hóa học Công nghiệp Việt Nam) trình bày các "Yêu cầu kiểm soát - Quan trắc nước thải"



Ông Ferdinand Friedrichs (LAR AG, Berlin / Đức) trình bày "Các yêu cầu kiểm soát - Quan trắc nước thải"



Ông Rene Heinrich (Viện Kỹ Thuật Và Quản Lý Môi Trường tại Trường Đại Học Witten/Herdecke, Witten / Đức) trình bày "Hiệu quả chi phí của việc vận hành hệ thống nước thải; an toàn lao động - các hướng dẫn và giải thích tại hệ thống nước thải"



Các học viên đang tham quan quá trình "Dọn dẹp hệ thống cống tại Công ty Cấp Thoát Nước Cần Thơ - Xí nghiệp thoát nước"



Ông Huỳnh Việt Dũng (Phó trưởng ban quản lý KCN Trà Nóc); Đại diện AKIZ và GIZ trao giấy chứng nhận hoàn thành khóa học

<http://www.canthostnews.vn/?tabid=186&NDID=22105&keyword=Tap-huan-%E2%80%9CVan-hanh-va-bao-tri-he-thong-xu-ly-nuoc-thai%E2%80%9D>

TRAINING COURSE ON OPERATION AND MAINTENANCE OF WASTEWATER TREATMENT SYSTEMS

Within the scope of the training course “Operation and Maintenance of Wastewater treatment system” of the Vietnam – German Joint Research Project AKIZ, after the 2 part of training course in September and October, 2012, the final part took place in the Meeting Hall of Tra Noc IZ under the organization of Training Center, AKIZ, GIZ and CEPIZA.

The 3rd part of the training course were taken by lecturers from Viet Nam Institute of Industrial Chemistry; Institute of Environmental Engineering and Management at the University of Witten / Herdecke gGmbH (IEEM) and LAR Company. Lecturers presented requirements on wastewater monitoring (sampling, sample preservation, sample analysis, analytical issues, errors in analysis); cost efficiency in operation of the wastewater treatment system and labor safety – instructions and explanations in the wastewater system. Moreover, after each topic, trainees could visit companies inside the IZ and practice laboratorial skills in the AKIZ – Lab.

To close the course, trainees had the certificate of completion issued by Mr. Huynh Viet Dung (Vice Chairman of CEPIZA), Representative of AKIZ and GIZ.

Some pictures from the training course.

6.6 Presentations

6.6.1 Presentations September 18 and 19, 2012

❖ Presentation Mr René Heinrich








Training Course

for

Wastewater Treatment Plant – Operators

at Tra Noc Industrial Zone

- September – November 2012 -

Can Tho, 18.9.2012
Meeting Hall Industrial Zone Tra Noc, Can Tho, Vietnam

Sponsored by:

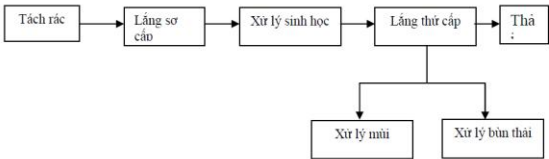


❖ Presentation Prof. Le Van Cat

CÔNG NGHỆ XỬ LÝ NƯỚC THẢI

1. Đặc điểm

- Công nghệ xử lý chính quy. Hiệu quả cao. Tiết kiệm diện tích. Chi phí vận hành cao.
- Xử lý tự nhiên: ao, hồ, vùng ngập nước. Hiệu quả xử lý thấp, sử dụng diện tích lớn, chi phí vận hành thấp.
- Một hệ thống xử lý nước thải bao gồm nhiều đơn vị công nghệ (công đoạn xử lý): tách rác thô, lắng cặn (sơ cấp), xử lý vi sinh, xử lý bùn thải, xử lý mùi.
- Xử lý vi sinh là đơn vị công nghệ trọng tâm của hệ thống xử lý nước thải.



Hình 1: Sơ đồ tổng quát hệ thống xử lý nước thải.

2. Nguyên tắc

- Vi sinh vật sử dụng các thành phần ô nhiễm trong nước thải để làm nguồn nguyên liệu sản xuất năng lượng cho hoạt động của chúng và tạo thành sinh khối.
- Trong trường hợp chất ô nhiễm là thành phần hữu cơ (BOD):
 - Chất hữu cơ (BOD) + Oxy → Năng lượng + H₂O + CO₂.
 - Sinh sản, phát triển tạo ra sinh khối mới với mức 0,5 kg sinh khối/ kg BOD tiêu thụ. Sinh khối tạo thành được lắng và tách ra khỏi nước.
- Thành phần hóa học của tế bào.

Thành phần hoá học đặc trưng của tế bào vi sinh (%).

Nguyên tố	Khoảng	Đại diện	Nguyên tố	Khoảng	Đại diện
C	45-55	50	Na	0,5-2,0	1
O	16-22	20	Ca	0,4-0,7	0,5
N	12-16	14	Mg	0,4-0,7	0,5
H	7-10	8	Cl	0,4-0,7	0,5
P	2-5	3	Fe	0,1-0,4	0,2
S	0,8-1,5	1	Khác	0,2-0,5	0,3
K	0,8-1,5	1			
- Thành phần carbon để xây dựng tế bào: từ nguồn hữu cơ (dị dưỡng), từ nguồn vô cơ như CO₂ (tự dưỡng).
- Vi sinh phát triển thuận lợi trong điều kiện đầy đủ các thành phần cần thiết, ví dụ đối với loại dị dưỡng hiếu khí BOD : N : P = 100 : 5 : 1.
- Nguồn thải BOD / N > 100 thì đối trọng cần xử lý là BOD, bổ sung thêm dinh dưỡng.

❖ Presentation Mrs. Tran Thi Ngoc Bich



6.6.2 Presentations October 11 and 12, 2012

❖ Presentation Prof. Nguyen Phuoc Dan

THUẬT NGỮ VÀ CÁC KHÁI NIỆM VỀ XỬ LÝ NƯỚC THẢI

LỚP TẬP HUẤN:
Vận Hành Trạm Xử Lý Nước Thải

PGS.TS. Nguyễn Phước Dân

1

❖ Presentation Dr. Bui Xuan Thanh

CÁC QUÁ TRÌNH XỬ LÝ NƯỚC THẢI

LỚP TẬP HUẤN:
Vận hành trạm xử lý nước thải

1

6.6.3 Presentation November 1 and 2, 2012

❖ Presentation Mrs. Nguyen Thi Hanh



BÀI GIẢNG
QUAN TRẮC VÀ PHÂN TÍCH NƯỚC THẢI
CÁC TRỞ NGẠI VÀ LỖI THƯỜNG GẶP

Trình bày: ThS. Nguyễn Thị Hạnh
Viện Hóa học Công nghiệp Việt Nam
Ngày 01/11/2012

❖ Presentation Mr. Ferdinand Friedrichs

Waste Waters at WWTP

- Waste water depends on factory and may contain hazardous waste disposal
- Acids, bases, oil, grease, heavy metals, solvents and other chemicals

❖ Presentation Mr. René Heinrich



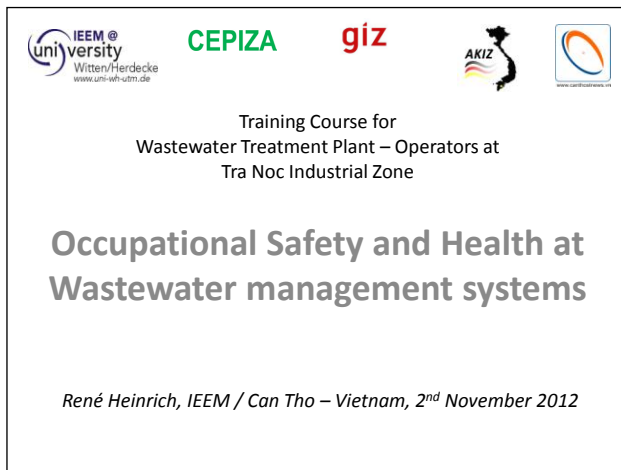




Training Course for
Wastewater Treatment Plant – Operators at
Tra Noc Industrial Zone

**Aspects of effectiveness of
wastewater treatment**

René Heinrich, IEEM / Can Tho – Vietnam, 2nd November 2012



6.7 Evaluations of trainees

Evaluation of sessions 1 and 2

Although the training course was fruitfully organized during the first 2 days, trainees' evaluations should be considered carefully for next times

- Arrangement of tables and projector in order for trainees to see easily
- There should be more detailed answers from the trainers
- Similar training courses should be held more regularly for trainees to improve knowledge and awareness
- There should be more practical visits to companies for trainees to see different treatment plants
- The content should be added with way for operating WWTP with capacity of $>6,000\text{m}^3/\text{day}$
- Materials for the course should be more about practical ways to discover troubles and trouble-shooting for WWTP's

Evaluation of sessions 3 and 4

- The content is most suitable for Environmental Engineers. For WWTP - Operators who mostly have electrical background (college ...) some more practical examples should to be added.
- Materials: Should be harmonized in the font and the words (with or without tones); there should be an outline for ease of searching; handouts should be arranged more in order so that trainee can easily catch up with.

Evaluation of sessions 5 and 6 and final evaluation

- Documents for reference suitable with the lectures
- Organize more tests
- Supplement reporting forms for managing, operating, checking the system
- It would be very helpful if the course is continued in the next years, combined with practical study tour. If it is possible we should come to treatment plants with big size so that trainees can learn more.
- Training material is enough which is arranged from low to high level. However, material should be arranged in a good order so that trainee can easily get and catch up with what the lecturer is mentioning.
- This course is very interesting. Wastewater treatment to enterprises are still out of date, the operators are sometimes not from environmental major, which leads to the fact that the

knowhow of operators should be improved, from the development of the training course in the next years.

- Most of the operators don't have high educational level; hence lecturers should use the appropriate language to explain professional words so that it is more understandable.
 - Any course brings a certain amount of knowledge which will never be ended. Thus, the training course should be opened next year with many other topics.
 - Should announce to the trainees the behaviors during the class (no using cell phone, silent mode...)
 - Should guide more about troubles and trouble shooting for the WWT system.
 - Should hold field trip to WWTPs with high quality
 - Should provide more documents about wastewater treatment
 - There should be one training course about the same topic next year with more detailed knowledge.
 - Training courses about gas emission, solid waste, and hazardous waste should also be cared.
 - Lessons should be more detailed, specific about wastewater treatment
 - The training course should be directed to young and active people so that the training can gain better result and will not waste the knowledge.
 - Good organization
 - Good materials
 - Many lecturers with good knowledge
 - There are many good things that trainee would not know if not participating the course.
 - Should mention more about chemical treatment process.
 - Should add the treatment process of difficult-biodegradable compounds by advanced oxidation
 - Content of plant maintenance is not deep enough yet
 - The duration is so short with large amount of knowledge → cannot fully absorb. For next time, the duration should be prolonged.
 - Similar course should be opened next year
 - Should focus more on difficulties and normal trouble when operating the system
 - Should focus more on new technology, chemicals... for better treatment
 - Should introduce some machineries, equipments for measuring pollutant so that companies can buy (if low price, high efficiency)
 - Coordinate with environmental management agency to propagandize environmental law, environmental procedures and normal mistakes of enterprises, solutions.
 - Should open training course about hazardous gas emission.
 - Should focus more on sampling.
-

6.8 Information on Places of the Study tour

6.8.1 My Phuoc 3 Industrial Zone

❖ About the investor

- Name: INVESTMENT AND INDUSTRIAL DEVELOPMENT CORPORATION (BECAMEX IDC CORP)
- Address: 230 Binh Duong Avenue, Thu Dau Mot City, Binh Duong Province
- Phone: (0650) 3 822 655 – (0650) 3 811 777
- Fax: (0650) 3 822 713 – (0650) 3 811 666
- Website: www.becamex.com.vn
- E-mail: vninvest@becamex.vn
- Industries: investment and construction of Industrial Zone Infrastructure, residential areas, urban areas and traffic infrastructure, stock, finance, insurance, banks, construction, commerce, real estate, services, information technology, concrete production, construction materials, minerals exploitation, pharmaceuticals, medicine and education.

❖ About the industrial zone

- Establishment decision: No1316/TTg-CN dated 28/8/2006 of the Prime Minister, Decision No 3920/QĐ-UBND dated 31/8/2006 of the Chairman of People's Committee about establishing and approving the investment and construction project for technical infrastructure of My Phuoc 3 Industrial Zone, Binh Duong Province.

LAND USING CONFIGURATION

Land type	Area (ha)	Ratio (%)
For constructing industrial factories	655,6895	67,0638
For constructing controlling, service centre	42,9747	4,3954
For green trees and equalizing lakes	123,3952	12,6208
For constructing infrastructure works	20,6478	2,1119
Wastewater treatment plants	2,5020	0,2559
For traffic	132,5013	13,5522
TOTAL	997,7105	100

- Address: Thoi Hoa Commune, My Phuoc Town, Ben Cat District, Binh Duong Province
- Geographical location: 45 km away from Ho Chi Minh City and 14 Km to the North of Thu Dau Mot City; 32km, 42km and 42km away from Tan Cang, Sai Gon Port Complex and Tan Son Nhat Airport, respectively.
- Total investment capital: 1,219.459 billions VND
- Industrial land for rent: 655.59 ha
- Technical infrastructure: complete
- Centralized wastewater treatment plants: capacity 16.000 m³/day
- In operation since: 2007
- Ratio of occupied land: 50,82%

(From http://www.binhduong.gov.vn/vn/sobannqanh_detail.php?id=8587&idcat=4538&idcat2=159)

6.8.2 Ho Chi Minh Vocational College of Technology

❖ Brief history of the institution

There are four important stages in the college's history: *Thu Duc Wounded Soldiers Training school* (1978 – 1993); *Handicapped Training school No.2* (1993 – 2001); *School of Technology No.2* (2001 – 2007); *Ho Chi Minh Vocational College of Technology* (2007).

Now the college offers multi-professional and multi-level training services that reach the national and the local standards. The labor are trained as competent workers, adaptable to the ever-increasing needs of the society.

The college is aiming to:

- Develop into one of the main focal vocational training institutions in Southern area and the whole Vietnam.
- Upgrade the training quality in order to integrate into the local and international quality.
- Provide high-quality manpower for domestic and international labor market.

❖ Qualification

Vocational College

- Computer Network Administration
- Repair of Communication Electronic Equipment
- Mechatronics
- Pattern – Making
- Industrial Electricity
- Industrial Refrigeration Electricity
- Industrial Electronic
- Auto Technology
- Metal Cutting and Sharpening
- Fashion Design
- Garment Technology
- Labour Hygiene Safety
- Wastewater Management

- Training period: 2.5 years
- Degree: Vocational college
- Admission conditions: According to regulation of vocational admission within decision no 08/2007/ QD- MOLISA on 26th, March 2007 of Minister of MOLISA.

Intermediate Vocation

- Processing of Accountant Data
- Computer Network Administration
- Processing of Office Data
- Graphics on Computer
- Industrial Electronic
- Civil Electronic
- Industrial Electricity
- Industrial Refrigeration Electricity
- Civil Refrigeration Electricity
- Automatic Electronic
- Repair of Refrigeration Equipment
- Auto Repair
- Lathing (Metal Cutting and Sharpening)
- Welding Technology
- Fashion Design
- Industrial Garment
- Labour Hygiene Safety

(From <http://english.hvct.edu.vn/qualification.aspx?tabid=504>)

6.8.3 Tam Phuoc Industrial Zone

Tam Phuoc Industrial Park was founded on 6 th October 2003. Located in the major economic area of South Vietnam with complete infrastructure, one hundred per cent of Tam Phuoc Industrial Park - land has been fully occupied by 50 investors from many countries for production premises and business operations.

The IP is located longwise National Highway 51, from which the distance to big cities like Vung Tau, Bien Hoa, HCM city is 60km, 15km and 30km, respectively. This makes the IP favorable for both water way and land way traffic.

The two industrial complexes of Nhon Trach 3 and Tam Phuoc cover dozens of business industries ranging from light, mechanic, pharmaceutical, cosmetic, chemical, electricity, electronic, construction material, textile, to footwear industry, etc.

❖ Land use breakdown

Total area: 323.18 ha

No.	Items	Area (ha)	Rate (%)
1	Factory premises	214,74	64,44
2	Warehouse and yard	15,18	4,70
3	Green trees	43,11	13,34
4	Management and service center	4,28	1,33
5	Intra-zone traffic	42,20	13,06
6	Construction sites	3,67	1,13

(From http://www.tinnghialand.vn/?sys_sOption=containers&sys_sTask=detail&c_id=7)