Report

WORKSHOP on
"MONITORING OF WASTEWATER SYSTEMS IN URBAN REGIONS"

24th and 25th May 2012 in Can Tho City, Vietnam

Legal Regulations - Technical Requirements - Analytical Requirements

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1 Introduction

1.1 Background: 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 and KFW.

The joint project is sponsored by the German Federal Ministry of Education and Research (BMBF) and the Ministry of Science and Technology of the Socialist Republic of Vietnam (MOST).

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 Sub-project 5, a monitoring concept and the development and operation of a containerized laboratory will be established. The monitoring concept has to take into consideration the local and regional situation in terms of environmental, legal, organisational and institutional as well economic circumstances with regard to tasks of wastewater monitoring.

1.2 Workshop on Monitoring and Visit of Delegation of MOST

The Workshop on "Monitoring of Wastewater Systems in Urban Regions" was held on 25th May, 2012 with the opportunity to visit the AKIZ-Project-Facilities on 24th May, 2012.

Also, a delegation of the Ministry of Science and Technology (MOST) visited the AKIZ facilities in Tra Noc Industrial Zone on 24th May, 2012.

The AKIZ – Project has organized the workshop jointly with the German ODA - Project "Wastewater Management Program" (WMP) of GIZ and was supported by the Can Tho Industrial Zone Management, CEPIZA. The joint organization by two German - Vietnamese wastewater projects in Can Tho combined successfully the advantages of both projects, which are experienced on industrial wastewater management (AKIZ) on one hand and urban wastewater management (WMP) on the other hand. A complete Agenda is attached in Annex 6.1.

The event was visited by two delegations from the central Vietnamese government, as there were representatives of Ministry of Construction (MOC) and Ministry of Science and Technology (MOST) attending.

Vice Minister Tran Viet Thanh of MOST and Director of MOST – Representative Office at Ho Chi Minh City, Dr. Bui Van Quyen, visited the AKIZ – Project - Facilities in Tra Noc Industrial zone on 24th May, 2012.

Mrs. Tran Thi Thao Huong, Representative of Department of Technical Infrastructure of MOC visited the AKIZ – Project Facilities at Tra Noc Industrial Zone on 24th May 2012 and the Workshop on 25th May 2012 as well.

2 Visit of Delegation of MOST

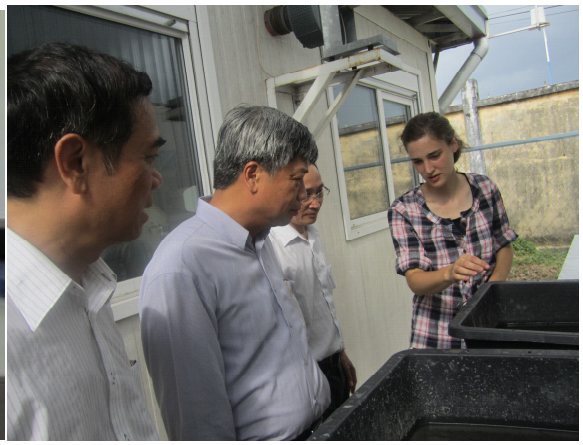
On May 24th, 2012 a delegation of MOST visited the AKIZ-Project-Facilities at the Industrial Zone (IZ) Tra Noc. MOST is a governmental agency which performs the state management of science and technology and covers, among other activities

- scientific and technological activities,
- the development of scientific and technological potential,
- standardization and
- measurement and quality control.

Picture 1: Delegation of MOST with AKIZ-Project-Team on the premises of the AKIZ-Project-Facilities

During the visit, the Vice Minister Tran Viet Thanh gave a speech about the importance of research for the wastewater sector in Vietnam and Ms. Sandra Kreuter (IEEM) gave a presentation about the AKIZ-Project and Tra Noc Industrial Zone.

Afterwards, the Vice Minister and the MOST South Director were shown a poster exhibition in the AKIZ-Project-Office, introducing all six AKIZ-Subprojects. Finally, the MOST – Delegation visited the containerized laboratory of AKIZ-Sub-project No. 5 and the Experimental Sludge Container of AKIZ-Sub-project No. 6 at the premises of Tra Noc Water plant. Last, the delegation visited the Pilot-container of AKIZ-Sub-project No. 4 at Western Saigon Beer Brewery (WSB).



Pictures 2 and 3: The Delegation of MOST visiting the AKIZ containerized laboratories

3 Workshop on Monitoring

3.1 Objective and Target of the Workshop

Objective
The Workshop was held to address aspects of legal regulations, technical and analytical requirements for the monitoring of wastewater systems in residential and industrial areas.

Different perspectives from wastewater dischargers, wastewater asset operators and wastewater asset owners in residential and industrial areas were discussed.

Target
The target was the improvement of awareness on above mentioned aspects of wastewater management for national and provincial stakeholders. Detailed knowledge and tools were provided to enhance the capacity of the management and technical staff of institutions in charge of wastewater management.

For the working groups, presentations and discussions consecutive translation was provided.

3.2 Time and Venue

The Workshop was held on 25th May, 2012 in Kim Tho Hotel in Can Tho City in Vietnam. An optional field visit of the AKIZ facilities in Tra Noc Industrial Zone took place on 24th May, 2012.

3.3 Participants

Participants of the workshop were representatives of the following interest groups:

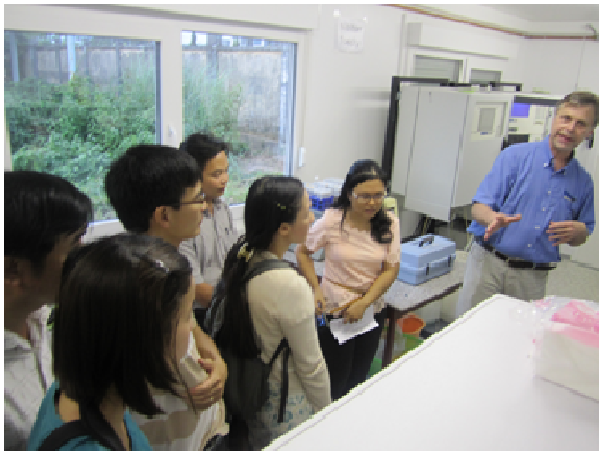
- Legislative Institutions
- Owners of Wastewater Assets
- Environmental Agencies
- Operators of Wastewater Assets
- Research Institutions
- Development Aid Projects
- Others

Regardless of the fact that with a total number of more than 80 participants the expectations to the number of participantswere exceeded by far, no logistic problems emerged in the course of events.

A full list of the participating institutions can be found in Annex 6.2.

3.4 Arrival and Welcome of Workshop Participants and Delegation of MOC

Workshop participants were given the chance to visit the AKIZ Facilities in Tra Noc on 24th May, 2012. Some 30 participants and a delegation of the Ministry of Construction (MOC) followed this invitation to get an impression of the AKIZ-Project-Facilities and to follow a presentation on the AKIZ-Project and -Facilities in Tra Noc. Also, a poster presentation was set up in the AKIZ office and the participants were shown the Laboratory and Experimental Containers of AKIZ-Sub-Project No. 5 and No. 6.



Picture 4: Workshop participants at the AKIZ containerized laboratory

The main concern of a specific meeting between the AKIZ-Project-Team and the delegation of MOC was to discuss the revision of Decree 88/2007/ND-CP on “Urban and industrial park water drainage”. It was worked out that the current version of the Decree 88 does not meet the requirements of the sector yet. The AKIZ-Project-Team is providing comprehensive suggestions for the revision and the implementation of regulations regarding industrial wastewater, as stated at Decree 88. Furthermore, joint workshops dealing with this topic are intended.

3.5 Presentations

Presentations were given on the topics of legal regulations as well as on technical and analytical requirements for the monitoring of wastewater systems in residential and industrial areas.

All presentations are attached in Annex 6.7.

First, Mr René Heinrich, AKIZ-Project Coordinator in Vietnam, gave an introductory presentation on the topic, introducing both German- Vietnamese Projects, AKIZ and WMP, followed by an opening by Dr. Bui Van Quyen, the Director of Most South.
Mr. Vu Xuan Thuong, a technical expert from Bac Ninh Water Supply & Sewerage Company (WMP – Partner Company) then gave a presentation on the “Situation of Wastewater

Management in Domestic Areas in Bac Ninh City" to display issues of wastewater management in a representative Vietnamese City.

Ms. Tran Thi Thao Huong from the Ministry of Construction gave a presentation on "Summary of State Management on Drainage and Sewerage Sector in Industrial Zones in Vietnam". In this presentation the fact of insufficient wastewater treatment in industrial zones was pointed out and that due to high investment costs many IZs are operated without a centralized wastewater treatment plant. As a consequence, wastewater of some industrial zones is discharged without appropriate treatment.

Picture 5 and 6: Ms. Tran Thi Thao Huong from MOC and Participants of the Workshop

Legal framework

Frank Pogade from the GfA Consulting Group (WMP Project of GIZ) gave a presentation on the "Legal framework for Monitoring of Waste Water Systems in Vietnam and Germany and how to set up an Indirect Discharger Cadastre".

The presentation included general aspects about rationales for monitoring of indirect dischargers and impacts of industrial wastewater and also gave an overview of monitoring and the related legal framework in Germany. However, the legal framework of Germany (like the Waste Water Ordinance) is very complex and not suitable yet for adaption in Vietnam. Furthermore, the enforcement of regulations, laws and ordinances is important but there are no clear responsibilities and also no standards yet for indirect discharges into sewer systems in Vietnam. Also, regulations on local level are missing that should state who is in charge of performing which activity. Besides this, the development of an indirect discharger was explained.

Technical Requirements

Two presentations were given, the first one by Ms. Sandra Kreuter and Ms. Inga Hölscher from the Institute of Environmental Engineering and Management at the University of Witten/ Herdecke gGmbH (AKIZ Project) on “Technical Requirements for Monitoring of Wastewater Systems”. The presentation gave an overview of aspects to be considered when monitoring indirect discharges and setting up a monitoring strategy. Also, two examples of monitoring strategies applied in Germany were explained and possible responsibilities for the monitoring were displayed. As a conclusion it could be said that no universally valid monitoring strategy exist but always has to be set up by consideration of the boundary conditions prevailing.

Ms. Truong Thi Kim Dung from the GfA Consulting Group (WMP – Project of GIZ) gave the second presentation on Technical Requirements about “First experiences from the Monitoring Program”. The steps in a wastewater monitoring process as well as the design of a monitoring program were explained as well as the first monitoring results of decentralized wastewater plants and the lessons learnt by experience.

Analytical Requirements

The presentation on analytical requirements was given by Dr. Wolfgang Genthe from LAR Process Engineering (AKIZ – Project). Analytical processes, analysis methods and quality assurance were presented and especially errors in sampling, preparation, analysis and documentation discussed. Results of monitoring were shown and the concentrations of the wastewater measured in the sewer system at Tra Noc Industrial Zone showed a clear dependency on the water level. It was pointed out that the challenges of monitoring in Tra Noc IZ are the tides, the flow direction of water, heavy rain and changing industries.

3.6 Working groups

Division into 3 Working Groups

In the afternoon of 25th May 2012, the participants were invited to take part in one of the following three parallel Working Groups:

- Group 1: Legal Framework for Monitoring of Wastewater Systems in Vietnam
- Group 2: Technical Requirements for Monitoring of Wastewater Systems in Vietnam
- Group 3: Analytical Requirements for Monitoring of Wastewater Systems in Vietnam

Methodology

The Methodology used in this workshop focused not only on presentation but on dynamic interaction of the participants to give participants more space for discussion and catch and document the ideas of stakeholders. Therefore, the Metaplan methodology was applied. This technique is used to collect ideas when a group of people works together.

The moderator gives an introduction into the topic and distributes cards for the participants to write on. Then a brainstorming process follows and the participants are asked to write down their ideas on the cards (one idea on one card) which are then put on a pin board. When all ideas are put on the board, the ideas are processed and the cards are arranged according to topics they belong to ('cluster') to display the results.

Implementation in the Working Groups

In the Working Groups, the moderator of the individual group gave a short introduction of the topic and explained the methodology used. Two pin boards were used per group, one to select ideas or comments about the current situation and one for proposals for the future situation. First, the participants were asked to write ideas or comments on their cards regarding the current situation of the topic which were then given to the moderator and put on the pin board. For this, red cards were used. Then, the ideas on the cards were discussed and arranged to groups of ideas.

Picture 7: Participants of the Working Groups

Afterwards, this process was repeated for the second topic, the proposals for the future, in which the participants had to write down ideas on green cards on how to solve or improve the problems. In the end, one of the participants of each group presented the results to all the participants of the workshop.

The documentation of the ideas and statements collected in the Working Groups can be found in Annex 6.3.

Group 1

In Group 1, the question of "What is the Legal Framework for Monitoring of Wastewater Systems in Vietnam and what can be improved on national/ provincial level?" was discussed. Moderator of this group was Mr Frank Pogade (GfA, WMP) and results were presented by Ms. Tran Thi Thao Huong (MOC).

Results Group 1 – Current Situation

The collection of statements on the current situation provided the following conclusions:

- No sufficient enforcement of legal framework due to unfeasible regulations
- The Law on Water Resources (1998) is no longer up-to-date
- There is no sufficient Law on Wastewater Management.

- At provincial level, there are too many different institutions, agencies, organizations in charge of state management in water resources and wastewater management, accordingly they can issue secondary regulations
- Different scattered regulations are issued by different state agencies at different levels → overlapping, conflicting, and contradictions. Hence, regulations can be understood in different ways. This has caused confusion at the local level about how to apply legal documents as well as intended violations against the Laws.
- There is a lack of legal framework for sufficient monitoring and inspection of dischargers. The responsibilities of related institutions and agencies are not yet clearly defined: Who monitor? Frequency of monitoring?
- There are currently only specific effluent standards for direct dischargers, i.e. enterprises that discharge wastewater into the environment but no standards for indirect dischargers, i.e. to the central wastewater treatment plants.
- Limits/values are too strict and unrealistic. The standards are especially too high for parameters regarding biodegradable substances such as BOD, COD, Nitrogen total, etc. For instance, threshold values for BOD and COD in treated industrial wastewater are 200mg/l and 400mg/l while normal values for domestic wastewater are 300mg/l and 600mg/l respectively and these values should not exceed 2000mg/l in Germany (under the condition that the ratio of BOD:COD should be 1:2 (!!!)). Actually, applying strict standards for these parameters do not favor the operation of the central wastewater treatment plants.
- The sanctions and administrative fines against violations of the law are missing or only in forms of warnings or temporary measures.
- The database about sources of pollution is not available at local level, which makes it difficult to implement monitoring
- While untreated or insufficiently treated wastewater could discharged into receiving sources that provide raw water for drinking water supply, there is no legal framework for control of contamination of these resources.
- There is still lack of incentives to encourage investments in wastewater treatment while it is considered as a burden by the enterprises due to huge costs for construction, operation and maintenance and limited awareness about environmental protection.

Picture 8: Mr Frank Pogade moderating Working Group 1

Results Group 1 - Recommendations

In the second part of the group work, the following recommendations were suggested:

- A new Law on Water Resources with integration of regulations on wastewater management is urgently necessary. Currently, the Draft of Law on Water Resources (amended) is expected to be passed by the National Assembly by the end of 2012
- Improve transparency in local legislation (Who is in charge to issue which documents)
- The relevant legal documents such as Decree 88, Decree 67, etc. should be reviewed to revise overlapping and conflicting issues
- Clearly allocate responsibilities of related institutions and agencies at local level in wastewater management in general and monitoring of wastewater systems in particular (Who is in charge of monitoring? Frequency of monitoring)
- Develop specific standards for wastewater to be discharged into central wastewater treatment plants (monitoring of indirect dischargers)
- Since the characteristics and components of wastewater are different from industry to industry, it is essential to classify indirect dischargers and develop effluent standards (typical parameters) for individual or group of industries. This will enable more realistic and feasible requirements and accordingly better enforcement.
- Strict sanctions against and fine on polluters
- Collect data/ information to set up an information system about potential polluters for better monitoring and implementing of preventive pollution control measures
- Review Circular on water safety plan (Circular 01/2008/TT-BXD) to enhance legal framework for preventing potential hazards to the quality of drinking water
- Provide incentives to encourage investments in wastewater treatment, e.g. through tax reduction
- Socialization of wastewater management, promote partnerships to share costs related to treatment technologies

Picture 9: Ms. Tran Thi Thao Huong presenting the results of Working Group 1

Group 2

In Group 2 the question to be discussed was “What are Technical Requirements for Monitoring of Wastewater Systems and what can be improved on national/ provincial level?” Moderator of this group was Ms. Sandra Kreuter (IEEM, AKIZ-Project) and results were presented by Ms. Truong Thi Kim Dung (GfA, WMP).

Picture 10: Moderation of Working Group 2

Results Group 2 – Current Situation

The following impressions on the current situation were collected in the first part of the working group:

- Criteria for industrial wastewater system monitoring is not available

- There is lack of plan for monitoring. Sampling/analytical procedures are missing or not followed.
- The monitoring/ sampling are not carried out frequently and continuously. Little attention is paid to monitoring of indirect dischargers
- Unsuitable time, location and tools for sampling (e.g. sampling from manholes when it rains)
- There is lack of updated information about development of dischargers (changes in industries)
- Hydrology and weather conditions (e.g. flow velocity) are not properly considered when carrying out sampling
- Problematic sample preservation/ storage
- No. of qualified human resources is limited. Technical staffs are not well-trained and unmotivated due to unsatisfactory incentives. However, there is lack of activities to increase their capacity.
- Poor infrastructure of the labs in Vietnam, insufficient budget for technical equipments. Consequently, equipments are often old and not well maintained

Results Group 2 – Recommendations

Recommendations for the improvement of the future situation were:

- Continuous update of monitoring plan
- The monitoring procedures should be transparent to all dischargers and management institutions
- Set up on-line and computerized monitoring and warning systems
- Elaborate standard procedures for sampling
- Frequent quality management of the lab analysis
- Share responsibilities in monitoring among related authority and investors/operators of central wastewater treatment plants
- Capacity building for technical staffs (training and refresher training) in monitoring skills, training by foreign experts
- Provide more financial and non-financial incentives for staffs in charge of monitoring (increased salaries & allowances, health insurance, reduced working hours, safety working conditions, etc.)
- Invest more in suitable equipments for sampling and measurement at site, mobilize funding from non-governmental organizations (NGO)

Picture 11: Ms. Truong Thi Kim Dung presenting the results of Working Group 2

Group 3

In Group 3 the question of “What are the Analytical Requirements for Monitoring of Wastewater Systems and what can be improved on national/ provincial level?” was discussed. Moderator of this group was Dr. Wolfgang Genthe (LAR, AKIZ- Project) and results were presented by Dr. Pham Huy Dong (VIIC, AKIZ – Project).

Picture 12: Dr. Wolfgang Genthe moderating Working Group 3

Results Group 3 – Current Situation

On the current situation, the following statements were mentioned by the participants:

- Taking samples but no analysis
- Changing matrix at samples
- Equipments (e.g. for measurements) don’t meet standards
- Qualified chemicals are often not available while it takes much time to order labs and chemical supplies. Hence, time for getting analysis results is very long.
- Influence of chemical for sample stabilization
- Over-used equipments affects accuracy
- Difficulty in distinguishing Nitrogen (Kendal) and total Nitrogen
- Lack of equipments
- Lack of standardized methods
- Quality management: Analysis of some parameters shows values of effluents higher than influents, result is sometime subjective

Results Group 3 - Recommendations

Suggestions on how to improve the situation were:

- Capacity building activities for technical staffs in sampling and analysis (trainings, study tours)
- The government should increase budget for equipments for wastewater quality control
- Accurate measurement equipments are necessary
- Sampling, sample storage should strictly follow the regulations and procedures
- Positive error should be avoided when analyzing COD (Influence of Cl^-)

Other questions by participants:

- Is it ok to filter samples by normal filter paper?
- Is it necessary to filter all samples? If not, what is the effect
- Should samples containing oils and fat be filtered?

Picture 13: Dr. Pham Huy Dong presenting the results of Working Group 3

4 Media Interest

On both days, May 24th and May 25th 2012, representatives of the local press and of a the local TV-Station were present.

The press article about the meeting of the delegation of MOST with the staff of the AKIZ-Project published in Can Tho Newspaper can be found in Annex 6.4. The television report was shown on May 24th on the local TV channel.

The press article about the Workshop on Monitoring of Wastewater Systems in Urban Regions published in Can Tho Newspaper can be found in Annex 6.5.
Parts of the workshop were shown on television on May 25th on Can Tho TV.

5 Conclusion and Outlook

As a conclusion it can be said that the Workshop was successful in terms of

- Interest of participants in the topic and therefore number of attendants
- Communication of participants from different interest groups
- Discussions of the presentations and within the working groups
- Results achieved in the Working Groups
- Feedback of the participants
- Collection of recommendations from/ for stakeholders

Conversations with participants after the workshop also showed throughout positive feedback. Especially the implementation of the working groups was well received and described as very productive regarding the communication of different interest groups and search of solutions for problems prevailing on legal, technical and analytical level.

Further workshops are already planned and will deal with specific technical aspects of wastewater management. Details will be worked out based on recommendations from the working groups and based on local priorities.
The application of the meta plan method or a similar method for working groups is planned and will be adjusted to the following workshop questions to assure the best possible results.

6 Annex

6.1 Timetable

Workshop Agenda as implemented

Time	Topic	Presenter
25th May 2012 (Moderation: Mr. René Heinrich, IEEM, AKIZ – Project Coordinator in Vietnam)		
1st Session "Introduction of Objectives"		
07.30 – 08.00 am	Registration of participants	
08.00 – 08.20 am	Introduction Workshop Objectives and Participating Projects and Institutions	Mr. René Heinrich, IEEM, AKIZ - Project
08.20 – 08.40 am	Opening	Dr. Bui Van Quyen, Ministry of Science and Technology - South, Director
08.40 – 08.50 am	Welcome	Mrs. Tran Thi Thao Huong, Ministry of Construction
08.50 - 09.10 am	Wastewater Management at Residential Areas in Bac Ninh	Mr. Vu Xuan Thuong, Bac Ninh Water Supply & Sewerage Company
2nd Session „Legal, technical and analytical aspects of Monitoring"		
09.10 – 09.50 am	Legal Framework for Monitoring of Wastewater Systems in VN and Germany, and how to set up an indirect discharger monitoring system	Mr. Frank Pogade, GfA, GIZ – Project
09.50 – 10.10 am	*Tea Break & Poster Exhibition*	
10.10 – 10.40 am	Technical requirements for Monitoring of Wastewater Systems, and first experiences from a monitoring programme in the AKIZ – Project in Industrial Zone Tra Noc	Ms. Sandra Kreuter, Ms. Inga Hölscher, IEEM, AKIZ Project
10.40 – 11.10 am	Technical requirements for Monitoring of Wastewater Systems, and first experiences from a monitoring programme in the GIZ - Wastewater Management Project	Ms. Truong Thi Kim Dung, GfA, GIZ - Project
11.10 – 11.50 am	Analytical Requirements for Monitoring of Wastewater Systems	Dr. Wolfgang Genthe, LAR AG, AKIZ – Project
11.50 – 12.00 am	Discussion	
12.00 am – 01.30 pm	*Lunch Break at Kim Tho Hotel*	
3rd Session „Working groups on 'Legal, technical and analytical aspects of Monitoring'"		
01.30 – 03.00 pm	Working in 3 parallel groups:	Facilitation by:
	Group 1 – What is the Legal Framework for Monitoring of Wastewater Systems in VN and what can be improved	Mr. Frank Pogade, GfA, GIZ – Project

	on national / provincial level?	
	Group 2 – What are Technical requirements for Monitoring of Wastewater Systems and what can be improved on national / provincial level?	Ms. Sandra Kreuter, IEEM, AKIZ Project & Ms. Truong Thi Kim Dung, GfA, GIZ – Project
	Group 3 – What are the Analytical Requirements for Monitoring of Wastewater Systems and what can be improved on national / provincial level?	Dr. Wolfgang Genthe, LAR AG, AKIZ – Project
03.00 – 03.30 pm	*Coffee Break*	
03.30 – 03.45 pm	Presentation results Working group 1 - Legal Framework for Monitoring of Wastewater Systems	Representative Group 1
03.45 – 04.00 pm	Presentation results Working group 2 - Technical requirements for Monitoring of Wastewater Systems	Representative Group 2
04.15 – 04.30 pm	Presentation results Working group 3 – Analytical Requirements for Monitoring of Wastewater Systems	Representative Group 3
04.30	Discussion, Summary and Closing	Moderator
05.30 pm	***Joint Dinner at Ninh Kieu Restaurant***	

A joint field visit at Tra Noc Industrial Zone and AKIZ – Research Facilities (Chemical Lab...) - organized for workshop participants at 24th May, 4.30 pm. Meeting point at the AKIZ – Project Office at Industrial Zone Tra Noc II (Water Plant).

6.2 List of participating Institutions

The workshop welcomed participation of more than 80 participants who are from the following institutions:

Legislative institution:
- Ministry of Construction, Department for Technical Infrastructure

Owners of wastewater assets:
- Can Tho Export Processing and Industrial Zone Authority, CEPIZA
- Ca Mau Economic Zone Management Board

Environmental agencies :
- Can Tho Environmental Police
- Department of South Western Environmental Preservation
- Department of Environmental Protection, Can Tho Department of Natural Resources and Environment (DONRE)
- Can Tho Department of Natural Resources and Environment, DONRE
- Departments of Natural Resources and Environment of Thoi Lai, O Mon, Phong Dien, Vinh Thanh, Cai Rang, Ninh Kieu Districts/Can Tho
- Centre for Environmental Monitoring, DONRE Can Tho
- Center for Analysis and Environment, Binh Duong
- Da Nang Department of Natural Resources and Environment
- Centre for Environmental Monitoring, Soc Trang Department of Natural Resources and Environment (DONRE)

Operator of wastewater assets:
- Can Tho Water Supply and Sewerage Company
- Tra Noc Water Supply Company
- CIPCO
- Soc Trang Public Works Company
- Bac Ninh Water Supply and Sewerage Company
- Can Tho Pesticide Company
- Western Sai Gon Beer Company

Research institution:
- Ministry of Science and Technology, Southern office in HCM City
- Centre for Applied Technology, Can Tho Department of Science and Technology (DOST)
- VIIC Hanoi
- Environmental College, Can Tho University

- Research Institute for Climate Change, Can Tho University
- Mekong Delta Research and Development Institute, Can Tho University
- IEEM Witten/Gerdecke
- LAR AG, Berlin
- United Nation University/University Bonn
- ZEF Bonn
- TU Darmstadt
- TU Braunschweig
- University of Hanover

Development aid projects:

- GIZ
- GfA

Others:

- Kobelco Eco Solutions Viet Nam, HCMC
- Stepro Hanoi
- Greentech Environment Joint Stock Co., HCMC
- Hai Fan Hong Kong Company
- Magazine “Đời sống pháp luật”
- Can Tho Department of Foreign affairs
- Can Tho Department of Planning and Investment
- Can Tho Department of Industry and Trade
- Can Tho Newspaper
- Tuoi Tre Newspaper
- VASEP Newspaper
- Docifish Company, Sa Dec
- Investment Newspaper
- Can Tho Television

6.3 Documentation Working Groups

Working Group 1: Legal Framework

CURRENT SITUATION	RECOMMENDATIONS
• Enforcement of legal framework is too weak due to unfeasible regulations • Legal documents are overlapping, conflicting, contradictory => can be understood in different ways => Intended violations • Legal pluralism at provincial level (Too many different institutions, organizations,…can issue regulations- officially or unofficially) • No monitoring of indirect dischargers • Limits/values are too strict and unrealistic • Law on Water Resources (1995) is no longer up-to-date, no Law on Wastewater Management • Insufficient monitoring and inspection of dischargers • Unclear allocation of responsibilities: Who monitor? Frequency? • Sanctions against violations? • No database about sources of pollution at local levels • Pollution of intake water for drinking water supply • Limited awareness of enterprises about wastewater treatment • Lack of incentives to encourage investment in wastewater treatment • High investment cost	• Review of legal documents (overlapping and conflicting issues) • Review Decree 88, 67 • Improve local legislation (Who is in charge?) • Develop standards for wastewater to be discharged into central wastewater treatment plants (monitoring of indirect dischargers) • Classification of indirect dischargers => Effluent standards for different industries necessary • Need of the new Law on Water Resources, integrate regulations on wastewater management into the new Law on Water Resources • Assign an institution to implement monitoring of wastewater system • Strict punishment and fine of enterprises violating environmental law • Instruments for sanctions against administrative violations • Develop database • Issue Water safety plan circular (for intake water pollution) • Awareness raising • Reductions in tax • Share cost related to environmental technology

Working Group 2: Technical Requirements

CURRENT SITUATION	RECOMMENDATIONS
• Domestic policy • No clarification on kind of industry • Frequency: too little, not continuously • Not well trained • Ability of analytical technicians • Lack of capacity building • Lack of materials • Analysis procedure (not follow) • Support policy for people in charge of monitoring • Lack of updated plan for development rate • Budget • Management • Little attention for indirect monitoring • Infrastructure of the labs in Vietnam • Old equipment • Maintenance problems • Lack of monitoring procedures • Sample preservation problem • Not includes hydrology conditions	• Improving staffs skill to work for monitoring • Training & refresher training • Suggest typical parameters for each industries • More money for staff, more money _ more responsibility • Classify parameter of each concrete industry • Authority + Investors together • Continuous update of monitoring • Foreign experts for training staffs • Propose funding by NGOs • Socialization of WW treatment • More investment on equipment • All dischargers and management institutions need to have monitoring procedures • Check analysis quality of the lab frequently • Building more central to monitoring and warning by online and computer system • Support fee for the monitor • Provide health insurance, Reduce working time • Provide safety working conditions

Working Group 3: Analytical Requirements

CURRENT SITUATION	RECOMMENDATIONS
• Unsuitable time for sampling (sampling from manholes when it rains) • Sampling tools • Weather • Sampling location • Flow speed • Sample storage • Wastewater is discharged into the ponds, lakes • Take sample but no analysis • Changing matrix at samples • Equipments don't meet standards • It takes much time to order labs and chemical supplies • Lack of chemical or unqualified chemicals • Long time for analysis • Influence of chemical for sample stabilization • Over-used equipment affects accuracy • Difficulty in distinguishing Nitrogen (Kendal) and total Nitrogen • Lack of equipments • Lack of standardized methods • Technical standards are not in harmony or too high • Criteria for IZ wastewater system monitoring missing • Some parameters have higher value for output than input, Values of effluents is higher than influents • Result is subjective	• Training for technical staffs in sampling and analysis • Capacity building for technical staffs, study tours • Provide equipments for wastewater quality control • Accurate measurement equipment necessary • Sampling and sample reservation should strictly follow the regulation • Buy suitable instruments to take samples and measure at site • Check the standards carefully • Set the standard procedures for sampling • Standards on quality of wastewater treatment/ • Responsibility for checking on direct flow: Police, DONRE

6.4 Press Article about the visit of the Vice Minister of MOST

Can Tho News paper
25.5.2012

Dự án Akiz đáp ứng nhu cầu về giải pháp nước thải cho các khu công nghiệp

(CT)- Ngày 24-5-2012, Thứ trưởng Bộ Khoa học và Công nghệ Trần Việt Thanh đã đến làm việc và tham quan mô hình xử lý nước thải thí điểm của Dự án Akiz tại khu công nghiệp Trà Nóc (TP Cần Thơ).

Dự án Akiz (giải pháp quản lý nước thải tổng hợp cho khu công nghiệp) do Bộ Giáo dục và Nghiên cứu Đức và Bộ Khoa học và Công nghệ Việt Nam hỗ trợ phát triển và thẩm định giải pháp quản lý nước thải tổng hợp nhằm đảm bảo thải bỏ hiệu quả và bền vững nước thải khu công nghiệp. Dự án được thực hiện theo 4 giai đoạn từ năm 2010 đến 2014 như: Nghiên cứu cơ sở và lý thuyết, điều chỉnh phù hợp với điều kiện địa phương và lắp đặt, tối ưu hóa và đánh giá, thẩm định và chuyển giao kết quả. Qua đó, các giải pháp xử lý phân tán, cận nguồn phát thải sẽ được trình diễn tại một số doanh nghiệp đại diện trong khu công nghiệp Trà Nóc như: tiền xử lý nước thải (từ sản xuất thuốc trừ sâu nhằm khử các chất độc hại), tái tạo năng lượng từ nước thải (từ một công ty chế biến thủy sản), thu hồi các chất có giá trị và tái tạo sử dụng nước thải sau xử lý (từ nhà máy sản xuất bia và nhà máy hóa sinh). Hiện mô hình xử lý thí điểm cho Công ty Cổ phần Bia Sài Gòn Miền Tây (thu hồi các chất có giá trị và tái tạo sử dụng nước thải sau xử lý) và container thí nghiệm xử lý bùn thải đang được vận hành tại khu công nghiệp Trà Nóc nhằm kiểm chứng và điều chỉnh các giải pháp công nghệ cao cho phù hợp với tình hình địa phương ở Miền Tây. Các mô hình thí điểm khác sẽ được thực hiện tại Công ty cổ phần Thuốc sát trùng Cần Thơ (khử độc tố) trong tháng 5-2012 và Công ty thủy sản Nam Phương (xử lý kỵ khí và thu hồi năng lượng) vào tháng 6-2012...

Qua buổi làm việc và tham quan mô hình xử lý nước thải thí nghiệm của Dự án Akiz, Thứ trưởng Bộ Khoa học và Công nghệ Trần Việt Thanh, đánh giá cao hoạt động của Dự án Akiz trong việc đáp ứng nhu cầu về giải pháp nước thải cho các khu công nghiệp. Thứ trưởng cũng mong rằng dự án này thực hiện đúng kế hoạch theo từng giai đoạn đã đề ra nhằm đưa ra giải pháp bổ sung cho dự án đầu tư xây dựng nhà máy xử lý nước thải tập trung ở các khu công nghiệp thuộc TP Cần Thơ và nhân rộng một số địa phương ở khu vực ĐBSCL...

H.V

AKIZ Project satisfies requirement on wastewater concept for industrial zones

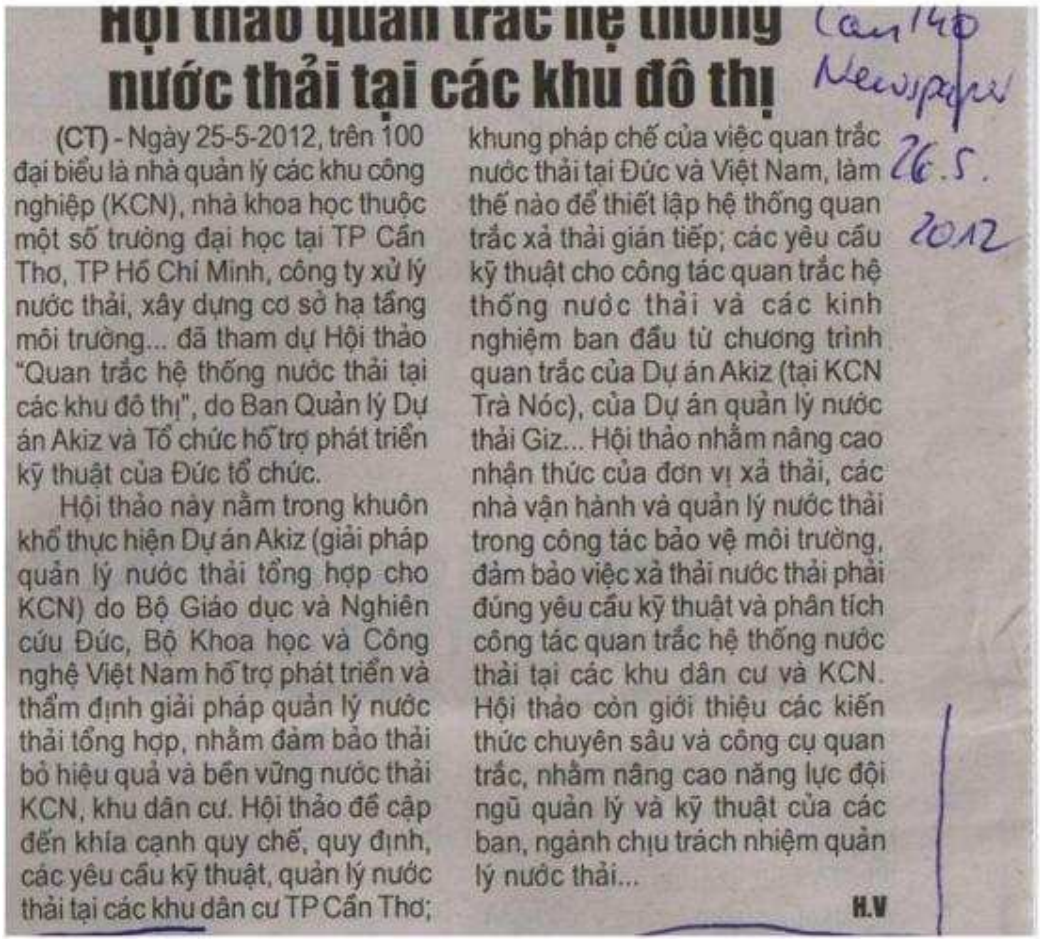
(CT) – On May 24th, 2012, The Vice minister of Ministry of Science and Technology – Mr Tran Viet Thanh did come to have a talk and visit the pilot plant for treating wastewater of AKIZ Project in Tra Noc Industrial Zone (Can Tho City).

AKIZ Project (integrated wastewater management concept for Industrial Zones) is sponsored by German Ministry of Education and Research BMBF and Vietnamese Ministry of Science and Technology to develop and verify the integrated wastewater management concept in order to make sure efficient and sustainable disposal of industrial wastewater. The project is implemented in 4 phases from 2010 to 2014, namely: basic and conceptual study, adaptation to local situation and set up of pilot system, optimization and evaluation and verification and transfer of result. Through that, decentralized and near – to- source technologies will be performed in some representative enterprises inside Tra Noc IZ as: pretreatment of wastewater (from pesticide production in order to detoxify toxic substances), regenerate energy from wastewater (from a seafood processing company), recovery of valuable substances and reuse of treated wastewater (from the brewery and biochemical company). Currently the pilot plant for Sai Gon Western Beer (recovery of valuable substances and reuse of treated wastewater) and the experimental container for sewage sludge treatment are operated in Tra Noc IZ to check and adjust high tech solutions to be suitable to the local conditions. Other pilot plants will be operated in Can Tho Pesticide Co (detoxification) by the end of May, 2012 and Nam Phuong seafood processing company (anaerobic treatment and energy regeneration) in June, 2012…

During the visit of AKIZ pilot plant, Vice Minister of Ministry of Science and Technology Tran Viet Thanh highly appreciated AKIZ's activities in satisfying the requirement on wastewater

concept for IZs. Vice Minister also wished that this project is exactly implemented as in the plan for each phase in order to give additional solution for the investment project socalled Centralized wastewater treatment plant in IZs in Can Tho and duplicated in some localities of the Mekong Delta region.
H.V

6.5 Press Article about the AKIZ Workshop



Hội thảo quan trắc hệ thống nước thải tại các khu đô thị

Can Tho Newspaper 26.5.2012

(CT) - Ngày 25-5-2012, trên 100 đại biểu là nhà quản lý các khu công nghiệp (KCN), nhà khoa học thuộc một số trường đại học tại TP Cần Thơ, TP Hồ Chí Minh, công ty xử lý nước thải, xây dựng cơ sở hạ tầng môi trường... đã tham dự Hội thảo "Quan trắc hệ thống nước thải tại các khu đô thị", do Ban Quản lý Dự án Akiz và Tổ chức hỗ trợ phát triển kỹ thuật của Đức tổ chức.

Hội thảo này nằm trong khuôn khổ thực hiện Dự án Akiz (giải pháp quản lý nước thải tổng hợp cho KCN) do Bộ Giáo dục và Nghiên cứu Đức, Bộ Khoa học và Công nghệ Việt Nam hỗ trợ phát triển và thẩm định giải pháp quản lý nước thải tổng hợp, nhằm đảm bảo thải bỏ hiệu quả và bền vững nước thải KCN, khu dân cư. Hội thảo đề cập đến khía cạnh quy chế, quy định, các yêu cầu kỹ thuật, quản lý nước thải tại các khu dân cư TP Cần Thơ; khung pháp chế của việc quan trắc nước thải tại Đức và Việt Nam, làm thế nào để thiết lập hệ thống quan trắc xả thải gián tiếp; các yêu cầu kỹ thuật cho công tác quan trắc hệ thống nước thải và các kinh nghiệm ban đầu từ chương trình quan trắc của Dự án Akiz (tại KCN Trà Nóc), của Dự án quản lý nước thải Giz... Hội thảo nhằm nâng cao nhận thức của đơn vị xả thải, các nhà vận hành và quản lý nước thải trong công tác bảo vệ môi trường, đảm bảo việc xả thải nước thải phải đúng yêu cầu kỹ thuật và phân tích công tác quan trắc hệ thống nước thải tại các khu dân cư và KCN. Hội thảo còn giới thiệu các kiến thức chuyên sâu và công cụ quan trắc, nhằm nâng cao năng lực đội ngũ quản lý và kỹ thuật của các ban, ngành chịu trách nhiệm quản lý nước thải...

H.V

WORKSHOP ON MONITORING OF WASTEWATER SYSTEM IN URBAN REGIONS

(CT) – On May 25th, 2012, over 100 participants who are IZs management boards, scientists of universities in Can Tho, HCMC, wastewater treatment companies, environmental infrastructure companies did come to the Workshop on "Monitoring of wastewater system in urban regions", organized by AKIZ Project and GIZ Project.

This workshop is in the scope of AKIZ Project (Integrated wastewater management concept) for IZs which is sponsored by German Ministry of Education and Research BMBF and Vietnamese Ministry of Science and Technology to develop and verify the integrated wastewater management concept in order to make sure efficient and sustainable disposal of industrial wastewater. The workshop mentioned about legal aspect, regulations, technical requirements on wastewater management in urban regions of Can Tho city; legal framework of wastewater monitoring in Germany and Viet Nam, how to establish the indirect discharger

monitoring system; technical requirements for monitoring and first experiences from the monitoring system of AKIZ Project in Tra Noc IZ, of GIZ's Wastewater Management Program. The workshop aimed to improve awareness of dischargers, wastewater operators and management boards in environmental protection, ensuring the wastewater disposal to be in accordance with technical and analytical requirement in residential areas and IZs. The workshop also introduced into-depth knowledge and tools for monitoring thus develops capacity of management staff and technical staff of agencies, institutions in charge of wastewater management…
H.V

6.6 Press Article about Wastewater Management in Industrial Zones in Can Tho

TO STRENGTHEN ON ENVIRONMENTAL TREATMENT IN INDUSTRIAL ZONES

Tuyet Trinh

Can Tho City is trying to become the industrial city by 2020 in which developing IZs, EPZs is considered as one of the most important solution for that target. There are currently 8 IZs in the locality of Can Tho, however, the infrastructure is un-complete, investment condition and policies are not quite attractive to investors. Moreover, the environmental issues inside the IZs are rather challenging since they haven't had the centralized wastewater treatment plant yet… Mr Vo Thanh Hung – Chief of CEPIZA, did have a discussion with journalist of Can Tho Newspaper and expressed:

- There are currently 8 IZs in the locality of Can Tho which have leased 561.45 ha of industrial land. Among of them, Tra Noc 1 IZ is 100% filled (135ha), Tra Noc 2 IZ is 94.8% filled (155ha); Hung Phu 1 IZ leased 28.8 in 270 ha of industrial land, Hung Phu 2A IZ is 15.51% filled, Hung Phu 2B IZ (62.63ha) has finished legal documents and expanded the reclaiming decision, CIPCO and centre for developing land fund, Cai Rang district are checking solution for compensating for the total land area of 62.63 ha; Thot Not IZ – first phase (150.55ha) is now having 9 projects with total capital 125.145 million USD. Centre for building infrastructure of Thot Not IZ is expanding sub-stage 1 for the 2nd phase with area up to 150.5ha; the Thoi Thuan resettlement area of 24.23 ha and have divided into 78 pieces of land for households. O Mon, Bac O Mon and Thot Not IZ-second phase are now in planning with the ratio 1/2000.

Q: How was the calling for investment to IZs in the locality of Can Tho during the past time, Sir?

- The procedure of calling for investment to IZs, EPZs in the locality of Can Tho has been rather well during the past time and gained some good results. However, this procedure was somehow stopped in 2011 and met certain difficulties. The main reasons are from global economical crisis, the inflation, implementation of Government's Resolution No 11 on tightening the budget to decrease the inflation rate, interest rates at banks are rather high which leads to

the fact that investors have difficulties in approaching the capital. This affect a lot to the investment for the infrastructure and the enterprises' business and production. Moreover, policies for compensating after site clearance often change, the fact that Can Tho is the centrally run city makes the land price competitive. The site clearance at IZs have nearly no progress. However, policies for investors to the IZs are no longer of interest to them. Fee for investing infrastructure of IZs is high, hence economical efficiency is low and the high price of renting land in IZ is one of the reason which makes the investors pensive. During the past time, Government has taken care of the city's infrastructure such as: Can Tho bridge, Cai Cui port… however, the fact that ships with high load can not enter ports is one of the big drawback for industrial development of Can Tho city in particular and Mekong Delta region in general…

Therefore, in 2012, CEPIZA will promote investment on infrastructure to attract secondary investors in order to fill the IZs. So as to have "clean land" for investors to IZs, CEPIZA has demanded infrastructure companies to tightly corporate with the Compensation Committee for site clearance in districts that have IZs (esp 3 IZs namely Hung Phu 1, Hung Phu 2A and Hung Phu 2B) and compensate, build resettlement areas. In parallel, compensation for clearing the IZ should also be made. Concentrate on all forces, divide into stages for investment and carrying out compensation, site clearance for established IZs (Thot Not 1, Hung Phu 1, Hung Phu 2A, Hung Phu 2B). Strengthen construction for technical infrastructure in IZs to serve for enterprises' land leasing.

The centralized wastewater treatment plant of Thot Not IZ is expected to be in operation by the first quarter of 2013, contributing to the solution for this IZ's environmental issues.

Q: At present most of the IZs in Can Tho city hasn't had the centralized wastewater treatment plant. How is this issued solved by CEPIZA to ensure the sustainable development of the IZ?

- To IZs founded after 2005, CEPIZA bases on Environmental Protection Law in 2005 to force technical infrastructure companies to invest on the wastewater drainage system before putting the project into operation. In this basic, CEPIZA will consider to issue investment certificate to secondary enterprises-investors.

To IZs founded before 2005, such as: Thot Not IZ, Tra Noc 1 and Tra Noc 2 IZ that have no centralized wastewater treatment system. To solve environmental issue especially water issues in these areas, CEPIZA request the investors to build their local wastewater treatment system so that the effluent reaches column B of national technical regulation on discharging standard before releasing to the sewer system of the IZ. Moreover, on August 19th, 2011, Thot Not IZ and Seen technical joint stock company organized the opening ceremony for the construction of Thot Not IZ's wastewater drainage system with the capacity of 5,000m3/day for 2 stages, total capital up to more than 80 billion VND. The first phase's capacity is 2,500m3/day with the capital of 50.4 billion VND (including the collecting system). Area for plant construction is 13,000m2 in section C of Thot Not IZ. This work is expected to be finished and operated by the first quarter of 2013.

Regarding to Tra Noc IZ, CIPCO – the infrastructure company has made the project on building the centralized wastewater treatment plant and submitted to Department of Planning And Investment for consideration and verification. Then it will be submitted to CPC for approval and expansion of implementation. The tendering process is expected to occur in the second quarter of 2012…

Q: In the mean time of waiting for the wastewater treatment plant to operate, how did CEPIZA guide the enterprises to implement the environmental impact assessment and the construction of wastewater treatment plant, Sir?

- Can Tho People's Committee has assigned CEPIZA to organize the assessment and approval of environmental impact assessment report to investment projects inside EPZs, IZs. Each year, CEPIZA co-operates with Department of South western environment (MONRE), Can Tho DONRE, environmental police , related agencies and institutions and environmental experts to organize training courses to popularize current regulations in environmental protection; environmental protection techniques for enterprises in operation in the IZs, EPZs…

To projects in operation in EPZs, IZs, CEPIZA guides enterprises to contact with scientific and technological units, environmental units, consulting centers and companies to make environmental impact assessment report for the project so that authorized agencies can consider, organize verification and approve in accordance with current regulations. When the EIA report has been approved, enterprises will have to invest on items such as wastewater treatment system, wastewater treatment plant, depending on the type of production of each company. CEPIZA only has function and responsibility on confirming the completion of environmental protection work as required by enterprises. On that basic, CEPIZA will found the practical inspection delegation, field sampling and have final assessment idea… in order to contribute to the environmental protection inside IZ.

Thank you Sir !

Tăng cường xử lý môi trường ở các khu công nghiệp

TUYẾT TRINH (thực hiện)

TP Cần Thơ đang phấn đấu trở thành thành phố công nghiệp trước năm 2020. Trong đó, phát triển các khu công nghiệp (KCN), khu chế xuất tập trung được xem là một trong những giải pháp quan trọng tiến đến mục tiêu trên. Trên địa bàn TP Cần Thơ hiện có 8 KCN tập trung, song, hạ tầng KCN chưa hoàn chỉnh, môi trường đầu tư, chính sách ưu đãi thu hút đầu tư chưa hấp dẫn nhà đầu tư. Bên cạnh đó, hiện nay vấn đề môi trường tại các KCN khá bất cập khi các KCN chưa có hệ thống xử lý nước thải tập trung...

(Xem trang 8)

8 Kinh tế thị trường

ÔNG VÕ THANH HÙNG, TRƯỞNG BAN QUẢN LÝ CÁC KHU CHẾ XUẤT VÀ CÔNG NGHIỆP CẦN THƠ

Tăng cường xử lý môi trường ở các khu công nghiệp

GIÁ VÀNG VÀ NGOẠI TỆ NGÀY 24-5-2012

6.7 Presentations

6.7.1 Presentations May 24, 2012

Presentation Sandra Kreuter

SPONSORED BY THE
Federal Ministry of Education and Research

AKIZ
Integrated Wastewater Concept
for Industrial Zones
exemplified for the Tra Noc Industrial Zone
in Can Tho, Vietnam

Dipl.-Ing. Sandra Kreuter

IEEM @ university Witten/Herdecke
Institute of Environmental Engineering and Management
at the University of Witten/Herdecke gGmbH

AKIZ - Integrated Wastewater Concept for Industrial Zones exemplified for the Tra Noc Industrial Zone in Can Tho, Vietnam, 24 May 2012

1. Location of IZ Tra Noc

2 AKIZ - Integrated Wastewater Concept for Industrial Zones exemplified for the Tra Noc Industrial Zone in Can Tho, Vietnam, 24 May 2012

1. Location of IZ Tra Noc

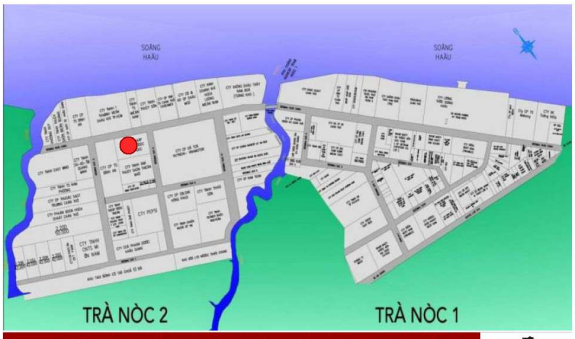
3 AKIZ - Integrated Wastewater Concept for Industrial Zones exemplified for the Tra Noc Industrial Zone in Can Tho, Vietnam, 24 May 2012

1. Location of IZ Tra Noc

- Tra Noc IZ is comprised of 2 IZs:
  Tra Noc 1 and Tra Noc 2.
- Total area: 290ha
  + Tra Noc 1 IZ(135ha): 100% filled
  + Tra Noc 2 IZ (155ha): 95.6% filled
- Tra Noc IZ 1 + 2 are
  2 in 8 IZs planned in the locality of Can Tho city and are 2 in 5 currently operated IZs.

AKIZ - Integrated Wastewater Concept for Industrial Zones exemplified for the Tra Noc Industrial Zone in Can Tho, Vietnam, 24 May 2012

1. Location of IZ Tra Noc



5 AKIZ - Integrated Wastewater Concept for Industrial Zones exemplified for the Tra Noc Industrial Zone in Can Tho, Vietnam, 24 May 2012

2. Development of Industrial Zone Tra Noc

- IZ Tra Noc – first IZ established in Can Tho
- Development started in 1990ies
- TN IZ 1: officially established in 1995; completed
- TN IZ 2: officially established in 1998; some parts under development

6 AKIZ - Integrated Wastewater Concept for Industrial Zones exemplified for the Tra Noc Industrial Zone in Can Tho, Vietnam, 24 May 2012

3. Industrial Zone Management

- **CEPIZA**
  = Can Tho Export Processing and Industrial Zone Authority
  - responsible for state management duties for all industrial parks in Can Tho City, incl. Tra Noc IZ
- **CIPCO**
  = Can Tho Industrial Park Infrastructure Company
  - responsible for implementation and operation and maintenance of infrastructure in Tra Noc IZ, including drainage system, roads, etc.

4. Industries in Tra Noc IZ

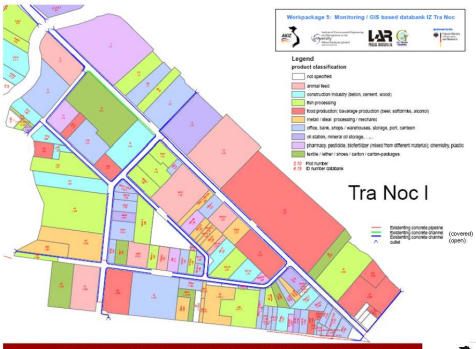
- Investment projects: 178
  (Tra Noc 1 : 123 and Tra Noc 2: 55).
- Total enterprises: 148
  (Tra Noc 1: 112; Tra Noc 2: 36).
- Enterprises in operation: 134.

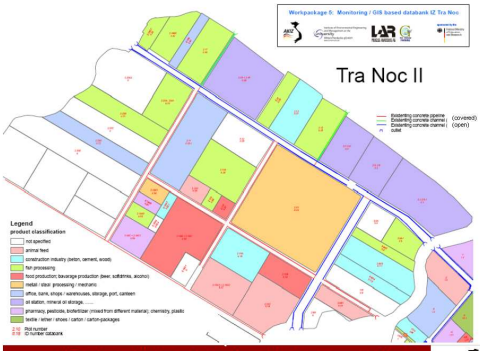
4. Industries in Tra Noc IZ

- Industries
  - Seafood processing,
  - Food / beverage production
  - Metal / steel processing,
  - Construction industry
  - Animal feed,
  - Pharmaceutical / pesticide / fertilizer,
  - Textile / leather / shoes / carton,
  - Oil stations / storages
  - Administration facilities

4. Industries in Tra Noc IZ

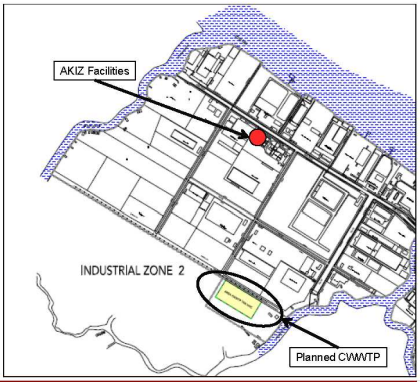
- Labor force: 29.642 people,
- accounts 86.6% of all Izs
  (Tra Noc 1: 17,466; Tra Noc 2: 12,176).
- Aquaculture is one of the main industries and produces most wastewater.





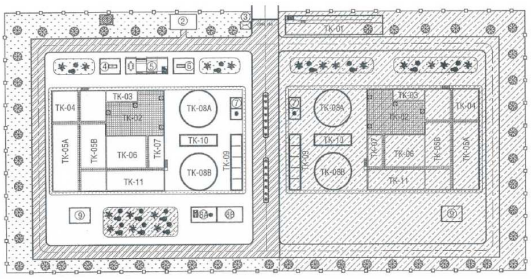
5. Wastewater Situation in Tra Noc IZ

- Only stormwater drainage in place;
- Wastewater is discharged into the stormwater drainage channels or directly into water bodies after treatment in the companies' private treatment plants or without any treatment
- Total wastewater: 12,000 m³/day, from 41 wastewater - producing enterprises.
- Tra Noc IZ hasn't a centralized wastewater treatment system yet, wastewater is released to the environment by 14 outlets.
- Construction of separate sewer network and CWWTP shall start in 2012



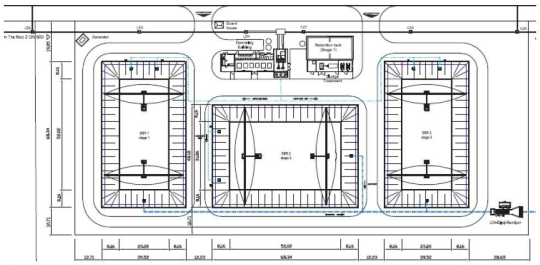
5. CWWTP Local Concept

6,000 m³/d (Stage 1) MAXIMUM 12,000 m³/d (Stage 2)



5. CWWTP AKIZ-Concept

6,000 m³/d (Stage 1), MAXIMUM 20,000 m³/d (3 Stages)

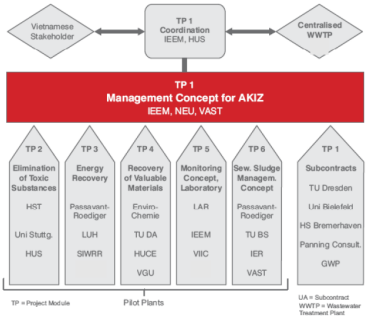


CW-SBR Tank

Structure of AKIZ Project

Project Period:
1 November 2010
-
30 April 2014

17 Vietnamese and German Scientific and Industrial Partners



TP 1 – Project Coordination +
Development of Management Concept

TP 1 – Project Coordination +
Development of Management Concept

Workshop on "Cost Calculation, Cost Transparency & Investment Financing for IZ Wastewater Management in Urban Regions" on 6 and 7 September 2011 in Can Tho

TP 1 – Project Coordination +
Development of Management Concept

Study Tour in Germany, 25 – 30 September 2011

TP 1 – Project Coordination +
Development of Management Concept

Joint AKIZ Workshop – 29 – 30 November 2011

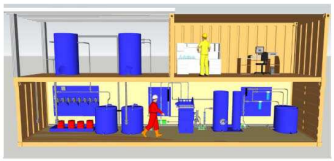
TP 1 – Project Coordination +
Development of Management Concept

Management Concept:

- Objective:
  sustainable operation of wastewater infrastructure in IZ
- results of the project will be condensed into two **guidelines**:
  - "Guideline on Integrated Wastewater Concepts for Industrial Zones" as decision support tool for implementation of wastewater disposal infrastructure,
  - "Financial Modeling of IZ Wastewater Solutions as Pre-Condition of Sustainable IZ Investments and Operations"

TP 2 – Detoxification

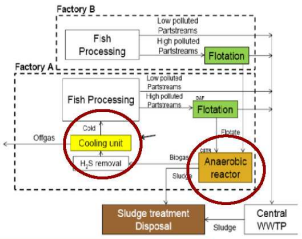
Can Tho Pesticide Company (CPC)



Universität Stuttgart

TP 3 – Anaerobic Treatment and Energy Recovery

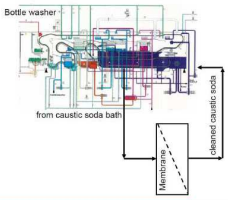
Nam Phuong Fish Processing Factory



TP 4 – Recovery of Valuable Materials

SABECO – Western Saigon Beer Brewery

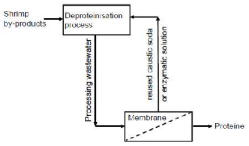
Bottle washing machine
Soda bath for washing of bottles
→ recovery of soda bath



TP 4 – Recovery of Valuable Materials

Phuong Duy Company

Production of chitin and glucosamine from shrimps shells



→ recovery of soda, proteins, energy

TP 5 – Container Laboratory and Monitoring

Development of adapted container laboratory

Operation of container laboratory and provision of laboratory services for other TP – AKIZ sub-projects

TP 5 – Container Laboratory and Monitoring

Development of a monitoring system for industrial zones

Workshop on Monitoring of Wastewater Systems in Urban Regions (organized by AKIZ, GIZ, CEPIZA) - **25 May 2012 in Can Tho**

TP 6 – Sewage Sludge Management Concept

Development of a sewage sludge management concept

Identified relevant sludge treatment technologies:

- Sludge digestion with and without chemical disintegration
- Co-composting with organic waste
- Natural dewatering and drying
- Reed bed treatment

Thank you for your attention !
HST
SYSTEMTECHNIK
Universität
Stuttgart
Leibniz
Universität
Hannover
Vietnamese-German University
VGU
TECHNISCHE
UNIVERSITÄT
DRESDEN
TECHNISCHE
UNIVERSITÄT
DARMSTADT
Technology for Water
ENVIROCHEMIE
Hochschule Bremerhaven
IEEM
University
Witten/Herdecke
www.uni-wh.de
VIIC
Universität Bielefeld
PASSAVANT ROEDIGER
31
AKIZ - Integrated Wastewater Concept for Industrial Zones exemplified for the
Tra Noc Industrial Zone in Can Tho, Vietnam, 24 May 2012

Presentation CEPIZA

CEPIZA — CAN THO EXPORT PROCESSING AND INDUSTRIAL ZONE AUTHORITY

GENERAL INFORMATION ON TRA NOC INDUSTRIAL ZONE

1

CEPIZA — CAN THO EXPORT PROCESSING AND INDUSTRIAL ZONE AUTHORITY

- Tra Noc IZ is comprised of 2 IZs: Tra Noc 1 and Tra Noc 2.
- Are 2 in 8 IZs planned in the locality of Can Tho city and are 2 in 5 currently operated IZs.
- Total area: 290ha
  + Tra Noc 1 IZ(135ha): 100% filled
  + Tra Noc 2 IZ (155ha): 95.6% filled

2

CEPIZA — CAN THO EXPORT PROCESSING AND INDUSTRIAL ZONE AUTHORITY

- Investment projects: 178 (Tra Noc 1 : 123 and Tra Noc 2: 55).
- Total enterprises: 148 (Tra Noc 1: 112; Tra Noc 2: 36). Enterprises in operation: 134.

3

CEPIZA — CAN THO EXPORT PROCESSING AND INDUSTRIAL ZONE AUTHORITY

- Labor force: 29.642 people, accounts 86.6% of all Izs (Tra Noc 1: 17,466; Tra Noc 2: 12,176).
- Industries: aquaculture, animal feeding; agricultural products; fertilizer, chemical, plant protection products; mechanical; construction materials…

4

CEPIZA — CAN THO EXPORT PROCESSING AND INDUSTRIAL ZONE AUTHORITY

- Aquaculture is one of the main industries and produces most wastewater.
- Total wastewater: 12,000 m^3/day, from 41 wastewater - producing enterprises.
- Tra Noc IZ hasn't had the Centralized wastewater treatment system, wastewater is released to the environment by 14 outlets.

5

6.7.2 Presentations May 25, 2012

Presentation René Heinrich

Monitoring (2)

Flow speed Measurement | Chemical Analyses

Waste Water Projects in Can Tho

- Waste Water & Solid Waste Management in Provincial Centres
- German Development Aid - Program / MOC
- Focus on residential areas
- CT, ST, TV, Vinh, HD, BN, SL, HB, LS

- Integrated Waste Water Management Concept for industrial Zones
- German Research - Project / MOST
- Focus on industrial areas
- Tra Noc - Can Tho and potential duplications

"Integrated Wastewater Concept for Industrial Zones"

... With near - to - source technologies to save and reuse waste waters incl. biogas generation and recuperation of valuables
for
tropical transformation and developing countries, exemplified at the Industrial Zone Tra Noc.

Sub Project 1 - Coordination & Management Concept

AKIZ / CEPIZA / CIPCO - Joint development of regulation for wastewater discharge and waste water tariff for Centralized Waste water treatment

Clarification of institutional and legal situation for waste water management

!! Planning, Tendering, Construction CWWTP managed by CIPCO

Sub Project 2 - Removal of toxic substances

Pilot plant Container:	Can Tho Pesticide Co. O Mon:	Hau Giang Pharmaceutical Co.:
- 1x 40 Feet - 1x 20 Feet - 1 m³ / hour	- From June 2012	- From 2013 (Optional)

Sub Project 3 - Anaerobic treatment with energy generation by biogas

Mobile Anaerobic Batch Test System at AKIZ - Lab at Tra Noc	Pilot Plant Container from July 2012 - 1 x 40 Feet - Flotation - Anaerobic Reactor - Cooling Unit	Consultancy for other Seafood Co. in Mekong delta region

Sub Project 4 – Recovery of valuable materials by membrane filtration

- Pilot plant Container
  - 2x 20 Feet
- WSB from April 2012:
  - Focus on Washing solution
- Phuong Duy – from 2013:
  - Focus on deproteinisation process

Sub Project 5 – Development & operation of cont. Lab & Monitoring

- Continuing sample takings for Monitoring
- Chemical Analyzes by permanent staff and other researchers
- Trainings, introductions to students, authorities, researchers …

Sub Project 6 – Sewage sludge management concept

- Experimental Container 20 Feet at Water plant Tra Noc from April 2012 – 2014
- Batch Plant for anaerobic experiments (Waste water samples from Tra Noc IZ)
- Continuous flow reactors for anaerobic sludge stabilization

Conclusion:

- It is important to organize a Workshop on monitoring of Waste Water Systems
- Discussion current practice in Vietnam
- Presentations of experience from Germany and Vietnam
- Working groups on 3 aspects of monitoring:

→Legal Framework for Monitoring
→Technical requirements for Monitoring
→Analytical Requirements for Monitoring

Thank you for listening! Looking forward to your respond …

- Prof. Dr. mult. Karl-Ulrich Rudolph
- Dipl.-Ing. René Heinrich
- Dipl.-Phys. Nguyen Van Long
- Dipl.-Ing. Sandra Kreuter
- Nguyen Thi Bich Tram

akiz.cantho2@gmail.com www.akiz.de

Presentation Tran Thi Thao Huong

MINISTRY OF CONSTRUCTION

SUMMARY OF STATE MANAGEMENT ON DRAINAGE AND SEWERAGE SECTOR IN INDUSTRIAL ZONE IN VIETNAM

Presented by:
Tran Thao Huong
Administration of Technical Infrastructure - MOC

Bộ Xây dựng – 37 Lê Đại Hành – Hai Bà Trưng – Hà Nội – Việt Nam

CONTENT:

- OVERVIEW OF WATER DRAINAGE MANAGEMENT IN INDUSTRIAL ZONES
- LEGAL FRAMEWORK
- SHORTCOMINGS AND RECOMMENDATIONS

1

1. OVERVIEW OF WATER DRAINAGE MANAGEMENT IN INDUSTRIAL ZONES

- By 2010: 260 industrial and export processing zones nation-wide.
- Total area: over 71.000 ha.
- 173 industrial zones (IZ) in operation
- 87 IZ are under land clearance and construction
- Highest concentration in Southeast region.

(Source: Data from Survey on Situation of Planning and Construction of Technical Infrastructure of IZs in Vietnam and Water Environment Study Report- JICA 2011)

2

2. OVERVIEW ABOUT WATER DRAINAGE MANAGEMENT IN INDUSTRIAL ZONES

Region	No. of WWTP under operation	No. of WWTP under construction	Total	No. of IZ	Ratio WWTP/ IZs (%)
Northern Midland and Mountain Area	2	2	4	16	25
Red River Delta	19	12	31	66	47
Central Coast	7	6	13	39	33
Central Highland	1	2	3	8	38
South East	61	4	65	88	74
Mekong Delta	11	6	17	43	40
Total	**101**	**32**	**133**	**260**	**51**

3

3. OVERVIEW ABOUT WATER DRAINAGE MANAGEMENT IN INDUSTRIAL ZONES

- 101 IZ have central wastewater treatment plant (CWWTP). Total capacity: approx. 340.000 m3/d.
- CWWTPs of 32 IZ are under construction with total capacity of over 160.000 m3/d.
- 127 IZ don't have CWWTP, among them almost 50 IZ are under operation.

4

4. OVERVIEW ABOUT WATER DRAINAGE MANAGEMENT IN INDUSTRIAL ZONES

- Average capacity of CWWTP: 2000-5000m3/d.
- Delayed progress of construction of factories.
- Consequently, no or insufficient wastewater for operation of CWWTP.

5

5. OVERVIEW ABOUT WATER DRAINAGE MANAGEMENT IN INDUSTRIAL ZONES

- Lack of budget for management, operation and maintenance.
- Example: Operation costs approx. 5000~8000 VND/m3 wastewater. The operation of one WWTP with capacity of 5000m3/d costs 25~40 mil. VND/d.

6

6. OVERVIEW ABOUT WATER DRAINAGE MANAGEMENT IN INDUSTRIAL ZONES

- Due to high investment cost, many IZ have been put into operation without CWWTP.
- Consequently, wastewater of some IZ is discharged into storm water drainage system or directly into the environment .

7

7. RELEVANT LEGAL FRAMEWORK

- Law of Construction, Law of Environmental Protection.
- Decree 29/2008/NĐ-CP dated 14.3.2008 of the Government on industrial, export processing and economic zones.
- Orientation for Water Drainage Development.
- Decree 88/2007/NĐ-CP on urban center and industrial zone water drainage.
- Other relevant legal documents.

8

8. SHORTCOMINGS

- Weak mechanism for industrial wastwater management, mainly characterized as principles and orders.
- Industrial wastewater management at local level hasn't been synchonously implemented, lack of qualified human resources
- Enterprises haven't paid proper attention to necessary pollution prevention measures.

9

9. SHORTCOMINGS

- Low number of factories connected to the central wastewater treatment system of IZ.
- Ineffective operation of CWWTP
- Insufficient implementation of wastewater tariff
- Lack of information system about pollution sources.
- Insufficient sanction against polluters.

10

10. RECOMMENDATIONS

- Strengthen basic mechanism in industrial wastewater management.
- Strengthen local capacity in wastewater management.
- Intensify pollution control measures
- Increase capacity and awareness of enterprises on environmental protection

11

11. RECOMMENDATIONS

- Review and revise legal documents relevant to wastewater management and promulgate conformable instructions.
- Clearly allocate responsibilities in inspection, monitoring and evaluation of water drainage activities at local level, evaluate effectivness of water drainage investment projects.
- Issue instructions for implementation of secondary regulations. Provinces promulgate local regulations on water drainage.

12

12. RECOMMENDATIONS

- Clearly define and strengthen roles of provincial institutions in planning, planning managment and management of urban and industrial water drainage investment projects.
- Periodically evaluate effectiveness of local water drainage system.

13

13. RECOMMENDATIONS

- Review and amend specific regulations on industrial water drainage management.
- Clarify responsibilities of state management institutions related to industrial water drainage activities
- Clarify responsibilities of operator of IZ drainage system, require periodical report to urban centers' authority.

14

14. RECOMMENDATIONS

- Develop training program to improve capacity in data collection, processing and evaluation for effective wastewater management
- Develop financing system to accelerate the construction of wastewater treatment plants.

15

15. RECOMMENDATIONS

- Strengthen institutional capacity in monitoring of water quality. Conduct assessment about necessary equipments
- Carry out information and education activities to increase awareness about environmental protection

16

On behalf of Ministry of Construction

Thank you for your attention!

Presentation Vu Xuan Thuong

SITUATION ON WASTEWATER MANAGEMENT IN DOMESTIC AREA IN BAC NINH CITY

Prepared by: Vũ Xuân Thương – technical expert – WW division - BNWSSC

Cần Thơ, 25th May. 2012

CONTENT

1. Introduction
2. Situation of wastewater management in Bac Ninh city.
3. Some issues
4. Solutions

1. INTRODUCTION

- Established in1997, in 2006 changed into one member limited company.
- Adress: No 57, Ngô Gia Tự street, Thị Cầu ward, Bắc Ninh city.
- Website: **capthoatnuocbacninh.vn**
- Total staff: 400

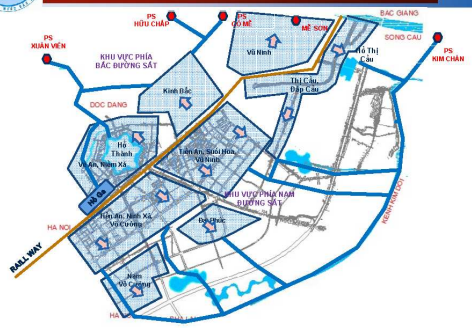
- Main activities
  - Product, bussiness in clearwater .
  - Management and maintenance sewer system in Bac ninh city.
  - Construction
- WW division in Bac ninh city:
  - Established in July, 2009.
  - Total staffs: 61
  - Management and maintenance sewer system in Bac ninh city since 2005.
  - Budget for Management and maintenance from PPC to annual alocate

SITUATION ON WASTEWATER MANAGEMENT

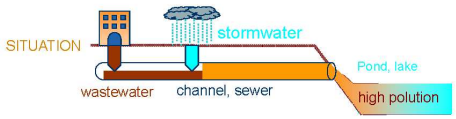
Some kind of sewers

Chủng loại	UNIT	In 2005	2012	rate
Box culvert	m	8.170	12.356	1,51
RC sewer	m	28.943	81.554	2,82
Manholes	set	1.437	3.840	2,67
Channel	m	2.122	2.132	1,01
Number of sewer line and areas	items	42	110	2,62

VALLEY AND EXISTING FLOW CHART OF DRAINAGE SYSTEM



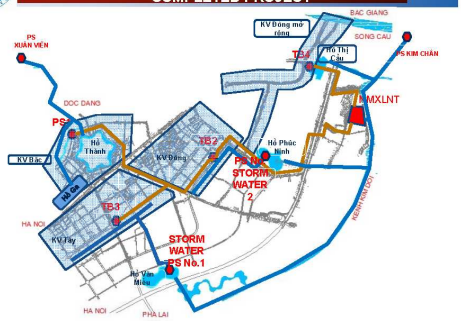
Existing wastewater flow



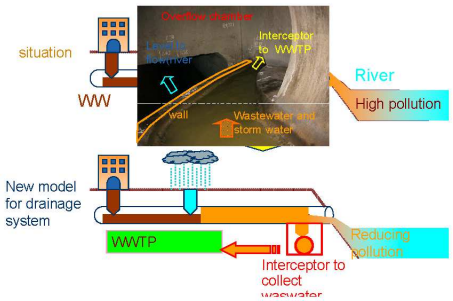
ASSESSMENT ON EXSISTING SEWER SYSTEM IN BACNINH CITY

- Sewer system is combined system.
- All of linked sewers is not so good.
- Some sewers having slope is not suitable
- Sewer is constructed by scroll, so wastewater leak in to ground to polute
- Wastewater is not collected, it flows to pond, river to pollute
- The more new urban area, the more flooded area
- In order to overcome this situation in Bac Ninh we have wastewater project to implement (supported by German Gov.)

FLOW CHART OF NEW SEWER SYSTEM AFTER COMPLETED PROJECT



FLOW CHART OF NEW SEWER SYSTEM AFTER COMPLETED PROJECT



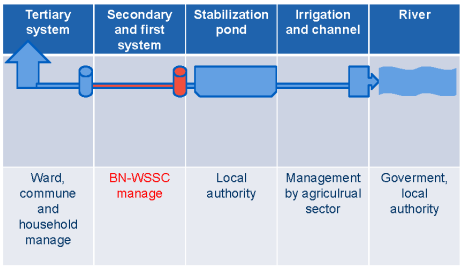
NEW SEWER SYSTEM

TT	ITEMS	LENGTH	DIFFERENT KIND
1	MAIN SEWER	20,3 km	RC SEWER D = 400 ÷ 1800
2	Box culvert	3,6 km	Dimension 4x2,5m; 4x2,3m; 5,5x2,3m; 2x2,5m
3	Interceptor	5,4 km	uPVC D = 300 ÷ 500
4	Pressure pipe	8,2 km	HDPE D = 200 ÷ 500
5	Wastewater PS	4 trạm	RC GRADE 350
6	Storm water PS	2 trạm	RC GRADE 350

(the end 2012)

- To solve flood in Bac Ninh city.
- To reduce pollution of groundwater, stabilization pond and channel in city
- To reduce negative affect to agriculture area around city.
- To advance regulation for wastewater management unit

2. Situation on waster management in bac ninh city



2. Situation on waster management in bac ninh city

- tertiary system include: sewers to collect wastewater from househould (by pipe or directly flow) belong to alley, helmet, small area and 2 sites of road. It is managed by ward, commune and residents
- Secondary system include: sewer in the main road to collect wastewater and stormwater (by outlet and screen bar) to pond, channel. This system is managed by BN WSSC.
- First system includes: Channel, drainage pumping station. It is managed by relating local authority and irrigational division.
-

3. Some problem

A. First system

- **Chanel, drainage pumping station for irrigation**
- Chanel and irrigation is not frequently dredging. It made to down drainage.
- not having structure to cooperate between wastewater division in city with irrigational division in agriculture sector.
- The capacity of stormwater pumping station is too small (it is not suitable to flow stormwater in urban area)

3. Some problem

- **Stablilization pond:**
- The unit which is managing is used not rignt way. (use for greed fishing)
- Is is not frequently dredged, botom of pond is raised up level.
- Pond is trespassed by household
- Outlet is occupied
- It leads to;
- Polution and not good signtseeing at urban area
- Reducing regulation of stormwater at stabilization pond
- .

3. Some problem

B. Secondary system

- Sewer and manholes is trespass and stolen cover. Residents open cover and throw out waste to sewer.
- Some urban area is not handed over the sewer system to company to manage.
- Sewer on national road is managed by another agency

3. Some problem

C. Tertiary system

- Wastewater is still flow on the road in Some areas. It caused pollution and sightseeing.
- Residents is connect by themselves and trespass other works
- Throw solid waste and scrap
- Sewer is not repaired and maintenance

4. Some method to solve

- ✓ Step by step to implement decree 88 (have detailed plan)
- ✓ Promulgating regulation on wastewater management.
- ✓ Approved wastewater tariff and collect tariff in order to O&M sewer system.
- ✓ Give master plan on wastewater including wastewater treatment
- ✓ Combine all project relating to drainage system to connect all of system
- ✓ The operation and maintenance need a contract
- ✓ Having solution for drainage through national road

4. Some method to solve

- ✓ Tertiary system need an unit to manage
- ✓ Stabilization pond need to operate by an unit and having method to trespass
- ✓ Dredging and operation of irrigation
- ✓ Improve drainage pumping station to suit with drainage in urban area.
- ✓ Having master plant on DWWT at suburban area
- ✓

THANK FOR YOUR ATTENTION!

Presentation Frank Pogade

Legal Framework for Monitoring of Waste Water Systems in VN and Germany, and how to set up an Indirect Discharger Monitoring system

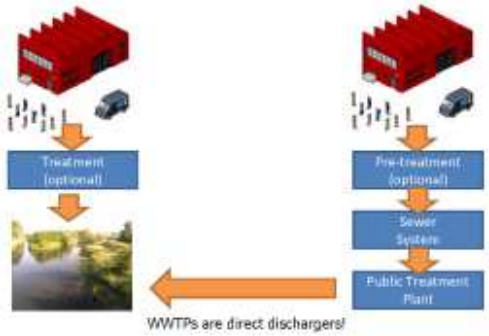
AKIZ Workshop "Monitoring of wastewater Systems in Urban regions"

Frank Pogade
GFA Consulting Group
Can Tho
May 25, 2012

Definition

Indirect discharge is the introduction of waste water into a (public) sewer system

Distinction between direct and indirect discharge



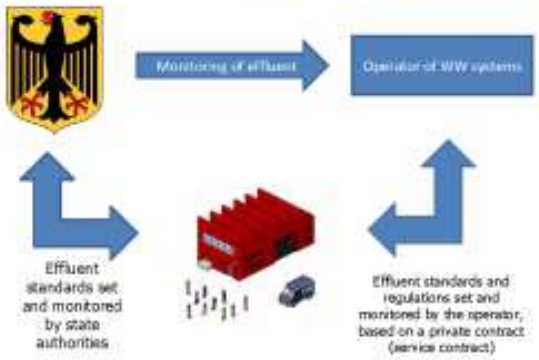
Rational for Monitoring Indirect Dischargers

1. To ensure the sound operation of the WWTP
2. To protect waste water assets (sewers, pumping stations, etc.)
3. Occupational health & safety
4. To put pressure on dischargers in order to replace hazardous substances in production, or change the production process, hence minimizing environmental impacts

Impact of (industrial) Wastewater

- Impact on sewer system
- Impact on treatment facility
- Impact on treatment process
- Impact on Safety & Health of worker
- Impact on the quality of sludge
- Impact on the environment / ecosystem

Monitoring of Indirect Dischargers in Germany



- The regulatory framework in Germany is rather difficult to understand: The 16 federal states are in charge of all "Water issues" (leading to many different regulations), while on national and EU level effluent standards for a large number of industries (direct dischargers) have been defined. These effluent standards are usually part of local indirect discharge regulations.

- The overall legal framework is the Federal Water Act (WHG).
- The German "Waste Water Ordinance" is the concrete legal basis for IDM, setting effluent standards for many industries (presently 57), both for direct and indirect discharge! This is a rather developed and sophisticated concept and (from WMP's point of view) not yet recommended for VN !!

- In Germany, most commercial indirect dischargers need a permit for discharging waste water into the public sewer system…

➢ no permit, no waste water disposal allowed

- Regulations, laws and ordinances make only sense when enforced!
- Who enforces?
  1. water authorities (enforcing public law)
  2. WW operators (enforcing private law)

If no enforcement is in place, the monitoring of indirect dischargers does not make much sense. Nevertheless, operators of WWTP should know who is discharging what into their sewer system.

Legal Background in VN

- Decree 88/2007/ND-CP
- Circular 09/2009TT-BXD (Ministry of Construction)
- Effluent standards (QCVN …)

Decree 88/2007/ND-CP

- On Drainage and Sewerage for Urban Areas and Industrial Zones

Art 6: Regulation on quality of the discharged wastewater

- Quality of wastewater discharged into receiving water body shall be in compliance with standards for wastewater discharged into receiving water body issued by competent state authority.

Vietnam does NOT have effluent standards for indirect discharges into sewer systems!

Art 11: Prohibited acts

Prohibited is:

- Discharge wastewater into sewer not meeting wastewater quality standards
- Discharge of substances and things that are not wastewater (or storm water)
- Wastewater dilution to achieve WW standard
- Connection to sewer without agreement
- Provision of wrong information

Art. 42: Regulation on wastewater discharge at connection points

- Discharger (customers) have to treat wastewater in their own facilities to meet required standards for discharging to sewer
- Discharger have to enter contractual agreements with qualified laboratories for testing every two months before discharging starts. The results have to be sent to treatment company

- The operators are responsible for controlling wastewater discharge from customers into the sewer system
- at any given time to ensure compliance with regulations
- The operators can take samples and test quality of the wastewater as needed

Art. 59: Rights and Duties of company

- Be compensated for losses and damages caused by relating parties
- Preparing and submitting alternatives of wastewater fees for approval by competent authorities
- Establishing database
- Coordinating with water supply entities for fee collection

Art. 60: Rights and duties of customers

- Being provided with sewerage services
- Paying full wastewater fees and in time
- Complying with regulations on standards for wastewater discharge

Art. 61: Inspection

- Construction inspectors shall function as sewerage inspectors

Scope of inspection:

- regulation compliance,
- detecting, prevention and dealing with violations against regulations

Circular 09,MoC:

- Other (non-domestic) wastewater discharged into sewerage system must meet standards of wastewater discharging into the system.
- In case of not meeting the standards, other wastewater must be pre-treated to meet the standards before discharging to the sewerage system

Conclusion:

The regulatory framework for introducing a IDM system in VN is rather favourable!

However,

•there are no standards yet for indirect discharge into sewer systems

•Regulations on local level are missing (who exactly is actually doing what, how and when?)

•Enforcement of law is critical

How to set up an Indirect Dischargers Monitoring System

Step 1:

Get an overview on the most relevant industries and commercial businesses that might discharge problematic waste water.

These dischargers are usually well-know (breweries, slaughterhouses, factories in general ...)

For the beginning, keep the number of the monitored companies small!

How to set up an Indirect Dischargers Monitoring System

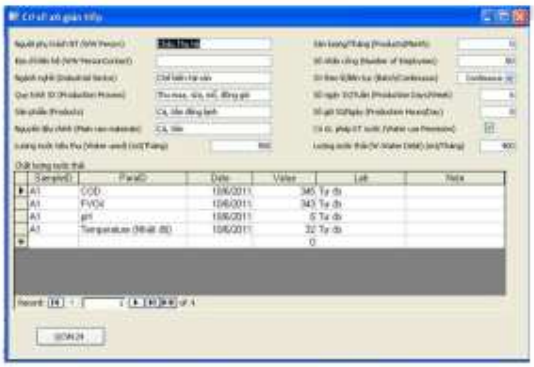
Step 2:

Collect data from these dischargers:

- Address, names of persons in charge
- Industrial sector
- Description of production process
- Fresh water consumption (often very difficult to determine!)
- Volume of waste water discharged (often very difficult to determine!)
- Discharging points into sewer system
- etc.

Data to be collected through visits and questionnaires. An electronic database is required

Electronic Data Base (Example from WMP)



How to set up an Indirect Dischargers Monitoring System

Step 3:

Evaluate collected data

- classification
- Potential danger for the operation of WW assets and treatment plants

We suggest to introduce 3 levels:

How to set up an Indirect Dischargers Monitoring System

Danger Levels:

	Highly relevant, severe potential impact on ww assets and treatment processes	Needs regular and frequent sampling (e.g. once a month) and frequent update of data. Close cooperation with water authorities required
	Potentially relevant, impact on ww assets and treatment processes might occur	Regular sampling required (1-2 times a year)
	Not relevant	No further action required, but data should be updated from time to time

How to set up an Indirect Dischargers Monitoring System

Step 4:

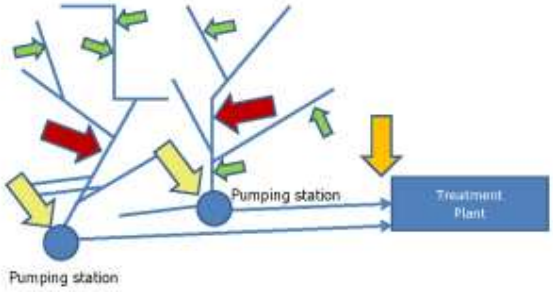
Establish a sampling procedure within the WW system

The following sampling points within a sewer network should be regularly sampled:

- Inlet to treatment plant (daily)
- Pumping stations (weekly)
- Main sewers (monthly)

How to set up an Indirect Dischargers Monitoring System

Sampling points in the sewer network



How to set up an Indirect Dischargers Monitoring System

Step 5:

Extend your data collection

- After having gained experiences with the most important dischargers, extend your database step by step.
- Example from Berlin / Germany: some 10.000 companies in the database, appr. 300 "status red"

How to set up an Indirect Dischargers Monitoring System

Step 6:

Connect to geographical information system (optional)

- For visualising locations and hazard potential of dischargers
- Allows hydraulic calculations if coupled with respective software

GIS (example from WMP)

How to set up an Indirect Dischargers Monitoring System

Step 7:

Regular update and maintenance !

- The most important issue!
- If budgets or human resources are limited, start with the most relevant dischargers only. Even 3 companies under monitoring is a starting point!

Sampling an indirect discharger

Thank you for your attention!

Presentation Sandra Kreuter and Inga Hoelscher

Workshop on Monitoring of Wastewater Systems in Urban Regions
25 May 2012

Integrated Wastewater Concept for Industrial Zones exemplified for the Tra Noc Industrial Zone in Can Tho, Vietnam

Technical Requirements for Monitoring of Wastewater Systems

Dipl.-Ing. Sandra Kreuter
cand.-Ing. Inga Hoelscher

Sponsored by the
Federal Ministry of Education and Research

Technical Requirements for Monitoring of Wastewater Systems

1. Objectives
2. Responsibilities and Identification of dischargers
3. Sampling
4. Analysis
5. Monitoring Strategies
6. Conclusion

1 – Monitoring Objectives

Overall:

a) Protecting **general public** from dangers, damages and against harassment (e.g. odors)

b) Protecting **water bodies**

c) Protection **operational staff** working at/with wastewater facilities (WWTP, sewer network, pumping stations, etc.)

d) Protecting and securing functioning of **wastewater facilities**

e) Avoiding difficulties regarding treatment, utilization and disposal of **sewage sludge**

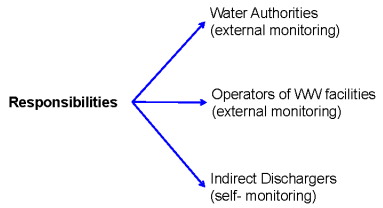
1 – Monitoring Objectives

Specific:

a) Control compliance of threshold values stipulated by law / regulations
→ Maximum concentration / load

b) Locating unauthorized discharges and dischargers
→ Variations in concentration / load

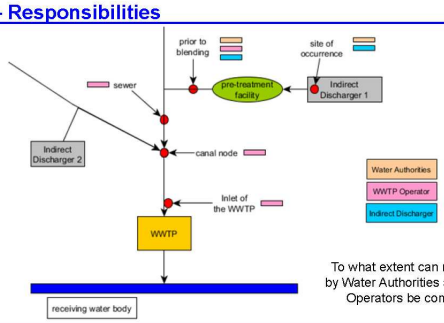
2 – Responsibilities Who monitors?



2 – Responsibilities Who monitors?

Selected Activities	Water Authorities	Operator Wastewater facilities	Indirect Discharger
Decision on: - enterprises to be monitored - relevant parameters - threshold values and definition of compliance	x	x	
- Control of compliance with threshold values	x	x	
- Site inspections	x	x	
- Detection of unauthorized indirect dischargers and discharges		x	
- Preparation and update of indirect discharger cadastre		x	
- Self-monitoring of effluents			x
- Preparation of self-monitoring report			x
- Claiming of self-monitoring results	x	x	

2 – Responsibilities



To what extent can monitoring by Water Authorities and WWTP Operators be combined?

3 - Sampling

→ What needs to be considered when sampling for monitoring?

Sampling

- **What** → - Testing Media
  - wastewater
  - sewer biofilm
  - canal sediments
- **Where** → - Sampling Location
  - place of occurrence
  - prior to mixing
  - sewer
  - canal nodes
  - inlet of WWTP
- **When** → - Time / - Frequency / - Duration
  - morning, noon, afternoon…
  - continuously
  - time or flow proportioning
  - daily, weekly, monthly…
  - campaign, ongoing
- **How** → - Method of sampling
  - grab sample
  - qualified grab sample
  - composite sample

→ **Results should be representative for the wastewater composition!**

4 – Analysis

→ What needs to be considered when analyzing wastewater?

Analysis

- **Method of Analysis** → - Standardised (Technical Standards)
- **Conservation of Samples** → - Sample Handling and Preservation
- **Quality Assurance** →
  - Plausibility Control
  - Multiple Determinations
  - Interlaboratory Tests
  - Sampling Protocol

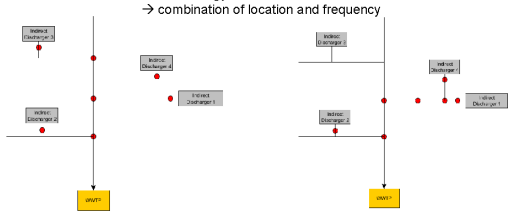
→ **Assuring representative results**

5 – Examples of Monitoring Strategies in Germany

Strategy Types of WWTP Operators: Manifold versus Concentrated Activities

Benchmarking Project in Germany, Franz and Peters 2011:

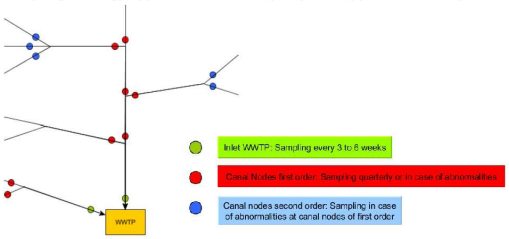
→ no universal strategy exist
→ combination of location and frequency



Manifold Activities | Concentrated Activities

5 – Examples of Monitoring Strategies in Germany

Sampling Strategy applied in the Municipality of Wuppertal, Germany



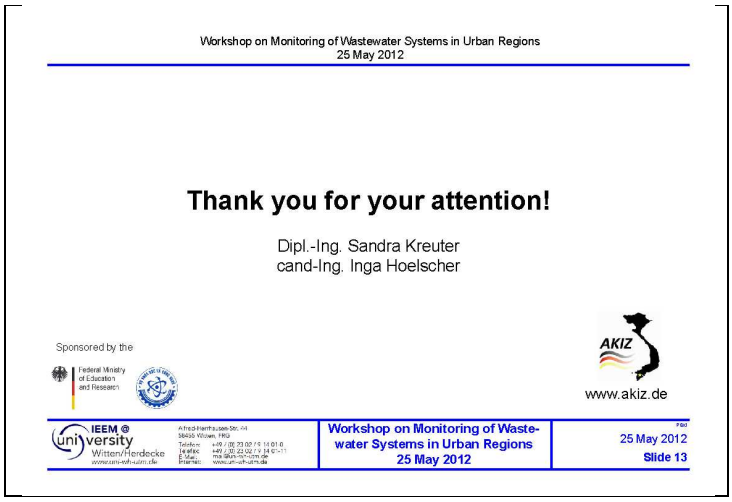
6 – Conclusion

→ **What has to be considered when setting up a monitoring strategy?**

→ <u>No universal valid monitoring strategy exist!</u>

→ Conditions to be considered:
- climate
- hydrological/ tidal influences
- budget → higher quality means higher costs
- availability of technical equipment
- availability of working staff
- wastewater facilities
- ….

→ Monitoring should be specific, targeted and cost effective
→ Adequate planning necessary to obtain needed information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Thank you for your attention!
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25 May 2012
Slide 13

Presentation Thruong Thi Kim Dung

First Experiences from Monitoring Program

Solid Waste and Waste Water Management Program (WMP)

Truong Thi Kim Dung
CanTho, May 25th, 2012
AKIZ Workshop

Contents

1. Definition of "Waste Water Monitoring"
2. Waste water monitoring program in the WMP
3. Experience and lessons learnt
4. First monitoring results of Decentralized Waste water Treatment Plants (DWWTPs)

11.06.2012 Seite 2

1. Definition of "Waste Water Monitoring"

- Waste water monitoring comprises all activities required to survey, understand, evaluate and improve waste water management systems, including sewer systems and treatment facilities.
- Those activities are collecting, processing and evaluating data
- The overall objective is to the achieve best performances of the waste water system at lowest possible costs.

11.06.2012 Seite 3

Steps in waste water monitoring process

11.06.2012 Seite 4

2. Waste water monitoring program in the WMP

- It is necessary to evaluate treatment performances of DWWTPs

DWWTP in Bac Ninh

DWWTP in Vinh/Nghe An

DWWTP in Can Tho

→ ***NEED MONITORING for collecting data and experiences***

11.06.2012 Seite 5

Detail objectives of waste water monitoring in WMP

- To know the treatment efficiency of the plants
- To learn lessons → Find out methods to improve plants
- To check whether effluent quality satisfies the legal requirements
- Disseminate results

11.06.2012 Seite 6

Partners involved in a wastewater monitoring program

Equipment needed for monitoring

Sludge level measuring pipe

Sampling Rod

pH value indicator Strips

Equipment needed for monitoring

Dissolved oxygen meter

Imhoff cone

Graduated cylinder

Equipment needed for monitoring

Rubber gloves

Dust mask

Design of a monitoring program

(1) Monitoring location

(2) Frequency of monitoring

(3) Pollutant parameters of samples analysed

(4) Data record sheet

(5) Statistical evaluation procedures

(6) Authorities can share monitoring data

Examples of a design in WMP

Waste water monitoring in practice in WMP

Task 1. Field observations

Waste water monitoring in practice in WMP

Task 2. Field measurements: examples

Sludge level measuring

Effluent characteristics: colour, odour, DO, temperature, pH, SS

11.06.2012 Seite 13

Waste water monitoring in practice in WMP

Task 3. Sampling and analysis

11.06.2012 Seite 14

How to take sample?

- ***Sampling locations***: mostly inlet and outlet
- ***Sampling method***: *5 Grab samples are taken 20 minutes a apart to create a composite sample*
- ***Preservation method***: cooled with ice
- ***Transportation to the lab***: by project car within the sampling day

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Waste water monitoring in practice in WMP

Task 4. Monitoring performance report

11.06.2012 Seite 16

3. Experience and lessons learnt

Problem 1: Type of sample

At the beginning: taking grab sample, not composite sample → not good results

Example:

➡ Solution: Take composite sample

11.06.2012 Seite 17

3. Experience and lessons learnt

Problem 2: Inflow rate measuring:

No inflow rate meter → Rudimental measuring

11.06.2012 Seite 18

3. Experience and lessons learnt

Problem 3. Sometimes, samples preserved for a long time→ affect results

Examples: Holding times of some parameters are not long

Parameter	Holding time (with refrigerator condition)
TH	[illegible]
BOD_5	1 day
TSS	1 day
TDS	1 day
NH_4^+ - N	[illegible]
PO_4^3 - P	1 day

Source [EPA 2007]

- The lab sometimes preserves samples 2 days or 3 days

11.06.2012 Seite 19

4. First monitoring results of DWWTPs

PERFORMANCE OF DWWTP IN VIEM XA/ BAC NINH CITY

Treatment efficiency
COD: 96 %
BOD: 94 %

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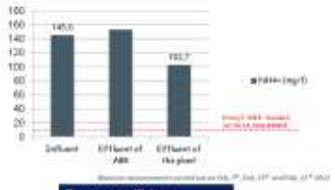
4. First monitoring results of DWWTPs

PERFORMANCE OF DWWTP IN VIEM XA/ BAC NINH CITY



Treatment efficiency
NH_4^+: 29 %

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4. First monitoring results of DWWTPs

PERFORMANCE OF DWWTP IN CAI KHE MARKET/ CAN THO CITY

Treatment efficiency
COD: 53 %
BOD: 53 %

11.06.2012 Seite 22

References

- [EPA 2007]. Regulatory monitoring and testing water and wastewater sampling]
- [EPA 2010]. Operating procedure of water sampling

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Chân thành cảm ơn

Thank you

11.06.2012 Seite 24

Presentation Wolfgang Genthe

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Analytical Requirements for Monitoring of Waste Water Systems

Ferdinand Friedrichs, Dr. Wolfgang Genthe
LAR PROCESS ANALYSERS AG

Aims

- Development of monitoring concept for industrial zones under the specific conditions in Vietnam and similar emerging countries will be developed
- Creation of reliable database of waste water
- Development and operation of an adapted containerized laboratory
- capacity building

…… all aims are still in process …..

Analytical Process

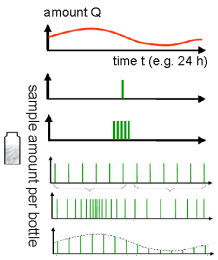
- selection and characterization of sampling the points
- sampling
- analysis on the spot
- Sample Preparation
- sample conservation
- analysis of samples
- Cleaning
- quality assurance
- evaluation of results
- documentation

From literature: errors in analytical process
- sampling 1000%
- sample preparation 100%
- instrumental analysis 10%
- documentation 1000%

Aspects of Different Sampling Strategies

(for example DIN 38402-11)

also 2 h or 24 h composite sample
also event driven sampling



Automatic Sampling

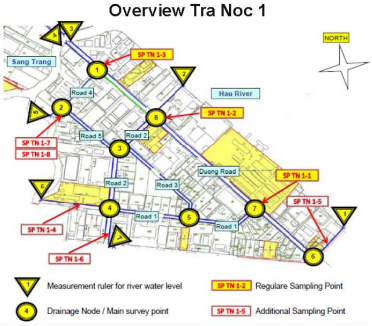
Sampling

continuous sampling

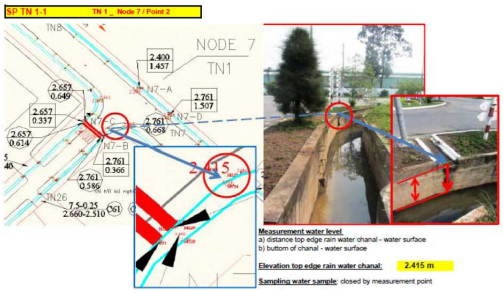
the actual campaign:
- 21 weeks, 1-2 times a week
- each measuring day 6 sampling points are investigated
- to obtain representative results 2 - 4 sample were taken at each measurement point
- every measuring day 4 – 5 times

→ sampling should be done at low tide and when it's not raining

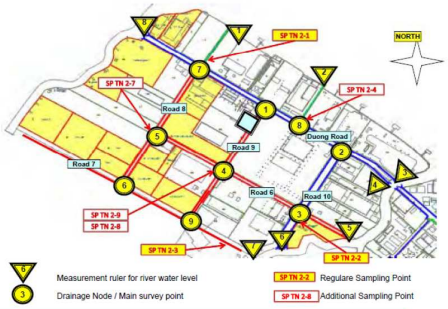
Overview Tra Noc 1



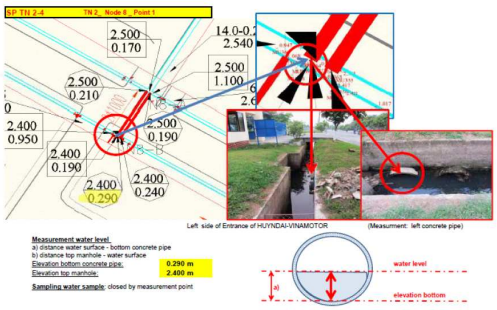
Example of Measurement Point Tra Noc 1



Overview Tra Noc 2



Example of Measurement Point Tra Noc 2



Water Speed and Water Level

Part of monitoring is measuring water levels and flow speed

- Calculation of flow volumes
- influence of the tide

Analysis on the Spot

pH, O_2 dissolved, redox potential, temperature, conductivity

Essential:
Planing and organizing ahead

- check completeness of the materials (bottles, vessels, ecc.)
- check electrodes (if necessary calibration)
- check documentation equipment
- execution according to prescribed protocol (e.g. O_2 measurement with movement)

Sample Conservation

- Conservation has to be done carefully
- By adding HCl, samples might be destroyed
- For methods like COD and N-NH4 Chloride is interfering
- If HNO_3 is added to the sample, N-NO_3 and TN can not be determined
- Metals: HNO_3 has to be added to prevent adsorption and precipitation
- Ammonia: If the pH > 8, the samples has to be conserved immediately after taking the sample by acidification.

Sample Conservation 2

- F: have been filtered directly after being taken with a 0.45 µm membrane filter.
- Pa: To the filtered samples, 0.5% H_2SO_4 has been added. Those samples have been neutralized before the measurement.
- fr: have been filtered and frozen directly after being taken

	08.02.2012 – T0			T2d	T7d	T14c
Sample	Dilution	c (ppm)	cuvette mg/L	c (ppm)	c (ppm)	c (ppm)
blank T0	1	-0,04		-0,23	-0,25	-0,35
Standard 1 ppm	1	1,32		1,07	0,87	0,72
TN2_N7OL1__100_F	20	30,18		19,85	12,87	12,35
TN2_N7OL1__100_F_pa				20,88	17,20	13,38
TN2_N7OL1__100_F_fr				21,89	10,52	
TN2_N4F3__103_F	25	21,63		15,15		3,56
TN2_N4F3__103_F_pa				27,80	21,20	15,28
TN2_N4F3__101_F_fr				24,85	14,33	
TN2_N4F4__103_F	10	3,34	2,90	4,55	3,00	2,37
TN2_N4F4__103_F_pa				6,22	4,41	2,06
TN2_N4F4__101_F_fr				4,23	2,54	

→ Blanc: constantly
→ Standards: decreasing
→ Samples: randomly, due to biological or chemical composition.

Sample Preparation

Membrane filter (0,45 µm)
- Acquisition cost low
- In long term more expensive

Pressure filter (0,45 µm)
- Acquisition cost high
- In long term less expensive (time savings)

Colorimetric Methods

P-PO_4, TP, N-NH_4, N-NO_3, TN and N-NO_2

- cuvette tests have high price and logistic difficulties
- used only for quality assurance
- programed methods are sometimes different in different languages; verify!

Details

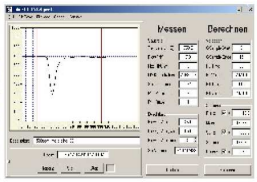
Analyte	Reagents	λ [nm]	remarks
PO_4^{3-}	Ammonium molybdate (in presents of potassium antimonyl tartrate) form an antimony-phosphomolybdic complex that is reduced to intensely colored molybdenum blue by ascorbic acid	580	this method is very time dependent
NO_3^-	in a H_2SO_4-H_3PO_4 solution with 2,6-Dimethylphenole forms 4-Nitro-2,6-dimethylphenole	324	easy to execute
NH_4^+	reacts at pH 12 with hypo-chlorite and salicylate in presents of disodiumpentacyanonitrosylferrate	655	sensitive to memory effects

TP: Poly- and organic phosphates needs to be digested in a H_2SO_4-persulfate solution at 100 °C for 1 hour, before measuring PO_4
TN: Koroleff digestion has to be done, adding persulfate and NaOH to the sample, heating up the sample at 100 °C for one hour

COD with LAR-Analyser

Water sample get's burned at 1200 °C in a carrier gas stream with a defined oxygen concentration; the oxygen concentration is measured after the combustion with ZrO2 oxygen sensor

An analysis requires 4 minutes, there are no chemicals used.



Quality Assurance

Compare results with different analytical methods

Measurement of standards and compare results with commercial cuvette tests

Compare results of real samples with external labs

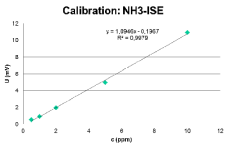
Participate round robin tests

Measurement of NH_4^+ with Ionselective Electrode (ISE)

- NH_4^+ converts to NH_3 after adding a base
- NH_3 diffuses through a hydrophobic gas permeable membrane

→ Results of ISE-NH3 were compared with NH4+ cuvette test with a good correlation.

….. but: without automatisation, ISE-NH3 seems not appropriate method for monitoring, because it doesn't safe time.



Results:

Method	C (ppm)
Cuvette Test	8,24
NH3-ISE	8,07

Results of Round Robin Tests

Parameter	"true" value [mg/l]	median [mg/l]	Standard deviation [mg/l]	"good" Laboratories of 27 (z<2)	"very good" Laboratories of 27 (z<1)	AKIZ Laboratory [mg/l]
$N - NO_3^-$	25,00	24,78	3,75	48%	41%	26,90
$N - NO_2^-$	4,73	4,71	0,47	78%	63%	4,60
$N - NH_4^+$	10,0	9,6	1,5	74%	52%	9,2
Cl^-	125,4	124,8	12,5	67%	59%	118,0
$P - PO_4^{3-}$	15,0	15,0	2,3	70%	56%	14,4
SO_4^{2-}	100,0	97,6	15,0	41%	26%	113,0
COD	130,46	129,00	19,57	81%	78%	134,00
BOD_5	80,21	80,21	12,03	52%	52%	no result
Total Phosphorous	4,52	4,55	0,68	67%	48%	5,00

The 2nd test (metals at trace levels) was not so good.

Results 1: Measurement at Tet Fest

To investigate the pollution of the sewage system, samples were taken at Tet Fest.

These results were compared with results of normal conditions in the industrial zone

	N7P2 13:00		N8P3 13:00	
Parameter	Tet	Normal	Tet	Normal
N-NO3	<0,5	1,91	1,7	11,17
N-NH4	8,32	20,02	8,39	37,71
TN	8,35	45,27	11,46	76,38
P-PO4	<0,5	3,45	<0,5	18,84
TP	1,68	3,94	0,73	27,05

Results 2

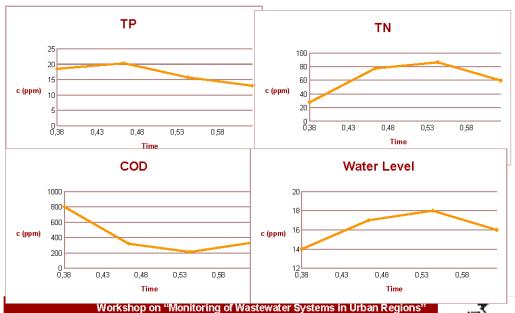
Examples of filtered samples (Tra Noc 1, node 7, point 2):

Time depth	Depth [cm]	Flow direction	Time sampling	pH	O2 [mg/L]	Redox [mV]	Temp. [°C]	Cond. [µS/cm]
09.05 am	63	no movement	09.10 am	9,1	0,2	-241	29,6	2110
11.00 am	45	towards Mekong	11.00 am	10,8	0,5	-215	30,2	2220
01.00pm	24	towards Mekong	01.00 pm	8,8	0,6	-34	32,8	2560
03.05/03.25pm*	14/21	towards Mekong	03.25 pm	8,3	1,8	-37	29,0	2280
Limit values	-	-	-	5,5 – 9	-	-	40	-

Time sampling	TP [ppm]	NH4 [ppm]	Nitrate [ppm]	TN [ppm]	WH [mmol]	BOD5 [mgO2/L]
09.10 am	2,15	17,58	1,07	121,5	2,25	133,5
11.00 am	3,25	8,67	1,07	95,2	1,63	147,0
01.00 pm	15,54	40,55	1,24	123,3	3,38	400,0
03.25 pm	12,08	19,23	0,70	135,7	1,75	147,0
Limit values	6	10	-	30	-	50

- strong influence of a 10-minute rain at 15.10 clock, with strong increase in flow velocity
- Unclear is the influence of the mud in the channels on results, especially if sample will not be filtered

Results



Challenges of Monitoring

Tides

Flow direction of the water

Heavy Rain

Changing Industry (seafood factories are closing)

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