

現地調査資料

資-1 調査サイトの情報

HATINH PROVINCE

1. Secondary School Phan Huy Chu – Hatinh province:

- Area of the school: 31,500 m².
- There are 28 classes; total number of pupils is 946 from class 1 to class 9; total number of teachers is 70.
- Water source is rain water and treated water from Ha Tinh City. Underground water is infected with alum; therefore, it cannot be used for daily consumption.
- Drinking water for pupils: their parents pay for this (about 1.5m³ per day).
- Water for domestic purposes: 7 – 10 m³ per day.
- Proposed solution: To build a treating alum water system to supply clean water for domestic usage (with capacity of 8 -12 m³ per day); to install a tower from which water is piped to every consuming zone; to install a filtering system using water after treated to supply pure water for drinking (with capacity of about 1.0 – 1.5 m³ per day).

2. Thach Ha General Hospital

Representative of the Hospital: Dr. Hoang Thanh Luc – Director

- Daily water demand:
 - o Average number of person working and treating in the Hospital: 1.000 persons.
In which:
180 staffs, 150-160 patients under treatment; 120 – 160 persons who comes to take care the patients; and 200-250 patients who come to check health.
 - o Total water consumption per day is from 80 to 100 m³. In summer, the consumption is higher.
- Current water supply:
 - o The hospital does not have water supply outlet from the Province.
 - o The current water supply is Singapore funded water treatment system: the water is pumped from the river and treated by normal treatment method and collected in the water tanks. The capacity is 3 m³ per day.
 - o The Hospital also has 4-5 deep wells. However, the water quality is very poor and cannot be used for domestic purposes and treatment purposes.
- Drinking water:
 - o Patient: the patient has to by drinking water to serve their own demand.

- Hospital's staff: drinking water demand is about 2.5 to 3liters/ person x 180 persons. Normally, the staffs boil water collected from the treated water tank for drinking.
- The hospital expectations about the pilot project:
 - The pilot project can help the hospital to set up a pure water supplying system with capacity of 4-5 m³ per hour for:
 - Hand washing before and after implementing operation
 - Tools washing before and after implementing operation or patient treatment.
 - Washing of clothes used in operation or patient treatment.
 - Water supply for sterilization of treatment tools
 - Water supply for preparing oriental medicine.
 - Water for drinking

For other purposes, the hospital is still using the Singapore funded water system.

The location selected for installing is in the ground near the Singapore funded water system.

3. Residential area – Bui Xa Hamlet, Phu Viet Commune, Thach Ha District, Ha Tinh Province

Representative of the hamlet: Mr. Nguyen Xuan Tam, head of the Hamlet.

- Daily water demand:
 - Average number of household in the hamlet: 230 households which are divided into three groups. The visiting residential area is one of the three groups with 80 households.
 - Daily consumption demand is about 0.3 m³ per person. Total demand for the group is about 100m³ per day. In which, demand of water for cooking and drinking is about 40 m³ per day.
- Current water supply:
 - The area has 7 dried months each year. The water is always shortage.
 - The main water source is a pond in the crop. The residents have to connect the pipes to the pond or use cans to collect water to their houses.
 - The hamlet also has deep wells which have alum water. Then, the households cannot use the water for domestic purposes
- The hamlet expectations about the pilot project:
 - The pilot project can help the hamlet to set up a pure water supplying system with capacity of 4-5 m³ per hour for: Cooking and drinking
 - Besides installing treatment system, the hamlet expects to have a water tank to keep treated water; hence, the household can come there to collect water by themselves.

- The location for installation is in the back of the residential area, near access road where is convenient for all households to come and collect the water.

For other purposes, the hamlet is still using surface water in the pond.

VINH LONG PROVINCE

1. Medical center in Quoi An commune, Vung Liem District, Vinh Long Province

Representative of the Medical Centre: Dr. Mai Van Hieu – Head

- Daily water demand:
 - Total number of functional clinics: 17.
 - Total number of under-treated patients: 30.
 - Number of persons coming to check health: 50 – 60 persons/day
 - Number of doctors and other staffs: > 10.
- Current water supply:
 - Water source: river water
 - Domestic consumption: alum in river water is deposited in a tank.
 - Drinking and cooking water: alum deposited is sterilized by chlorine and boiled for drinking and cooking. The quality is very poor.
- The medical center's expectations about the pilot project:
 - The pilot project can help the center to set up a pure water supplying for:
 - Water for drinking
 - Water supply for sterilization of treatment tools/ clothes
 - Capacity of 1m³ pure water per hour
- Selected location for the pilot project:
 - Water source: River water
 - Location: near the present water tank of the medical center

2. Nguyen Trung Truc Primary School, Vinh Hoa village, Tan Ngai commune, Vinh Long Province

Representative of the Primary School: Le Van Lai – Deputy Head

- Daily water demand:
 - Total number of pupils of the school: 168.
 - Total number of teachers: 05.

- Total number of class rooms and functional rooms: 07.
- Current water supply:
 - Water source: stagnant water in a pond behind the school, water is not treated and pumped directly to the school for cleaning purposes.
 - Drinking water: the teachers, staffs and pupils have to buy or bring to school by themselves.
- The School's expectations about the pilot project:

The pilot project can help the school to set up a pure water supplying for:

 - o Water for drinking
 - o Water supply for hand cleaning of pupils in the schools
 - o Capacity of 1m³ pure water per hour
- Selected location for the pilot project:
 - o Water source: River water in Rach Ro Canal in front of the School
 - o Location: near the gate of the school

3. Ngai Tu C Primary School, Nga Cai village, Ngai Tu commune, Tam Binh District, Vinh Long Province

Representative of Commune: Pham Phu Cuong – Deputy Head of Ngai Tu Commune People Committee

- Daily water demand:
 - In the location, there are one primary school and one kindergarden: Total number of pupils of the school: 200 (plus 50 kindergarteners).
 - Total number of teachers: 16.
 - Total number of classrooms and functional rooms: 21
- Current water supply:
 - Water source: using alum underground water in the well
 - Drinking water: underground water is boiled
- The School's expectations about the pilot project:

The pilot project can help the school to set up a pure water supplying for primary school and kindergarden:

 - o Water for drinking
 - o Water supply for babies and pupils' cleaning
 - o Capacity of 1m³ pure water per hour
- Selected location for the pilot project:
 - o Water source: River water in front of the School

- Location: near the gate of the school, between the primary school and kidergarden.

資-2 現地機関面談記録

(非公開とする)

資-3 水質試験実施機関の情報と試験結果

資-3-1 水質試験実施機関の情報

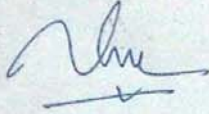
Quality Assurance and Testing Center (QUATEST) - 1 in Hanoi

**List of Laboratory Certifications
of Quality Assurance and Testing Center 1**

No	Name of Documents		Issued Authorities
	Vietnamese Name	English Name	
01	Giấy chứng nhận đăng ký kinh doanh	Business Registration	Investment & Planning Department - HNPC
02	Quyết định về việc công nhận phòng thí nghiệm	Decision on Recognition of Laboratory	Ministry of Science and Technology
03	Chứng chỉ công nhận	Certificate of Accreditation	Ministry of Science and Technology
04	Hồ sơ năng lực phòng thử nghiệm Hóa – Môi trường	Capability Profile of Chemical – Environmental Laboratory	Quality Assurance and Testing Center 1

SỞ KẾ HOẠCH VÀ ĐẦU TƯ
THÀNH PHỐ HÀ NỘI
PHÒNG ĐĂNG KÝ KINH DOANH 02

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc



GIẤY CHỨNG NHẬN ĐĂNG KÝ KINH DOANH
TỔ CHỨC KHOA HỌC VÀ CÔNG NGHỆ
Mã số doanh nghiệp: 0100111602-1

Business Registration Certificate
Technology and Science Organization

Chuyển từ số 0109000019, do Phòng Đăng ký kinh doanh – Sở Kế hoạch và Đầu tư
Hà Nội cấp lần đầu: ngày 10 tháng 04 năm 2008
Đăng ký thay đổi lần 1: ngày 29 tháng 07 năm 2010

"CHUYÊN ĐỔI TỪ TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 1 THEO QUYẾT ĐỊNH SỐ 56/QĐ-
BKHCN NGÀY 17/01/2007 CỦA BỘ KHOA HỌC CÔNG NGHỆ"

1. Tên tổ chức khoa học và công nghệ:

Tên tổ chức khoa học và công nghệ viết bằng tiếng Việt:

TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 1

Tên tổ chức khoa học và công nghệ viết bằng tiếng nước ngoài:

QUALITY ASSURANCE AND TESTING CENTER 1

Tên tổ chức khoa học và công nghệ viết tắt:

QUATEST1

2. Địa chỉ trụ sở chính: Số 8 Hoàng Quốc Việt, phường Nghĩa Đô, Quận Cầu Giấy, Hà Nội

Điện thoại: 38361399

Fax: 38361199

Email: hanhchinh@quatest1.com.vn

Website: quatest1.com.vn

3. Chức năng, nhiệm vụ của tổ chức: theo Điều lệ tổ chức và hoạt động của tổ chức khoa học và công nghệ.

4. Ngành, nghề kinh doanh:

Số TT	Tên ngành nghề
1	- Kiểm tra, thử nghiệm và đánh giá chất lượng sản phẩm, hàng hoá và dịch vụ theo chỉ định của cơ quan quản lý Nhà nước có thẩm quyền;
2	- Kiểm định phương tiện đo trong phạm vi được công nhận;
3	- Hiệu chuẩn, kiểm tra và đánh giá các phương tiện đo, hệ thống đo;
4	- Chứng nhận sản phẩm, dịch vụ phù hợp tiêu chuẩn và các quy chuẩn kỹ thuật;
5	- Thử nghiệm, đánh giá, thẩm định chất lượng, kỹ thuật, vệ sinh, an toàn của sản phẩm, hàng hoá, dịch vụ, vật liệu, cấu kiện, dự án và công trình theo yêu cầu của các cơ quan quản lý, các doanh nghiệp, các tổ chức và cá nhân;
6	- Giám định thương mại;
7	- Khảo sát, đánh giá các điều kiện kỹ thuật, thực trạng công nghệ, chuyển giao công nghệ và an toàn công nghiệp, tư vấn và đánh giá chất lượng công trình xây dựng theo quy định: quan trắc, đánh giá tác động và thực trạng môi trường;

8	- Nghiên cứu, chế tạo và cung cấp các chuẩn đo lường, mẫu chuẩn và các phương tiện đo;
9	- Cung cấp dịch vụ bảo trì, bảo dưỡng và sửa chữa các phương tiện đo, thiết bị thử nghiệm, thiết bị kỹ thuật;
10	- Tổ chức thực hiện, nghiên cứu triển khai ứng dụng tiên bộ khoa học, công nghệ;
11	- Đào tạo, bồi dưỡng nghiệp vụ chuyên môn kỹ thuật về chất lượng, đo lường, thử nghiệm, chuyên giao công nghệ, các hệ thống quản lý, công cụ quản lý chất lượng và các nội dung có liên quan khác (Chỉ hoạt động sau khi được cơ quan có thẩm quyền cho phép).
12	- Chứng nhận hệ thống quản lý chất lượng hàng hóa, công trình phù hợp tiêu chuẩn và quy chuẩn kỹ thuật;
13	- Đánh giá quy trình hàn, quy trình kiểm tra hàn không phá hủy (NDT), kỹ năng thợ hàn;
14	- Kiểm tra an toàn công nghiệp, các loại máy, thiết bị, vật tư có yêu cầu về an toàn.

5. Tổng giá trị tài sản được giao quản lý và sử dụng tại thời điểm đăng ký kinh doanh: 24.486.372.888 (Hai mươi bốn tỷ bốn trăm tám mươi sáu triệu ba trăm bảy mươi hai nghìn tám trăm tám mươi tám đồng VN)

6. Tên cơ quan chủ quản: TỔNG CỤC TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG

Địa chỉ trụ sở chính: 8 Hoàng Quốc Việt, Quận Cầu Giấy, Hà Nội

7. Người đại diện theo pháp luật của tổ chức:

Chức danh: Giám đốc

Họ và tên: NGUYỄN CẢNH TÔI

Giới tính: (Nam)

Sinh ngày: 12/09/1954 Dân tộc: Kinh

Quốc tịch: Việt Nam

Chứng minh nhân dân (hoặc hộ chiếu) số: 011559290

Ngày cấp: 18/05/2007

Nơi cấp: Công an Tp Hà Nội

Nơi đăng ký hộ khẩu thường trú: Số 01, ngõ 235 Đặng Tiến Đông, phường Trung Liet, quận Đống Đa, Hà Nội

Chỗ ở hiện tại: Số 01, ngõ 235 Đặng Tiến Đông, phường Trung Liet, quận Đống Đa, Hà Nội

8. Tên, địa chỉ chi nhánh:

9. Tên, địa chỉ văn phòng đại diện:

TRƯỜNG PHÒNG



PHÓ TRƯỞNG PHÒNG

Nguyễn Tuấn Vinh

BỘ KHOA HỌC VÀ CÔNG NGHỆ CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
VĂN PHÒNG ĐỘC LẬP - TỰ DO - HẠNH PHÚC
CÔNG NHẬN CHẤT LƯỢNG

Số: 1044/QĐ-CNCL

Hà Nội, ngày 26 tháng 12 năm 2011.

QUYẾT ĐỊNH

VỀ VIỆC CÔNG NHẬN PHÒNG THÍ NGHIỆM

Decision on
Recognition of Laboratory

**GIÁM ĐỐC
VĂN PHÒNG CÔNG NHẬN CHẤT LƯỢNG**

- Căn cứ Luật Tiêu chuẩn và Quy chuẩn kỹ thuật ngày 30 tháng 6 năm 2006;
- Căn cứ Quyết định số 26/2007/QĐ-BKHHCN ngày 31 tháng 10 năm 2007 của Bộ trưởng Bộ Khoa học và Công nghệ về việc quy định tổ chức và hoạt động của Tổ chức công nhận;
- Căn cứ Quyết định số 1101/QĐ-TTg ngày 23/7/2009 của Thủ tướng Chính phủ về các tổ chức sự nghiệp thuộc bộ Khoa học và Công nghệ;
- Căn cứ Quyết định số 258/QĐ-BKHHCN ngày 16 tháng 02 năm 2011 về việc ban hành điều lệ Tổ chức và Hoạt động Văn phòng Công nhận Chất lượng;
- Theo đề nghị của Trung tâm Kỹ thuật Tiêu chuẩn Đo lường Chất lượng 1 và đề nghị của trường đoàn đánh giá PTN Điện - Điện tử.

QUYẾT ĐỊNH

Điều 1: Công nhận Phòng thí nghiệm:

TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 1

mang số hiệu **VILAS 028** với danh mục phép thử kèm theo quyết định này (phụ lục 01 ÷ phụ lục 07).

Điều 2: Phòng thí nghiệm được mang số hiệu: **VILAS 028**.

Điều 3: Phòng thí nghiệm được công nhận ở Điều 1 phải tuân thủ đầy đủ các yêu cầu về công nhận theo quy định hiện hành.

Điều 4: Quyết định này có hiệu lực đến ngày 06 tháng 5 năm 2014 và Phòng thí nghiệm sẽ chịu sự giám sát định kỳ mỗi năm một lần.

Điều 5: Quyết định này thay thế cho Quyết định số 288/QĐ-CNCL ngày 06/5/2011.

Nơi nhận:

- Cơ sở được đánh giá;
- HS đánh giá;
- Lưu VT, (3);



Nữ Xuân Thủy

PHỤ LỤC KÈM THEO

Quyết định số 1044/QĐ-CNCL ngày 26 tháng 12 năm 2011

1. Phụ lục 1: Phòng thử nghiệm Điện, điện tử.
2. Phụ lục 2: Phòng thử nghiệm Thực phẩm.
3. Phụ lục 3: Phòng thử nghiệm Môi trường và hóa chất.
4. Phụ lục 4: Phòng thử nghiệm Xăng, dầu, khí.
5. Phụ lục 5: Phòng thử nghiệm Cơ khí và vật liệu xây dựng.
6. Phụ lục 6: Phòng thử nghiệm Hàng tiêu dùng.
7. Phụ lục 7: Phòng thử nghiệm Không phá hủy và an toàn công nghiệp.



BỘ KHOA HỌC VÀ CÔNG NGHỆ
VĂN PHÒNG CÔNG NHẬN CHẤT LƯỢNG

MINISTRY OF SCIENCE AND TECHNOLOGY
BUREAU OF ACCREDITATION (BoA)



Member of ILAC/APLAC MRA

CHỨNG CHỈ CÔNG NHẬN *Certificate of Accreditation*

Phòng thí nghiệm: TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 1

Laboratory: QUALITY ASSURANCE AND TESTING CENTER 1

Địa điểm PTN/ Lab location:

Số 8 Hoàng Quốc Việt, Cầu Giấy, Hà Nội

đã được đánh giá và phù hợp với các yêu cầu của
has been assessed and found to conform with the requirements of

ISO/IEC 17025: 2005

Lĩnh vực công nhận
Field of Accreditation

ĐIỆN - ĐIỆN TỬ, HÓA, SINH, CƠ, VẬT LIỆU XÂY DỰNG, NDT
Electrical-Electronic, Chemical, Biological, Mechanical, Civil-Engineering, NDT

Mã số
Accreditation No

VILAS 028

GIAM ĐỐC
VĂN PHÒNG CÔNG NHẬN CHẤT LƯỢNG
(Director of Bureau of Accreditation)



VŨ XUÂN THỦY

Ngày/Date of issue: 26/12/2011 (Annex of decision: 1644/QĐ-CNCL dated 26/12/2011)

Hiệu lực công nhận/Period of Validation: up to 06/5/2014.

Hiệu lực lần đầu/ Beginning of accreditation: 06/5/2011.

QUALITY ASSURANCE AND TESTING CENTER 1

Capacity Profile

Chemical-Environmental Laboratory

Address: No. 8 Hoang Quoc Viet st., Cau Giay, Ha Noi

Tell: 04.38361397

Fax: 04. 38361199

Email: Testlab5@quatest1.com.vn website: <http://www.quatest1.com.vn>

Ha Noi, 2012

I. Introduction

- Chemical-Environmental Laboratory was established by decision no. 239/TCCB-QĐ of Directorate for Standards and Quality in 15/09/1994.
- Chemical-Environmental Laboratory was accredited with TCVN (ISO/IEC) 17025, VILAS No. 028.
- Chemical-Environmental Laboratory has functions:
 - + Environmental impact assessment
 - + Environmental consultant
 - + Design and setting up pollutions treatment system
 - + Environmental monitoring and analysis (in air, water, soil and sediment):
 - Trace heavy metals
 - Physical and chemical parameters
 - Organic pesticides (Chlorinated pesticides, Phosphorus pesticides, carbamate..)
 - Phenols
 - PCBs
 - PAHs
 - VOCs and semi-VOCs
 - Bacterial count
 - Chemicals and fertilizers
 - Analysis of hazardous substances in electric and electronic products
 - Analyst training

II. List of labor

No.	Full name	Position	Degree	Graduated school
1	Nguyen Ngoc Cham	Head of Lab.	Master of Environmental Technology	Hanoi University of Science and Technology
2	Cao Lam Giang	Analyst	Bachelor of Environmental Technology	Vietnam National University, Ha Noi
3	Dang Viet Lam	Analyst	Master of Environmental and Bio-Technology	Myong-Ji, Korea
4	Hoang Thu Thuy	Analyst	Master of Chemist	Vietnam National University, Ha Noi
5	Nguyen The Hao	Analyst	Bachelor of Chemist	Vietnam National University, Ha Noi
6	Vu Thi Thu Huong	Analyst	Bachelor of Chemist	Vietnam National University, Ha Noi
7	Tran Van Hung	Analyst	Bachelor of Environmental Technology	Hanoi University of Science and Technology
8	Pham Le Nguyen	Analyst	Engineer of Physics	Hanoi University of Mining and Geology

III. Main equipments

No.	Name of Equipment	Country	Actual status
1	Gas chromatography – Mass spectrometry (GC-MS)	Agilent, US	Good
2	Gas chromatography Shimadzu 2010 Plus(GC/FID,ECD)	Shimadzu, Japan	Good
3	Trace-GC (thermo Finigant)	Thermo, US	Good
4	Liquid Chromatography Shimadzu (LC 10A, 20A)	Shimadzu, Japan	Good
5	Inductively coupled plasma mass spectrometry (ICP-MS)	Agilent, US	Good
6	Atomic Absorption Spectrophotometric (AAS)	Zeenit,	Good
7	BOD5 analyser	Velp, Italy	Good
8	Total organic carbon analyser (TOC)	Shimadzu, Japan	Good
9	Hack set for sample preparation	Hack, US	Good
10	Ultraviolet spectrophotometer (UV)	Shimadzu, Japan	Good
11	Ultraviolet-visible spectrophotometer(UV-VIS)	Shimadzu, Japan	Good
12	Water distiller	England	Good
13	Quick analyser in field	US	Good
14	Set for bacterial count (Autoclave, laminar flow cabinet,incubator)	-	Good
15	Other laboratory instruments	-	Good
16	Samplers (Air, waters, soils, sediments)	US	Good

IV. List of completed and implemented work

No.	Name of customer	Sample type	Sample quantity	Sample parameters
1	Viet Nam Environment administration (since 1996 up to now)	Ambient air	100/year	Dust, NO ₂ , SO ₂ , CO
		Surface water	20/year	To, pH, DO, Conductivity, BOD ₅ , COD, TSS, As, Pb, Cd, Hg, Phenols, Oils and greases, PAHs,
		Sediment	6/year	Pb, As, Cd, Hg, Pesticides, PAHs, PCBs
		Acid rain	1000/year	pH, Conductivity, K ⁺ , Na ⁺ , Ca ²⁺ , Mg ²⁺ , NH ⁴⁺ , Cl ⁻ , F ⁻ , NO ₂ ⁻ , NO ₃ ⁻ , SO ₄ ²⁻ , Br
2	Northern geological division	Waters	200/year	BOD ₅ , COD, TSS, Pb, Cd, Hg, As, Phenols, CN, Organo chlorinated pesticides.
3	Ha Noi department of natural resources and environment	Waste water and surface water	150/year	T ^o , pH, DO, , BOD, COD, TSS, Pb, As, Cd, Hg, Phenols, CN, Oils and greases, total N, total P, total coliform, PAHs.
4	Hai Phong department of natural resources and environment	Water		Hardness, As, Fe, Hg, Cr, Mn, CN, Phenol, pesticides.
		Air		CO, SO ₂ NO _x , dust
5	Coca-cola VietNam co.,ltd	Water		T ^o , pH, DO, COD, SS, TDS, NH ₄ , Cl ₂ , Pb, Cr, total N, total P, Fe, surface-active substances, Oils and greases.

		Air		CO, SO ₂ NO _x , dust
6	Bong Mieu Gold miner company	Waste water		CN, BOD ₅ , COD, SS, Phenol
		Air		CO, CO ₂ , NO _x , SO ₂ , dust
7	Viet Nam SHOWA auto parts Co.,Ltd	Waste gas	10/year	VOCs, CO, NO _x , dust, CO ₂ , SO ₂
		Ambient air	4/year	T ^o , Humidity, Wind speed, Noise level, VOCs, CO, NO _x , dust, CO ₂ , SO ₂ .
		Tap water	4/year	pH, DO, Conductivity, BOD ₅ , COD, SS, Pb, As, Cd, Hg.
		Waste water	100/year	33 parameter belong to QCVN 40: 2011/BTNMT
8	Van Cuong Construction United Co. Ltd	Ambient air and Noise	50/year	Dust, noise level, CO, NO _x , SO ₂
		Surface water	50/year	T ^o , Conductivity, pH, DO, TSS, BOD ₅ , COD, oils and greases, Coliform, Pb, As, Hg, Cd.
9	Soil research institute	Soil		PCBs, CN, Organo phosphorus pesticides, Tetrachlorethylene, Trichlorethylene, Dichloromethane, Carbontetrachloride, 1,2-Dichloroethane, 1,1-Dichloroethane...
10	Soils and Fertilizers Institute	Gas		CH ₄
11	Nghe An	Soil		Pb, Cd, Hg, As, pesticides.

	Monitoring and Environmental technology center	Surface water		T ^o , pH, Conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs, pesticides.
12	Hung Yen department of natural resources and environment	Soil		Pb, Cd, Hg, As, pesticides.
		Surface water		T ^o , pH, Conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs, pesticides.
13	Bureau Veritas VietNam LTD	Waste gas		CO, SO ₂ , NO _x , hydrocarbon.
		Waste water		pH, BOD ₅ , COD, TSS, Pb, Cu, Co, Ni, Zn, Sn, Se, Hg, mineral oils, total N, total P, NH ₄ , Phenol, Cl ⁻ , DO, Tetrachlorethylene, Tetrachloethylene
14	Daiwa plastics thanglong Co.Ltd.	Waste water	12/year	33 parameter belong to QCVN 40: 2011/BTNMT
		Soil		Pb, Cd, Hg, As, OPs, OPs.
		Surface water	4/year	T ^o , pH, conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs, pesticides.
		Waste gas	10/year	VOCs, CO, NO _x , dust, CO ₂ , SO ₂
15	Vietnam Academy of Science and Technology	Gas		CH ₄ , C ₂ H ₂ , CO ₂ , H ₂ S, NH ₃

16	Ha Tinh Monitoring and Environmental technology center	Soil		Pb, Cd, Hg, As, pesticides.
		Surface water		T ^o , pH, Conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs, pesticides.
17	Sai Son Cement Joint Stock Company	Gas	10/year	CO, CO ₂ , SO ₂ , NO _x , dust
		Water	6/year	T ^o , pH, Conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs, pesticides.
18	Vicem Bimson Cement Joint Stock Company	Gas	50/year	CO, CO ₂ , SO ₂ , NO _x , dust
		Water	10/year	T ^o , pH, Conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs
19	Nippon paint Vietnam Co.Ltd	Gas	20/year	CO, CO ₂ , SO ₂ , NO _x , Bụi, Xylen, Toluene, Benzen, Ethylacetate, Acetone
		Water	4/year	T ^o , pH, Conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs
20	Viet Hung float glasses Company	Gas	50/year	CO, CO ₂ , SO ₂ , NO _x , dust
		Water	10/year	T ^o , pH, Conductivity, DO, COD, BOD ₅ , SS, CN, phenol, Oils and greases, PAHs
21	Thăng Long Industrial Park and about 50 Japan company (Showa, Ohara, Nippon koatsu, Atsumitec	Gas	30/month	CO, CO ₂ , SO ₂ , NO _x , dust, Temp., wind speed, Humidity, VOCs.
		Waste water	50/month	33 parameter belong to QCVN 40: 2011/BTNMT
		Surface water	60/year	33 parameter belong to QCVN

	VN, Toho, TOTO, Dragon, Enplas VN, Kai VN, Ikeuchi VN, FCC VN, Eiwo VN, Seed VN, Kyb VN, Mitsubishi VN, Fujikin VN, Rional VNm Toa VN, Sakurai VN, Paker VN, Hoya VN, Sato VN, Sumi nacco, Sumi heavy, Alpha, Aikawa, MHI, Yasufuku, Nittodenko, Hanoi stell, Yabashi, Chioda, Kane package, Santomas, Toshiba, Daiwa, Kom, Kanayama, Hov, Noda, Seiko, Sanko, Toyoda, Yamaha)	Tap water	8/year	40: 2011/BTNMT 14 parameter belong to QCVN 02: 2009/BYT
22	Noi Bai Industrial Park	Gas		CO, CO ₂ , SO ₂ , NO _x , dust, Temp., wind speed, Humidity.
		Waste water		33 parameter belong to QCVN 40: 2011/BTNMT
23	Honda Viet Nam Company	Ambient Air	100/year	QCVN 05, 06: 2009/BTNMT
		Waste gas		QCVN 19, 20: 2009/BTNMT and QCVN 30: 2010/BNTMT

		Waste water	60/year	33 parameter belong to QCVN 40: 2011/BTNMT and 11 parameter belong to QCVN 14: 2008/BTNMT
		Surface water	4/year	32 parameter belong to QCVN 08: 2008/BTNMT
		Tap water	12/year	14 parameter belong to QCVN 02: 2009/BYT
24	Vinh Phuc department of natural resources and environment	Air, Surface water and waste water		
25	Thai Nguyen department of natural resources and environment	Cau river water		

Ha Noi, 10th September, 2012

Head of Chemical-Environmental Laboratory

Nguyen Ngoc Cham

Quality Assurance and Testing Center (QUATEST) - 3 in Ho Chi Minh

**List of Laboratory Certifications
of Quality Assurance and Testing Center 3**

No	Name of Documents		Issued Authorities
	Vietnamese Name	English Name	
01	Giấy chứng nhận đăng ký kinh doanh	Business Registration	Investment & Planning Department - HNPC
02	Quyết định về việc công nhận phòng thí nghiệm	Decision on Recognition of Laboratory	Ministry of Science and Technology
03	Chứng chỉ công nhận	Certificate of Accreditation	Ministry of Science and Technology
04	Hồ sơ năng lực phòng thử nghiệm Hóa – Môi trường	Capability Profile of Chemical – Environmental Laboratory	Quality Assurance and Testing Center 3

Departure of Planning and Investment

SỞ KẾ HOẠCH VÀ ĐẦU TƯ
THÀNH PHỐ HỒ CHÍ MINH
PHÒNG ĐĂNG KÝ KINH DOANH

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Business Registration and Tax Registration Certificate

GIẤY CHỨNG NHẬN ĐĂNG KÝ KINH DOANH VÀ ĐĂNG KÝ THUẾ
TỔ CHỨC KHOA HỌC CÔNG NGHỆ
Số: **0301281040**

Đăng ký lần đầu, ngày 23 tháng 07 năm 2007, Số ĐKKD: 4109000001
Đăng ký thay đổi lần thứ: 2, ngày 24 tháng 12 năm 2009

1. Tên Tổ chức khoa học và công nghệ **TRUNG TÂM KỸ THUẬT TIÊU CHUẨN
ĐO LƯỜNG CHẤT LƯỢNG 3**
viết bằng tiếng Việt:

Tên Tổ chức khoa học và công nghệ **QUALITY ASSURANCE AND TESTING
CENTER 3 (QUATEST 3)**
viết bằng tiếng nước ngoài:

Tên Tổ chức khoa học và công nghệ **TRUNG TÂM KỸ THUẬT 3**
viết tắt:

2. Địa chỉ trụ sở chính: **49 Pasteur, Phường Nguyễn Thái Bình, Quận 1**

Điện thoại: **84.8.8294274** Fax: **84.8.8293012**

3. Chức năng, nhiệm vụ của tổ chức theo Điều lệ tổ chức và hoạt động của tổ chức khoa học và công nghệ

4. Ngành, nghề kinh doanh: *Dịch vụ hiệu chuẩn, kiểm tra và đánh giá các phương tiện đo, hệ thống đo. Dịch vụ bảo trì, bảo dưỡng và sửa chữa các phương tiện đo, thiết bị thử nghiệm, thiết bị kỹ thuật. Các dịch vụ chứng nhận sản phẩm, dịch vụ, công trình xây dựng phù hợp tiêu chuẩn và quy chuẩn kỹ thuật. Các dịch vụ thử nghiệm, đánh giá, thẩm định chất lượng, kỹ thuật, vệ sinh, an toàn của sản phẩm, hàng hóa, dịch vụ, vật liệu, cấu kiện. Giám định sản phẩm, hàng hóa, dịch vụ. Kiểm định an toàn công nghiệp. Khảo sát, quan trắc, đánh giá tác động và thực trạng môi trường. Kiểm toán năng lượng. Khảo sát, đánh giá các điều kiện kỹ thuật, thực trạng công nghệ. Giám định công nghệ các dự án đầu tư thiết bị công nghệ, chuyển giao công nghệ và môi giới đổi mới công nghệ. Kiểm định chất lượng công trình xây dựng. Sản xuất, kinh doanh chuẩn đo lường, chất chuẩn, thiết bị, phương tiện đo lường và kiểm nghiệm. Dịch vụ tư vấn lập các dự án đầu tư và trang bị phòng thí nghiệm. Dịch vụ tư vấn áp dụng các hệ thống quản lý, các công cụ quản lý chất lượng và giải pháp kỹ thuật nhằm cải tiến và nâng cao năng suất, chất lượng của sản phẩm, dịch vụ. Dịch vụ tổ chức thực hiện, nghiên cứu triển khai ứng dụng tiến bộ khoa học, công nghệ. Dịch vụ tư vấn về các giải pháp sử dụng năng lượng hợp lý. Dịch vụ đào tạo bồi dưỡng về chuyên môn, nghiệp vụ tiêu chuẩn, đo lường chất lượng, thử nghiệm, chuyển giao công nghệ, các hệ thống quản lý, công cụ cải tiến năng suất chất lượng và các nội dung khác có liên quan. Dịch vụ ứng dụng kỹ thuật mã số, mã vạch. Dịch vụ phát hành tiêu chuẩn và các tài liệu có liên quan đến tiêu chuẩn, đo lường, chất lượng. Dạy nghề. Giáo dục nghề nghiệp.*

(Doanh nghiệp phải thực hiện theo đúng những quy định của pháp luật)



5. Tổng giá trị tài sản được giao quản lý và sử dụng tại thời điểm đăng ký kinh doanh : 144.201.523.534 đ (Một trăm bốn mươi bốn tỷ hai trăm lẻ một triệu năm trăm hai mươi ba nghìn năm trăm ba mươi bốn đồng).

6. Tên cơ quan chủ quản: **TỔNG CỤC TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG**

Địa chỉ trụ sở chính: *Số 8 Hoàng Quốc Việt, Quận Cầu Giấy, TP Hà Nội*

Điện thoại : 04.7911606

Fax : 04.7911595

Email : *vptdc@tcvn.gov.vn*

Website : *www.tcvn.gov.vn*

7. Người đại diện theo pháp luật của tổ chức:

Chức danh : *Giám đốc*

Họ và tên : **TRẦN VĂN DŨNG**

(*Nam*)

Sinh ngày: *20/02/1954* Dân tộc: *Kinh* Quốc tịch: *Việt Nam*

Chứng minh nhân dân (Hộ chiếu): *020074819*

Ngày cấp : *13/07/2005* Nơi cấp : *CA Tp Hồ Chí Minh*

Nơi đăng ký hộ khẩu thường trú : *168B Võ Thị Sáu, Phường 8, Quận 3, TPHCM*

Chỗ ở hiện tại : *168B Võ Thị Sáu, Phường 8, Quận 3, TPHCM*

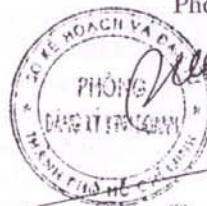
Chữ ký:



TRƯỞNG PHÒNG

(*ký, đóng dấu và ghi rõ họ tên*)

Phó Trưởng Phòng



Lâm Thị Thu Cúc

Ministry of Science and Technology
Bureau of Accreditation

BỘ KHOA HỌC VÀ CÔNG NGHỆ CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
VĂN PHÒNG ĐỘC LẬP - TỰ DO - HẠNH PHÚC
CÔNG NHẬN CHẤT LƯỢNG

Số: 103.2012/QĐ-VPCNCL

Hà Nội, ngày 09 tháng 5 năm 2012.

QUYẾT ĐỊNH Decision on Recognition of Laboratory

VỀ VIỆC CÔNG NHẬN PHÒNG THÍ NGHIỆM

GIÁM ĐỐC
VĂN PHÒNG CÔNG NHẬN CHẤT LƯỢNG

- Căn cứ Luật Tiêu chuẩn và Quy chuẩn kỹ thuật ngày 30 tháng 6 năm 2006;
- Căn cứ Quyết định số 26/2007/QĐ-BKHHCN ngày 31 tháng 10 năm 2007 của Bộ trưởng Bộ Khoa học và Công nghệ về việc qui định tổ chức và hoạt động của Tổ chức công nhận;
- Căn cứ Quyết định số 1101/QĐ-TTg ngày 23/7/2009 của Thủ tướng Chính phủ về các tổ chức sự nghiệp thuộc bộ Khoa học và Công nghệ;
- Căn cứ Quyết định số 258/QĐ-BKHHCN ngày 16 tháng 02 năm 2011 về việc ban hành điều lệ Tổ chức và Hoạt động Văn phòng Công nhận Chất lượng;
- Theo đề nghị của Đoàn chuyên gia đánh giá và Ban thẩm xét.

QUYẾT ĐỊNH

Điều 1: Công nhận Phòng thí nghiệm:

TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 3
PHÒNG THỬ NGHIỆM MÔI TRƯỜNG

mang số hiệu **VILAS 004** với danh mục phép thử kèm theo quyết định này.

Điều 2: Phòng thí nghiệm được mang số hiệu: **VILAS 004**.

Điều 3: Phòng thí nghiệm được công nhận ở Điều 1 phải tuân thủ đầy đủ các yêu cầu về công nhận theo quy định hiện hành.

Điều 4: Quyết định này có hiệu lực đến ngày 09 tháng 5 năm 2015 và Phòng thí nghiệm sẽ chịu sự giám sát định kỳ mỗi năm một lần.

Nơi nhận:

- Cơ sở được đánh giá;
- HS đánh giá;
- Lưu VT, (3);



Nữ Xuân Thủy



PHỤ LỤC

ATTACHMENT

(Kèm theo quyết định số: 103.2012/QĐ - VPCNCL ngày 09 tháng 05 năm 2012 của giám đốc Văn phòng Công nhận Chất lượng)

Tên phòng thí nghiệm: **Trung tâm Kỹ thuật Tiêu chuẩn Đo lường Chất lượng 3**
Phòng thử nghiệm Môi trường

Laboratory: **Quality Assurance and Testing Center 3**
Environmental Testing Laboratory

Cơ quan chủ quản: **Tổng cục Tiêu chuẩn Đo lường Chất lượng**

Organization: **Directorate for Standards, Metrology and Quality**

Lĩnh vực thử nghiệm: **Hóa**

Field of testing: **Chemical**

Người phụ trách/ Representative: **Trần Văn Dũng**

Người có thẩm quyền ký/ Approved signatory:

TT	Họ và tên	Phạm vi
1.	Trần Văn Dũng	Các phép thử công nhận của Phòng thử nghiệm Môi trường/ <i>Accredited tests of Environmental Testing Laboratory</i>
2.	Đình Văn Trữ	
3.	Hoàng Lâm	
4.	Trần Thị Mỹ Hiền	
5.	Lương Thanh Uyên	
6.	Phan Thành Trung	
7.	Nguyễn Văn Phú	

Số hiệu/ Code: **VILAS 004**

Địa chỉ/ Address: **7 đường 1, Khu công nghiệp Biên Hoà 1, Đồng Nai**

Địa điểm/Location: **7 đường 1, Khu công nghiệp Biên Hoà 1, Đồng Nai**

Điện thoại/ Tel: **(84-61) 383 6212**

Fax: **(84-61) 383 6298**

E-mail: **qt-kythuattn@quatest3.com.vn**

Website: **www.quatest3.com.vn**

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

Lĩnh vực thử nghiệm: Hoá

Field of test: Chemical

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có)/ Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
1.	Nước uống, nước khoáng đóng chai, nước ngầm, nước cấp nồi hơi <i>Drinking water, mineral water, under ground water, water for boiler</i>	Độ pH <i>pH value</i>	2 ~ 14	SMEWW 2005 (4500 – H ⁺) TCVN 6492:2011
2.		Độ trong Dienert <i>Clarity</i>	(0 ~ 100) cm	TCVN 5501:1991
3.		Độ đục <i>Turbidity</i>	(1 ~ 10000) NTU	SMEWW 2005 (2130 B)
4.		Xác định tổng hàm lượng cặn lơ lửng (qua lọc max 2,0 µm) <i>Determination of total suspended solids (TSS, max 2.0 µm filter) content</i>	5 mg/L	SMEWW 2005 (2540 D) TCVN 6625:2000
5.		Xác định hàm lượng oxy hoà tan <i>Determination of dissolved oxygen (DO) content</i>	0,5 mg /L	SMEWW 2005 (4500 – O C)
6.		Xác định hàm lượng clorua (Cl ⁻) <i>Determination of Chloride content</i>	0,7 mg /L	SMEWW 2005 (4110 C)
7.		Xác định hàm lượng nitrit (NO ₂ ⁻) <i>Determination of Nitrite content</i>	0,7 mg/L	SMEWW 2005 (4110 C)
8.		Xác định hàm lượng sulfat (SO ₄ ²⁻) <i>Determination of Sulphate content</i>	4,0 mg/L	SMEWW 2005 (4110 C)
9.		Bicarbonate (HCO ₃ ⁻) <i>Bicarbonate content</i>	5,0 mg/L	SMEWW 2005 (2320 B)
10.		Xác định hàm lượng thủy ngân (Hg) <i>Determination of Mercury content</i>	0,3 µg/L (1,0 ~ 15,0) µg/L	SMEWW 2005 (3112 B)

AFL 01.09

Lần ban hành: 5.10

Trang: 2/10

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN


LIST OF ACCREDITED TESTS

VILAS 004

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có) Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
11.		Xác định hàm lượng arsen, antimon, selen <i>Determination of arsenic, antimonium, selenium content (As, Sb, Se)</i>	0,3 µg/L (0,50 ~ 15,0) µg/L	SMEWW 2005 (3114 C)
12.	Nước uống, nước khoáng đóng chai, nước ngầm, nước cấp nồi hơi <i>Drinking water, mineral water, under ground water, water for boiler</i>	Xác định hàm lượng các kim loại <i>Determination of metals content (Al, Ag, Ba, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sn, Zn, Na, K, Si)</i>	Al: 0,05 mg/L Ba: 0,01 mg/L Bo: 0,01 mg/L Be: 0,01 mg/L Cd: 0,002 mg/L Ca: 0,05 mg/L Cr: 0,01 mg/L Co: 0,005 mg/L Cu: 0,01 mg/L Fe: 0,01 mg/L Pb: 0,005 mg/L Mg: 0,05 mg/L Mn: 0,05 mg/L Mo: 0,01 mg/L K: 0,10 mg/L Si: 0,05 mg/L Ni: 0,001 mg/L Na: 0,050 mg/L Sr: 0,05 mg/L V: 0,01 mg/L Zn: 0,01 mg/L	SMEWW 2005 (3120 B)
13.		Độ dẫn điện ở 20 °C <i>Conductivity at 20 °C</i>	1 µS/cm	SMEWW 2005 (2510 B)
14.		Dư lượng phenol <i>Phenol Residues in clear water</i>	1,0 µg/L (2,0 ~ 200) µg/L	QTTN/KT3 035:2005
15.		Xác định hàm lượng photphat (PO ₄ ³⁻) <i>Determination of Phosphate content</i>	0,7 mg/L	SMEWW 2005 (4110 C)

 AFL 01.09

Lần ban hành: 5.10

Trang: 3/10 

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có)/ Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
16.	Nước uống, nước khoáng đóng chai, nước ngầm <i>Drinking water, mineral water, under ground water</i>	Hoạt độ phóng xạ tổng alpha và tổng beta trong nước <i>Gross activitive for alpha and beta in water</i>	Alpha: 0,1 Bq/L Beta: 1,0 Bq/L	QTTN/KT3 072:2011
17.	Nước uống, nước khoáng đóng chai, nước ngầm <i>Drinking water, mineral water, under ground water</i>	Dư lượng thuốc trừ sâu họ clo hữu cơ (Aldrin, HCB, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Dieldrin, α - Endosulfan, β - Endosulfan, Endosulfan-sulfate, Endrin, α - HCH, β - HCH, γ - HCH, δ - HCH, heptachlor, Heptachlor-epoxide, Methoxychlor) <i>Organochlorine pesticide residues</i>	0,5 μ g/L	SMEWW 2005 (6630 B)
18.		Dư lượng thuốc trừ sâu họ lân hữu cơ (Acephate, Fenthion, Diazinon, Dimethoate, Chlorpyrifos, Chlorpyrifos-methyl, Parathion, Parathion-methyl, Fenitrothion, Malathion, Methidathion) <i>Organophosphorus pesticide residues</i>	1,0 μ g/L	SMEWW 2005 (6630 B)
19.		Dư lượng thuốc trừ sâu họ carbamate (Aldicarb sulfoxide, Aldicarb sulfone, Oxamyl, Methomyl, Aldicarb, Propuxur, Carbofuran, Carbaryl, Methiocarb, Isoprocarb, Fenobucarb, Carbendazim, Imidachloride, Thiabendazole) <i>Carbamate pesticide residues</i>	2,0 μ g/L	SMEWW 2005 (6610 B)
20.		Dư lượng thuốc trừ cỏ (2,4-D, 2,4,5-T, 2,4-DB, 2,4-DP, MCPA, MCPP, (Mecoprop), 2,4,5-TP (Fenopro)) <i>Herbicide residues</i>	2,0 μ g/L	SMEWW 2005 (6640 B)

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có)/ Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
21.	Nước uống, nước khoáng đóng chai, nước ngầm <i>Drinking water, mineral water, under ground water</i>	Dư lượng thuốc trừ sâu cúc tổng hợp (Permethrin, Cypermethrin, Fenvalerate, Deltamethrin) <i>Pyrethroid pesticide residues</i>	5,0 µg/L	SMEWW 2005 (6630 B)
22.		Xác định chỉ số Pemanganat <i>Determination of Permanganate index</i>	1 mg /L	TCVN 6186:1996
23.		Độ pH <i>pH value</i>	2 ~ 14	TCVN 6492:2011
24.		Vàng dầu mỡ và màu bằng mắt thường <i>Film of oil and color (visual)</i>	-	TCVN 4506:1987
25.	Nước dùng cho vữa và bê tông	Xác định tổng hàm lượng cặn lơ lửng <i>Determination of total suspended solids (TSS) content</i>	5,0 mg/L	TCVN 6625:2000
26.		Xác định hàm lượng sulfat (SO ₄ ²⁻) <i>Determination of Sulphate content</i>	20,0 mg/L	TCVN 6200:1996
27.		Xác định hàm lượng clorua (Cl ⁻) <i>Determination of Chloride content</i>	5,0 mg /L	TCVN 6194:1996
28.		Xác định chỉ số Pemanganat <i>Determination of Permanganate index</i>	1 mg /L	TCVN 6186:1996
29.		Xác định hàm lượng muối hoà tan <i>Determination of total dissolved solids content</i>	1,0 mg/L	TCVN 4560:1988
30.		Độ pH <i>pH value</i>	2 ~ 14	SMEWW 2005 (4500 - H ⁺) TCVN 6492:2011
31.	Nước thải, nước sông <i>Waste water, river water</i>	Xác định tổng hàm lượng cặn lơ lửng (qua lọc max 2,0 µm) <i>Determination of total suspended solids (TSS, max 2.0 µm filter) content</i>	5,0 mg/L	SMEWW 2005 (2540 D) TCVN 6625:2000
32.		Xác định hàm lượng cặn toàn phần (sấy ở 105 °C) <i>Determination of total solid matters (dried at 105 °C) content</i>	5,0 mg/L	SMEWW 2005 (2540 B)

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có)/ Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
33.	Nước thải, nước sông <i>Waste water, river water</i>	Xác định hàm lượng chất rắn dễ bay hơi <i>Determination of volatile Solids (VS) content</i>	5,0 mg/L	SMEWW 2005 (2540 E)
34.		Xác định độ cứng toàn phần <i>Determination of total hardness</i>	1,6 mg/L	SMEWW 2005 (2340 C)
35.		Xác định độ kiềm tổng <i>Determination of total alkalinity</i>	20 mg/L	SMEWW 2005 (2320 B)
36.		Xác định hàm lượng dầu, mỡ tổng <i>Determination of total oil & grease content</i>	1,4 mg/L	SMEWW 2005 (5520 B)
37.		Xác định hàm lượng sulfat (SO ₄ ²⁻) <i>Determination of Sulphate content</i>	20,0 mg/L	TCVN 6200:1996
38.		Xác định hàm lượng clorua (Cl ⁻) <i>Determination of Chloride content</i>	5,0 mg /L	TCVN 6194:1996
39.		Xác định hàm lượng photpho tổng số <i>Determination of total phosphorus content</i>	0,3 mg/L	SMEWW 2005 (4500-P B & E)
40.		Xác định nhu cầu oxy sinh hóa sau 5 ngày (BOD ₅) <i>Determination of biochemical oxygen demand (BOD₅)</i>	10 mg/L	TCVN 6001:1995 SMEWW 2005 (5210 B)
41.		Xác định hàm lượng thủy ngân (Hg) <i>Determination of mercury content</i>	1,0 µg/L	SMEWW 2005 (3112 B)
42.		Xác định hàm lượng oxy hòa tan <i>Determination of dissolved oxygen (DO)</i>	1 mg/L	SMEWW 2005 (4500 – O C)
43.		Xác định nhu cầu oxy hóa học (COD) <i>Determination of chemical oxygen demand (COD)</i>	5 mg Oxy/L	SMEWW 2005 (5220 D)
44.		Xác định hàm lượng asen, antimon, selen <i>Determination of arsenic, antimonium, selenium content (As, Sb, Se) content</i>	1,0 µg/L	SMEWW 2005 (3114 C)

AFL 01.09

Lần ban hành: 5.10

Trang: 6/10

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có)/ Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
45.	Nước thải, nước sông <i>Waste water, river water</i>	Xác định hàm lượng các kim. loại <i>Determination of metals content</i> (Al, Ag, Ba, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Ni, Pb, Sn, Zn, Na, K, Si, Tl).	Al: 0,05 mg/L Be: 0,05 mg/L Ca: 0,05 mg/L Cr: 0,05 mg/L Cu: 0,05 mg/L Fe: 0,05 mg/L Mn: 0,05 mg/L Mo: 0,05 mg/L Ni: 0,05 mg/L Sr: 0,05 mg/L V: 0,05 mg/L Zn: 0,05 mg/L K: 0,1 mg/L Si: 0,1 mg/L Mg: 0,1 mg/L Na: 0,1 mg/L Bo: 0,2 mg/L Pb: 0,02 mg/L Tl : 0,02 mg/L Co: 0,02 mg/L Ba: 0,02 mg/L Cd: 0,05 mg/L	SMEWW 2005 (3120 B)
46.	Rau, trái cây <i>Vegetable, fruit</i>	Dư lượng thuốc trừ sâu họ lân hữu cơ (Acephate, Diazinon, Dimethoate, Chlorpyrifos, Chlorpyrifos-methyl, Malathion, Methidathion) Organophosphorus pesticide residues	10,0 µg/kg	QTTN/KT3 080: 2012
		Dư lượng thuốc trừ sâu họ lân hữu cơ (Fenthion, Parathion, Parathion-methyl, Fenitrothion, Hexaconazole Difenoconazole, Proniconazole Terbuconazole) <i>Organophosphorus pesticide residues</i>	50,0 µg/kg	

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

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47.	Rau, trái cây <i>Vegetable, fruit</i>	Dư lượng thuốc trừ cỏ. (2,4-D, 2,4,5-T, 2,4-DB, 2,4-DP, MCPA, MCPP, (Mecoprop), 2,4,5-TP (Fenopro)) <i>Herbicide residues</i>	10,0 µg/kg	QTTN/KT3 079: 2011
48.		Dư lượng Carbamate (Aldicarb sulfoxide, Aldicarb sulfone, Oxamyl, Methomyl, Aldicarb, Propuxur, Carbofuran, Carbaryl, Methiocarb, Isoprocarb, Fenobucarb, Carbendazim, Imidachloride, Thiabendazole) <i>Carbamate residues</i>	10,0 µg/kg	QTTN/KT3 066:2010
49.		Dư lượng Dithiocarbamates <i>Dithiocarbamates residues</i>	100 µg/kg (0,01 ~ 10,0) mg/kg	QTTN/KT3 059:2009
50.		Dư lượng thuốc trừ sâu cúc tổng hợp (Lamda-Cyhalothrin, Cypermethrin, Permethrin, Deltamethrin, Fenvalerate) <i>Pyrethroid pesticide residues</i>	(50 ~ 100,0) µg/kg	QTTN/KT3 065:2011 (GC/MS) QTTN/KT3 067:2011 (GC/ECD)
51.		Dư lượng thuốc trừ sâu họ clo hữu cơ (Aldrin, HCB, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Dieldrin, α - Endosulfan, β - Endosulfan, Endosulfan-sulfate, Endrin, α - HCH, β - HCH, γ - HCH, δ - HCH, heptachlor, Heptachlor-epoxide, Methoxychlor) <i>Organochlorine pesticide residues</i>	10.0 µg/kg	QTTN /KT3 067:2011
52.	Vải, vật liệu dệt may, da <i>Textile and textile material, leather</i>	Màu Azodyes <i>Azo dyestuffs</i>	4,0 mg/kg	LFGB § 64 BVL 82-02-2/3/4 TCVN 7619-1/2
53.	Vải <i>Textile</i>	Xác định hàm lượng formaldehyde <i>Determination of formaldehyde content</i>	3,6 mg/kg (12,0 ~ 250,0) mg/kg	ISO 14184 – 1 : 1998 TCVN 7421 – 1 : 2004

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có)/ Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
54.	Da <i>Leather</i>	Xác định hàm lượng formaldehyde (sắc kí lỏng) <i>Determination of formaldehyde content (HPLC)</i>	0,3 mg/kg	DIN EN ISO 17226 – 1 : 2008
55.		Xác định hàm lượng Crom (VI) <i>Determination of Crome (VI) content</i>	3 mg/kg	ISO 17075: 2007
56.	Nhựa, kim loại <i>Plastic, metal</i>	Xác định hàm lượng chì, cadmium, thủy ngân (Pb, Cd, Hg) <i>Determination of lead, cadmium, mercury content</i>	(5 ~ 100) mg/kg	IEC 62321 : 2008
57.		Xác định hàm lượng Crom (VI) <i>Determination of Hexavalent chromium content</i>	4 mg/kg	IEC 62321 : 2008
58.	Nhựa <i>Plastic</i>	Xác định hàm lượng Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) <i>Determination of Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) content</i>	5 mg/kg	IEC 62321 : 2008
59.	Chất thải <i>Solid wastes</i>	Độ pH 10% <i>pH value</i>	1 ~ 12	ASTM D 4980:89
60.		Độ ẩm <i>Moiture</i>	> 0,1%	TCVN 6648:2000
61.		Cyanua <i>Cyanide</i>	5 mg/kg	EPA SW-846 Method 9010 C
62.		Xác định hàm lượng dầu, mỡ tổng <i>Determination of total oil & grease content</i>	20 mg/L	SMEWW 2005 (5520 E)
63.		Xác định hàm lượng kim loại (Al, Sb, As, Bo, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Na, Sr, Tl, V, Zn) <i>Determination of Metals content (Al, Sb, As, Bo, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Na, Sr, Tl, V, Zn)</i>	0,1 mg/L (0,1 ~ 50) mg/L	US EPA SW-846 Method 1311 (phá mẫu/sample preparing). EPA Method 200.7 (phân tích/analysis)

DANH MỤC PHÉP THỬ ĐƯỢC CÔNG NHẬN

LIST OF ACCREDITED TESTS

VILAS 004

TT	Tên sản phẩm, vật liệu thử <i>Materials or products tested</i>	Tên phép thử cụ thể <i>The Name of specific tests</i>	Giới hạn phát hiện (nếu có)/ Phạm vi đo <i>Detection limit (if any)/ range of measurement</i>	Phương pháp thử <i>Test methods</i>
64.	Chất thải <i>Solid wastes</i>	Xác định hàm lượng kim loại (Al, Sb, As, Bo, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Na, Sr, Tl, V, Zn). <i>Determination of Metals content (Al, Sb, As, Bo, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Na, Sr, Tl, V, Zn).</i>	1,5 mg/kg (2 ~ 50) mg/kg	US EPA SW-846 Method 3051A (phá mẫu/sample preparing) EPA Method 200.7 (phân tích/analysis)
65.	Dầu cách điện <i>Insulating liquids</i>	Xác định hàm lượng PCBs <i>Determination of PCBs content</i>	4 mg/kg	ASTM D 4059: 2010
66.	Đất <i>Soils</i>	Xác định hàm lượng kim loại (Al, Sb, As, Bo, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Na, Sr, Tl, V, Zn). <i>Determination of metals content (Al, Sb, As, Bo, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, Se, Ag, Na, Sr, Tl, V, Zn).</i>	5 mg/kg (5 ~ 100) mg/kg	US EPA SW-846 Method 3050 B (phá mẫu/sample preparing) EPA Method 200.7 (phân tích/analysis)

Ghi chú/ Note:

- QTTN /KT3: Phương pháp do phòng thí nghiệm xây dựng/ *Laboratory developed method*
- SMEWW: *Standard methods for the Examination of water and wastewater*
- EPA: *Environmental Protection Agency.*
- LFGB § 64 BVL: *Gesetz zur Neuordnung des Lebensmittel- und des Futtermittelrechts (German food and feed law, Federal Office for Consumer Protection and Food Safety).*

BỘ KHOA HỌC VÀ CÔNG NGHỆ
VĂN PHÒNG CÔNG NHẬN CHẤT LƯỢNG

MINISTRY OF SCIENCE AND TECHNOLOGY
BUREAU OF ACCREDITATION (BoA)



Member of ILAC/APLAC MRA

CHỨNG CHỈ CÔNG NHẬN *Certificate of Accreditation*

Phòng thí nghiệm: TRUNG TÂM KỸ THUẬT TIÊU CHUẨN ĐO LƯỜNG CHẤT LƯỢNG 3
PHÒNG THỬ NGHIỆM MÔI TRƯỜNG

Laboratory: QUALITY ASSURANCE AND TESTING CENTER 3
ENVIRONMENTAL TESTING LABORATORY

Địa điểm PTN/ Lab location:

Số 7, Đường 1, Khu công nghiệp Biên Hòa 1, Đồng Nai

đã được đánh giá và phù hợp với các yêu cầu của
has been assessed and found to conform with the requirements of

ISO/IEC 17025: 2005

Lĩnh vực công nhận
Field of Accreditation

HÓA
Chemical

Mã số
Accreditation No

VILAS 004

GIÁM ĐỐC
VĂN PHÒNG CÔNG NHẬN CHẤT LƯỢNG
(Director of Bureau of Accreditation)



VŨ XUÂN THỦY

Ngày/Date of Issue: 09/5/2012 (Annex of decision: 103.2012/QĐ-VPCNCL dated 09/5/2012)
Hiệu lực công nhận/Period of Validation: up to 09/5/2015.
Hiệu lực lần đầu/Beginning of accreditation: 28/8/1997.

**DIRECTORATE FOR STANDARDS, METROLOGY AND QUALITY
QUALITY ASSURANCE AND TESTING CENTER 3**

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Ho Chi Minh City 2012

1. INTRODUCTION

QUATEST 3 that was established on 05 November 1994 as stated on Decision No.1275/QĐ of Ministry of Science and Technology is a scientific professional organization under the Directorate for Standards, Metrology and Quality.

QUATEST 3 provides a wide range of technical services related on standards, measurement, quality and assessment with the following functions:

- Checking, appraisal on quality, sanitatiton, safe of products, goods, materials, members of a construction.
- Testing materials, products and goods.
- Appraisal, adjusting and assessing measurement methods.
- Certifying the compliance of products with standards and technical specifications; certifying the conformity of vegetables, fruit and tea with VietGAP
- Testing and assessing industrial safe.
- Surveying, observing, analyzing and evaluating present conditions and environmental impact.
- Surveying and evaluating technical conditions, technological conditions and technology transfer.
- Training and consulting on productivity, quality, applying code and bar code technology.
- Researching and formulating standards on measurement, samples and measurement equipment.
- Consulting how to apply codes and bar codes.
- Providing information, standards, and materials related to standard, measurement and quality.

2. TECHNICAL CAPACITY

- Water testing (drinking water, domestic water and underground water)
- Testing solid, liquid, air waste.
- Testing pure gases.
- Testing content of pesticide in food.
- Identifying radioactive in farming products, food and water.
- Analyzing samples for assessment of environmental impact.
- Testing chemicals, minerals, cosmetics, materials, solvents, fertilizer, and pesticide.

- Analyzing metal materials, wrapping (leather, toys, paint, pottery, and china)

3. TESTING METHODS

TCVN, APHA, FDA, FAO, DIN, ASTM, ISO, EN, IS, AOAC,...

4. MAIN EQUIPMENT

- Ultraviolet-visible spectrophotometer (UV-Vis)
- Atomic Absorption Spectrophotometric (AAS)
- Inductively coupled plasma spectrometry (ICP-OES)
- GC
- GC/MS, ECD
- Fluorescence spectrometry ray X – XRF
- GC/MS-TOF
- GC/MS-TOF
- HPLC
- Alpha, Beta Radioactivity Meter
- Water testing equipment (BOD, electrical, pH, độ đục, Jar test...).
- Element identifying equipment (C, H, N, S, O)
- Microwave sample testing equipment
- Surface stress indicator
- Potentiometric Titration
- Karl Fischer Titration

5. TESTING SERVICE

Main services include mechanic and non-destructive testing (NDT); consumer goods; furniture, construction materials, electric and electronic, EMC, chemicals, environment, gas and oil, food, microbiology and genetically modified organism (GMO).

6. PERSONNEL

At present, QUATEST 3 has 230 members of technicians and consultants, including 11 laboratories and 8 measurement laboratories, 07 appraisal laboratories.

BOARD OF DIRECTORS

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資-3-2 水質試驗結果

Cr.	Parameter	Unit	Vietnamese Standard (109 parameters)		Japanese Standard (60 parameters)		HA THIN PROVINCE			VINH LONG PROVINCE			Remarks	
			Maximum Limit	Examination Level	Maximum Limit	Examination Level	Pham Huy Chu School	Thach Ha Hospital	Bui Xa Commune	Quoi An Hospital	Nuyen Trung Tuc School	Ngai Tu C School		
I. Perceptible parameters and inorganic constituents														
1	Color (*)	TCU	15	A	5	A	16	ND	26	ND	70	ND	72	ND
2	Taste and odour (*)	-	No strange taste & odour	A	No strange taste & odour	A	No smell No taste	No smell No taste	No smell No taste	No smell No taste	No smell No taste	No smell No taste	No smell No taste	No smell No taste
3	Turbidity (*)	NTU	2	A	2	A	2.4	ND	25.2	ND	5.8	ND	2.3	ND
4	pH (*)	-	Within 6.5-8.5	A	Within 6.5-8.6	A	7.1	7.9	7.4	7.1	7.4	7.2	7.7	7.3
5	Hardness, calculated by CaCO ₃ (*)	mg/l	300	A	300	A	182.5	181	75.4	86.8	50.4	49.9	69.8	88
6	Total Dissolved Solids (TDS) (*)	mg/l	1000	B	500	B	359	463	174	270	63	83	188	55.2
7	Aluminum (*)	mg/l	0.2	B	0.2	B	0.5	ND	0.33	0.33	1.33	2.66	0.48	0.5
8	Ammoniac (*)	mg/l	3	B	3	B	ND	ND	0.2	1	0.2	2.1	0.3	0.4
9	Antimony	mg/l	0.005	C	0.005	C	ND	ND	ND	ND	ND	ND	ND	ND
10	Total Arsenic	mg/l	0.01	B	0.01	B	0.002	ND	ND	ND	ND	ND	ND	0.005
11	Barium	mg/l	0.7	C	0.7	C	ND	ND	ND	ND	ND	ND	ND	ND
12	Boron and boric acid	mg/l	0.3	C	0.3	C	ND	ND	ND	ND	ND	ND	ND	ND
13	Cadmium	mg/l	0.003	C	0.003	C	ND	ND	ND	ND	ND	ND	ND	ND
14	Chloride (*)	mg/l	250-300 (*)	A	200	A	50.9	79.2	29.7	31.8	4.5	5	6.2	7.5
15	Total Chromium	mg/l	0.05	C	0.05	C	ND	ND	0.02	0.02	0.02	0.02	0.02	0.02
16	Total Copper (*)	mg/l	0.07	C	0.07	C	ND	ND	ND	ND	ND	ND	ND	ND
17	Cyanide	mg/l	1.5	B	0.8	B	ND	ND	ND	ND	ND	ND	ND	ND
18	Fluoride	mg/l	0.05	B	0.05	B	ND	ND	ND	ND	ND	ND	ND	ND
19	Hydrogen sulfide (*)	mg/l	0.05	B	0.3	B	0.31	0.04	ND	1.5	0.05	2.24	1.23	0.03
20	Total Iron (Fe ²⁺ + Fe ³⁺) (*)	mg/l	0.3	B	0.3	B	0.09	ND	0.05	0.47	0.3	0.08	0.1	0.13
21	Lead	mg/l	0.01	B	0.01	B	ND	ND	ND	ND	ND	ND	ND	ND
22	Total Manganese	mg/l	0.3	A	0.05	A	0.001	ND	ND	ND	ND	ND	ND	ND
23	Total Mercury	mg/l	0.001	B	0.0005	B	ND	ND	ND	ND	ND	ND	ND	ND
24	Molybdenum	mg/l	0.07	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
25	Nickel	mg/l	0.02	C	0.02	C	ND	ND	ND	ND	ND	ND	ND	ND
26	Nitrate	mg/l	50	A	10	A	3.4	2.6	3.4	1.3	0.9	1	ND	3.4
27	Nitrite	mg/l	3	A	10	A	ND	ND	ND	ND	ND	ND	ND	ND
28	Selenium	mg/l	0.01	C	0.01	C	ND	ND	ND	ND	ND	ND	ND	ND
29	Sodium	mg/l	200	B	200	B	31.6	54.8	22.5	49.3	6.7	33.9	49.3	22.5
30	Sulfate (*)	mg/l	250	A	250	A	67.3	124	15.6	73.5	6.1	22.4	64	73.5
31	Zinc (*)	mg/l	3	C	1	C	ND	ND	ND	ND	ND	ND	ND	ND
32	Permanganate	mg/l	2	A	-	A	6.5	3.6	8.5	7.6	11.6	8	2.8	11.6
II. Content of organic substances														
a. Chlorinated alkenes														
33	Carbon tetrachloride	µg/l	2	C	2	C	ND	ND	ND	ND	ND	ND	ND	ND
34	Dichloromethane	µg/l	20	C	20	C	ND	ND	ND	ND	ND	ND	ND	ND
35	1,2-Dichloroethane	µg/l	30	C	40	C	ND	ND	ND	ND	ND	ND	ND	ND
36	1,1,1-Trichloroethane	µg/l	2000	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
37	Vinyl chloride	µg/l	5	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
38	1,2-Dichloroethene	µg/l	50	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
39	Trichloroethene	µg/l	70	C	10	C	ND	ND	ND	ND	ND	ND	ND	ND
40	Tetrachloroethene	µg/l	40	C	10	C	ND	ND	ND	ND	ND	ND	ND	ND
b. Aromatic hydrocarbons														
41	Phenol and derivatives of Phenol	µg/l	1	B	5	B	ND	ND	ND	ND	ND	ND	ND	ND
42	Benzene	µg/l	10	B	10	B	ND	ND	ND	ND	ND	ND	ND	ND
43	Toluene	µg/l	700	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
44	Xylenes	µg/l	500	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
45	Ethyl benzene	µg/l	300	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
46	Styrene	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
47	Benz(a)pyrene	µg/l	0.7	B	-	B	ND	ND	ND	ND	ND	ND	ND	ND
c. Chlorinated benzenes														
48	Monochlorobenzenes	µg/l	300	B	-	B	ND	ND	ND	ND	ND	ND	ND	ND
49	1,2-Dichlorobenzene	µg/l	1000	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
50	1,4-Dichlorobenzene	µg/l	500	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
51	Trichlorobenzene	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
d. Groups of complex organic substances														
52	DT (2-ethylhexyl) adipate	µg/l	80	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
53	DT (2-ethylhexyl) phthalat	µg/l	80	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
54	Arylamide	µg/l	0.5	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
55	Epiclohydrin	µg/l	0.4	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
56	Hexachloro butadiene	µg/l	0.6	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
III. Pesticides														
57	Alachlor	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
58	Aldicarb	µg/l	10	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
59	Aldrin/Dieldrin	µg/l	0.03	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
60	Atrazine	µg/l	2	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
61	Benazone	µg/l	30	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
62	Carbaryl	µg/l	5	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
63	Chlorane	µg/l	0.2	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
64	Chlorobutol	µg/l	30	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
65	DDT	µg/l	2	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
66	1,2-Dibromo-3-Chloropropane	µg/l	30	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
67	2,4-D	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
68	1,2-Dichloropropane	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
69	1,3-Dichloropropane	µg/l	0.03	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
70	Heptachlor & heptachlor epoxide	µg/l	9	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
71	Hexachlorobenzene	µg/l	1	B	-	B	ND	ND	ND	ND	ND	ND	ND	ND
72	Isoproturon	µg/l	9	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
73	Lindane	µg/l	2	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
74	MCPA	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
75	Methoxychlor	µg/l	10	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
76	Methachlor	µg/l	6	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
77	Molinate	µg/l	10	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
78	Pendimethalin	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
79	Permethrin	µg/l	9	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
80	Propanil	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
81	Simazine	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
82	Trifluralin	µg/l	20	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
84	2,4-DE	µg/l	100	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
85	Dichlorop	µg/l	10	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
86	Fenprop	µg/l	10	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
87	Meoprop	µg/l	10	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
88	2,4,5-T	µg/l	9	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
IV. Disinfectants and disinfectant by products														
89	Monochloramine	µg/l	3	B	-	B	ND	ND	ND	ND	ND	ND	ND	ND
90	Chlorine residue	mg/l	Within 0.5-0.5	A	-	A	ND	ND	ND	ND	ND	ND	ND	ND
91	Bromate	µg/l	25	C	10	C	ND	ND	ND	ND	ND	ND	ND	ND
92	Chlorite	µg/l	200	C	60	C	ND	ND	ND	ND	ND	ND	ND	ND
93	2,4,6-Trichlorophenol	µg/l	900	C	-	C	ND	ND	ND	ND	ND	ND	ND	ND
94	Formaldehyde	µg/l	100	C	80	C	ND	ND	ND	ND	ND	ND	ND	ND
95	Bromofom	µg/l	100	C	100	C	ND	ND	ND	ND	ND	ND	ND	ND
96	Dibromochloromethane	µg/l	60	C	30	C	ND	ND	ND	ND	ND	ND	ND	ND
97	Bromodichloromethane	µg/l	200	C	40	C	ND	ND	ND	ND	ND	ND	ND	ND
99	Dichloroacetic acid	µg/l	50	C	40	C	ND	ND	ND	ND	ND	ND	ND	ND
100	Trichloroacetic acid	µg/l	100	C	20	C	ND	ND	ND	ND	ND	ND	ND	ND

レベル A (15 項目)

Or.	Parameter	Unit	Vietnamese Standard (15 parameters + Aluminum)		Japanese Standard Maximum Limit	HA THIN PROVINCE: Phan Huy Chu School			HA THIN PROVINCE: Thach Ha Hospital			HA THIN PROVINCE: Bui Xa Commune			VINH LONG PROVINCE: Quoi An Hospital				VINH LONG PROVINCE: Nauyen Trung Truc School			VINH LONG PROVINCE: Ngai Tcu C School			
			Maximum Limit	Examination Level		15 of C Level Test	A Level Test	15 of C Level Test	A Level Test	15 of C Level Test	A Level Test	15 of C Level Test	A Level Test	Raw Water	Present Treatment	HOH	A Level Test	15 of C Level Test	A Level Test	15 of C Level Test	A Level Test	15 of C Level Test	A Level Test		
I. Perceptible parameters and inorganic constituents																									
1	Color ^(*)	TCU	15	A	5	ND	ND	ND	16	ND	ND	11	ND	ND	26	ND	ND	ND	70	ND	ND	72	ND	ND	
2	Taste and odour ^(*)	-	No strange taste & odour	A	No strange taste & odour	No smell No taste	No smell No taste	No strange odour	No smell No taste	No smell No taste	No strange odour	No smell No taste	No smell No taste	No strange odour	No smell No taste	No smell No taste	No smell No taste	No strange odour	No smell No taste	No smell No taste	No strange odour	No smell No taste	No smell No taste	No strange odour	
3	Turbidity ^(*)	NTU	2	A	2	3.9	ND	ND	2.4	ND	ND	8.3	2.3	ND	25.2	10.1	2.7	ND	58	2.3	ND	98.2	ND	ND	
4	pH ^(*)	-	Within 6.5-8.5	A	Within 5.8-8.6	6.9	7.1	7.5	7.9	7.7	7.8	7.1	7.7	7.7	7.4	7.2	7.7	7.1	6.9	7.4	7.3	7.2	7	7.9	7.2
5	Hardness, calculated by CaCO ₃ ^(*)	mg/l	300	A	300	39.6	49.9	69.4	182.5	181	184	75.4	86.8	88.9	60.4	49.9	59.8	64	88	65	60.6	55.1	66.8	56.7	
7	Aluminum ^(*)	mg/l	0.2	B	0.2	0.07	0.5	ND	ND	0.36	ND	0.29	0.33	ND	1.33	2.66	0.48	ND	3.77	0.5	0.06	4.59	0.2	0.08	
14	Chloride ^(*)	mg/l	250-300 ^(**)	A	200	2.4	4.2	21	50.9	79.2	70.3	29.7	31.8	40.5	4.5	5	6.2	50	7.5	8.1	26.6	8.3	9.2	15.9	
20	Total Iron (Fe ²⁺ + Fe ³⁺) ^(*)	mg/l	0.3	A	0.3	0.31	0.04	ND	ND	ND	ND	1.5	0.05	ND	2.24	1.23	0.03	ND	0.05	0.06	ND	5.29	0.05	ND	
22	Total Manganese	mg/l	0.3	A	0.05	0.09	ND	ND	ND	0.05	0.17	0.47	0.3	0.15	0.08	0.1	0.13	0.1	0.3	0.47	0.04	0.27	0.11	ND	
26	Nitrate	mg/l	50	A	10	ND	ND	0.7	3.4	2.6	1.5	3.4	ND	1.0	1.3	0.9	1	ND	ND	3.4	ND	2	1.3	0.8	
27	Nitrite	mg/l	3	A	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
30	Sulfate ^(*)	mg/l	250	A	-	10.3	67.3	51.5	75.4	124	149	15.6	73.5	82	6.1	22.4	64	31.6	73.5	15.6	41.6	9.1	60.9	42.9	
32	Permanganate	mg/l	2	A	-	6.5	3.6	ND	8.5	7.6	1.4	11.6	8	1.2	4	2.8	2.8	1.2	8	11.6	1.6	11.7	4.9	1.6	
IV. Disinfectants and disinfectant by products																									
90	Chlorine residue	mg/l	Within 0.3-0.5	A	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
VI. Micro-organism																									
108	Total Coliform	Bacterial /100ml	0	A	100 or less	1.5×10 ²	1.5×10 ⁴	Less than 1	2.5×10 ³	Less than 1	Less than 1	5.5×10 ¹	Less than 1	Less than 1	1.5×10 ²	Less than 1	Less than 1	Less than 1	5.5×10 ¹	Less than 1	Less than 1	2.0×10 ²	3.0×10 ⁰	Less than 1	
109	E. coli or thermo-tolerant coliform	Bacterial /100ml	0	A	0	1.0×10 ¹	Less than 1	Less than 1	4.0×10 ²	Less than 1	Less than 1	1.0×10 ¹	Less than 1	Less than 1	6.0×10 ¹	Less than 1	Less than 1	Less than 1	1.0×10 ¹	Less than 1	Less than 1	3.0×10 ¹	Less than 1	Less than 1	

Note:
 (*) Perceptible parameters
 (**) Applicable to maritime areas and islands
 Both Nitrate and Nitrite might possibly create Methaemoglobin. Thus, in case both substances exist in drinking water, then the concentration (C) of each substance in compared with maximum limit is not allowed to exceed 1 and is calculated by following formula:
 Cnitrate/ max limit of Nitrate + Cnitrite/ max limit of Nitrite < 1
 Testing result exceed Vietnamese Standard (TCVN01: 2009/BYT)

資-4 ベトナム国飲料水水質基準(QCVN01:2009/BYT)



SOCIALIST REPUBLIC OF VIETNAM

QCVN 01 : 2009/BYT

NATIONAL TECHNICAL REGULATION ON DRINKING WATER QUALITY

HANOI – 2009

QCVN : 2009/BYT

Preface:

QCVN 01: 2009/BYT is compiled by Department of Preventive Medicine & Environment and promulgated by MOH's Minister at the Circular No.04/2009/TT-BYT dated 17th June 2009.

**NATIONAL TECHNICAL REGULATION
ON THE DRINKING WATER QUALITY**

**PART I.
GENERAL RULES**

I. Applicable scope

This Technical Regulation stipulates limits of quality criteria for water used for drinking and processing food (hereinafter called drinking water).

II. Applicable subject

This Technical Regulation applies to institutions, organizations, individuals and households who exploit, trade drinking water, including piped water providers for domestic purposes with capacity of 1,000 m³/day or above (hereafter called water providers).

III. Explanation of words/phrases

In this Regulation, following words/phrases will be thoroughly understood as:

1. Perceptible criteria are elements on color and taste which are felt by human senses.
2. AOAC stands for *Association of Official Analytical Chemists*.
3. SMEWW stands for *Standard Methods for the Examination of Water and Waste Water*.
4. US EPA stands for *United States Environmental Protection Agency*.
5. TCU stands for *True Color Unit*.
6. NTU stands for *Nephelometric Turbidity Unit*.
7. pCi/l stands for *Picocuri per litre*.

**PART II.
STIPULATIONS ON TECHNICAL AREAS**

Table on the limits of quality parameters:

Or.	Parameter	Unit	Maximum limit	Testing method	Examination Level
I. Perceptible parameters and inorganic constituents					
1.	Color (*)	TCU	15	TCVN 6185 - 1996 (ISO 7887 - 1985) or	A

				SMEWW 2120	
2.	Taste and odour ^(*)	-	No strange taste & odour	Perceptible, or SMEWW 2150 B and 2160 B	A
3.	Turbidity ^(*)	NTU	2	TCVN 6184 - 1996 (ISO 7027 - 1990) or SMEWW 2130 B	A
4.	pH ^(*)	-	Within 6,5-8,5	TCVN 6492:1999 or SMEWW 4500 - H ⁺	A
5.	Hardness, calculated by CaCO ₃ ^(*)	mg/l	300	TCVN 6224 - 1996 or SMEWW 2340 C	A
6.	Total Dissolved Solid (TDS) ^(*)	mg/l	1000	SMEWW 2540 C	B
7.	Aluminum ^(*)	mg/l	0,2	TCVN 6657 : 2000 (ISO 12020 :1997)	B
8.	Ammoniac ^(*)	mg/l	3	SMEWW 4500 - NH ₃ C or SMEWW 4500 - NH ₃ D	B
9.	Antimony	mg/l	0,005	US EPA 200.7	C
10.	Total Arsenic	mg/l	0,01	TCVN 6626:2000 or SMEWW 3500 - As B	B
11.	Barium	mg/l	0,7	US EPA 200.7	C
12.	Boron and boric acid	mg/l	0,3	TCVN 6635: 2000 (ISO 9390: 1990) or SMEWW 3500 B	C
13.	Cadmium	mg/l	0,003	TCVN6197 - 1996 (ISO 5961 - 1994) or SMEWW 3500 Cd	C
14.	Chloride ^(*)	mg/l	250 300 ^(**)	TCVN6194 - 1996 (ISO 9297 - 1989) or SMEWW 4500 - Cl ⁻ D	A
15.	Total Chromium	mg/l	0,05	TCVN 6222 - 1996 (ISO 9174 - 1990) or SMEWW 3500 - Cr ⁺	C
16.	Total Copper ^(*)	mg/l	1	TCVN 6193 - 1996 (ISO 8288 - 1986) or SMEWW 3500 - Cu	C
17.	Cyanide	mg/l	0,07	TCVN 6181 - 1996 (ISO 6703/1 - 1984) or SMEWW 4500 - CN ⁻	C
18.	Flouride	mg/l	1,5	TCVN 6195 - 1996 (ISO10359 - 1 - 1992) or SMEWW 4500 - F ⁻	B
19.	Hydrogen sulfide ^(*)	mg/l	0,05	SMEWW 4500 - S ²⁻	B

20.	Total Iron (Fe ²⁺ + Fe ³⁺) ^(*)	mg/l	0,3	TCVN 6177 - 1996 (ISO 6332 - 1988) or SMEWW 3500 - Fe	A
21.	Lead	mg/l	0,01	TCVN 6193 - 1996 (ISO 8286 - 1986) SMEWW 3500 - Pb A	B
22.	Total Manganese	mg/l	0,3	TCVN 6002 - 1995 (ISO 6333 - 1986)	A
23.	Total Mercury	mg/l	0,001	TCVN 5991 - 1995 (ISO 5666/1-1983 - ISO 5666/3 -1983)	B
24.	Molybdenum	mg/l	0,07	US EPA 200.7	C
25.	Nickel	mg/l	0,02	TCVN 6180 -1996 (ISO8288 -1986) SMEWW 3500 - Ni	C
26.	Nitrate	mg/l	50	TCVN 6180 - 1996 (ISO 7890 -1988)	A
27.	Nitrite	mg/l	3	TCVN 6178 - 1996 (ISO 6777-1984)	A
28.	Selenium	mg/l	0,01	TCVN 6183-1996 (ISO 9964-1-1993)	C
29.	Sodium	mg/l	200	TCVN 6196 - 1996 (ISO 9964/1 - 1993)	B
30.	Sulfate ^(*)	mg/l	250	TCVN 6200 - 1996 (ISO9280 - 1990)	A
31.	Zinc ^(*)	mg/l	3	TCVN 6193 - 1996 (ISO8288 - 1989)	C
32.	Permanganate	mg/l	2	TCVN 6186:1996 or ISO 8467:1993 (E)	A
II. Content of organic substances					
a. Chlorinated alkenes					
33.	Carbon tetrachloride	µg/l	2	US EPA 524.2	C
34.	Dichloromethane	µg/l	20	US EPA 524.2	C
35.	1,2 Dichloroethane	µg/l	30	US EPA 524.2	C
36.	1,1,1 - Trichloroethane	µg/l	2000	US EPA 524.2	C
37.	Vinyl chloride	µg/l	5	US EPA 524.2	C
38.	1,2 Dichloroethene	µg/l	50	US EPA 524.2	C
39.	Trichloroethene	µg/l	70	US EPA 524.2	C
40.	Tetrachloroethene	µg/l	40	US EPA 524.2	C
b. Aromatic hydrocarbons					
41.	Phenol and derivatives of Phenol	µg/l	1	SMEWW 6420 B	B
42.	Benzene	µg/l	10	US EPA 524.2	B

43.	Toluene	µg/l	700	US EPA 524.2	C
44.	Xylenes	µg/l	500	US EPA 524.2	C
45.	Ethyl benzene	µg/l	300	US EPA 524.2	C
46.	Styrene	µg/l	20	US EPA 524.2	C
47.	Benzo(a)pyrene	µg/l	0,7	US EPA 524.2	B
c. Chlorinated benzenes					
48.	Monochlorobenzens	µg/l	300	US EPA 524.2	B
49.	1,2- Dichlorobenzene	µg/l	1000	US EPA 524.2	C
50.	1,4- Dichlorobenzene	µg/l	300	US EPA 524.2	C
51.	Trichlorobenzene	µg/l	20	US EPA 524.2	C
d. Groups of complex organic substances					
52.	Di(2-ethylhexyl) adipate	µg/l	80	US EPA 525.2	C
53.	Di(2-ethylhexyl) phtalat	µg/l	8	US EPA 525.2	C
54.	Acrylamide	µg/l	0,5	US EPA 8032A	C
55.	Epiclohydrin	µg/l	0,4	US EPA 8260A	C
56.	Hexaclaro butadiene	µg/l	0,6	US EPA 524.2	C
III. Pesticides					
57.	Alachlor	µg/l	20	US EPA 525.2	C
58.	Aldicarb	µg/l	10	US EPA 531.2	C
59.	Aldrin/Dieldrin	µg/l	0,03	US EPA 525.2	C
60.	Atrazine	µg/l	2	US EPA 525.2	C
61.	Bentazone	µg/l	30	US EPA 515.4	C
62.	Carbofuran	µg/l	5	US EPA 531.2	C
63.	Chlordane	µg/l	0,2	US EPA 525.2	C
64.	Chlorotoluron	µg/l	30	US EPA 525.2	C
65.	DDT	µg/l	2	SMEWW 6410B, or SMEWW 6630 C	C
66.	1,2 - Dibromo - 3 Chloropropane	µg/l	1	US EPA 524.2	C
67.	2,4 - D	µg/l	30	US EPA 515.4	C
68.	1,2 - Dichloropropane	µg/l	20	US EPA 524.2	C
69.	1,3 - Dichloropropene	µg/l	20	US EPA 524.2	C
70.	Heptachlor & heptachlor epoxide	µg/l	0,03	SMEWW 6440C	C
71.	Hexachlorobenzene	µg/l	1	US EPA 8270 - D	C
72.	Isoproturon	µg/l	9	US EPA 525.2	C
73.	Lindane	µg/l	2	US EPA 8270 - D	C

74.	MCPA	µg/l	2	US EPA 555	C
75.	Methoxychlor	µg/l	20	US EPA 525.2	C
76.	Methachlor	µg/l	10	US EPA 524.2	C
77.	Molinate	µg/l	6	US EPA 525.2	C
78.	Pendimetalin	µg/l	20	US EPA 507, US EPA 8091	C
79.	Pentachlorophenol	µg/l	9	US EPA 525.2	C
80.	Permethrin	µg/l	20	US EPA 1699	C
81.	Propanil	µg/l	20	US EPA 532	C
82.	Simazine	µg/l	20	US EPA 525.2	C
83.	Trifuralin	µg/l	20	US EPA 525.2	C
84.	2,4 DB	µg/l	90	US EPA 515.4	C
85.	Dichloprop	µg/l	100	US EPA 515.4	C
86.	Fenoprop	µg/l	9	US EPA 515.4	C
87.	Mecoprop	µg/l	10	US EPA 555	C
88.	2,4,5 - T	µg/l	9	US EPA 555	C
IV. Disinfectants and disinfectant by-products					
89.	Monochloramine	µg/l	3	SMEWW 4500 - Cl G	B
90.	Chlorine residue	mg/l	Within 0,3 - 0,5	SMEWW 4500Cl or US EPA 300.1	A
91.	Bromate	µg/l	25	US EPA 300.1	C
92.	Chlorite	µg/l	200	SMEWW 4500 Cl or US EPA 300.1	C
93.	2,4,6 Trichlorophenol	µg/l	200	SMEWW 6200 or US EPA 8270 - D	C
94.	Formaldehyde	µg/l	900	SMEWW 6252 or US EPA 556	C
95.	Bromoform	µg/l	100	SMEWW 6200 or US EPA 524.2	C
96.	Dibromchlorometane	µg/l	100	SMEWW 6200 or US EPA 524.2	C
97.	Bromodichlorometane	µg/l	60	SMEWW 6200 or US EPA 524.2	C
98.	Chloroform	µg/l	200	SMEWW 6200	C
99.	Dichloroacetic acid	µg/l	50	SMEWW 6251 or US EPA 552.2	C
100.	Trichloroacetic acid	µg/l	100	SMEWW 6251 or US EPA 552.2	C
101.	Chloral hydrate (trichloroacetaldehyde)	µg/l	10	SMEWW 6252 or US EPA 8260 - B	C
102.	Dichloroacetonitrile	µg/l	90	SMEWW 6251 or US EPA 551.1	C

103.	Dibromoacetonitrile	µg/l	100	SMEWW 6251 or US EPA 551.1	C
104.	Trichloroacetonitrile	µg/l	1	SMEWW 6251 or US EPA 551.1	C
105.	Cyano chlorite (as CN ⁻)	µg/l	70	SMEWW 4500J	C
V. Radioactive constituents					
106.	Gross α activity	pCi/l	3	SMEWW 7110 B	B
107.	Gross β activity	pCi/l	30	SMEWW 7110 B	B
VI. Micro-organism					
108.	Total Coliform	Bacterial/100 ml	0	TCVN 6187 - 1,2 :1996 (ISO 9308 - 1,2 - 1990) or SMEWW 9222	A
109.	E.coli or thermo-tolerant coliform	Bacterial/100 ml	0	TCVN6187 - 1,2 : 1996 (ISO 9308 - 1,2 - 1990) or SMEWW 9222	A

Note:

- (*) perceptible parameters.
- (**) Applicable to maritime areas and islands.

- Both Nitrate and Nitrite might possibly create Methaemoglobin. Thus, in case both substances exist in drinking water, then the concentration (C) of each substance in compared with maximum limit is not allowed to exceed 1 and is calculated by following formula :

$$C_{\text{Nitrate}}/\text{max limit of Nitrate} + C_{\text{Nitrite}}/\text{max limit of Nitrite} \leq 1$$

PART III.

FREQUENCY OF WATER QUALITY MONITORING/INSPECTION

I. Monitoring/inspection prior to the use of water sources

- Testing of all parameters under A, B, C levels to be carried out by water providers.

II. Regular monitoring

1. For parameters under A level:

- a) Test at least 01 time per week, to be done by water providers ;
- b) Test, monitor and experiment at least 01 time per month by functional agencies.

2. For parameters under B level:

- a) Test at least 01 time per 6 months, to be done by water providers;
 - b) Test, monitor and experiment at least 01 time per 6 months by functional agencies.
3. For parameters under C level:
- a) Test at least 01 time per 2 years, to be done by water providers;
 - b) Test, monitor and experiment at least 01 time per 2 years by functional agencies

III. Unscheduled monitoring/inspection

1. Following circumstances are required to have urgent monitoring/inspection:
- a) The results of testing of water sources' hygiene or epidemic investigations reveal that water sources have potentially risks to contamination.
 - b) Environmental incidents appeared, which might negatively impact to the hygienic quality of water sources;
 - c) Other specific requirements.

PART IV. IMPLEMENTATION ARRANGEMENTS

I. Responsibilities of water providers:

- 1. Ensure water quality and carry out the testing/monitoring as per stipulations in this Technical Regulation.
- 2. Subject to the testing, monitoring/inspection of functional agencies.

II. Responsibilities of provincial Department of Health

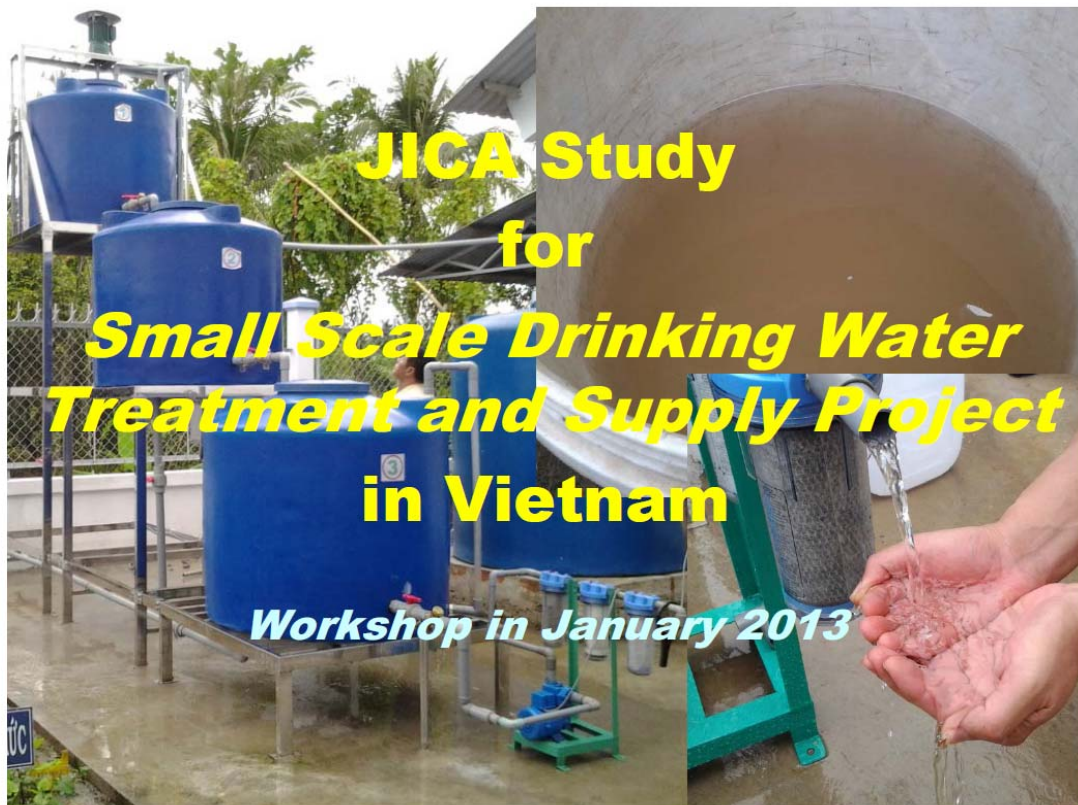
Provincial DOHs will be responsible to provide guidance, inspection/monitoring on the compliance of this Technical Regulation of relevant organizations, institutions, individuals who involve in the process of exploitation, production and trading water for drinking purposes within the provincity/city.

III. Responsibilities of Ministry of Health

MOH will lead relevant agencies/institutions to provide guidance, inspection/monitoring on the compliance of this Technical Regulation.

IV. In case of possible changes/supplementation or adjustment of stipulations in this Technical Regulation, the new/revised regulatory document issued by MOH's Minister will be followed.

資-5 ワークショップ資料

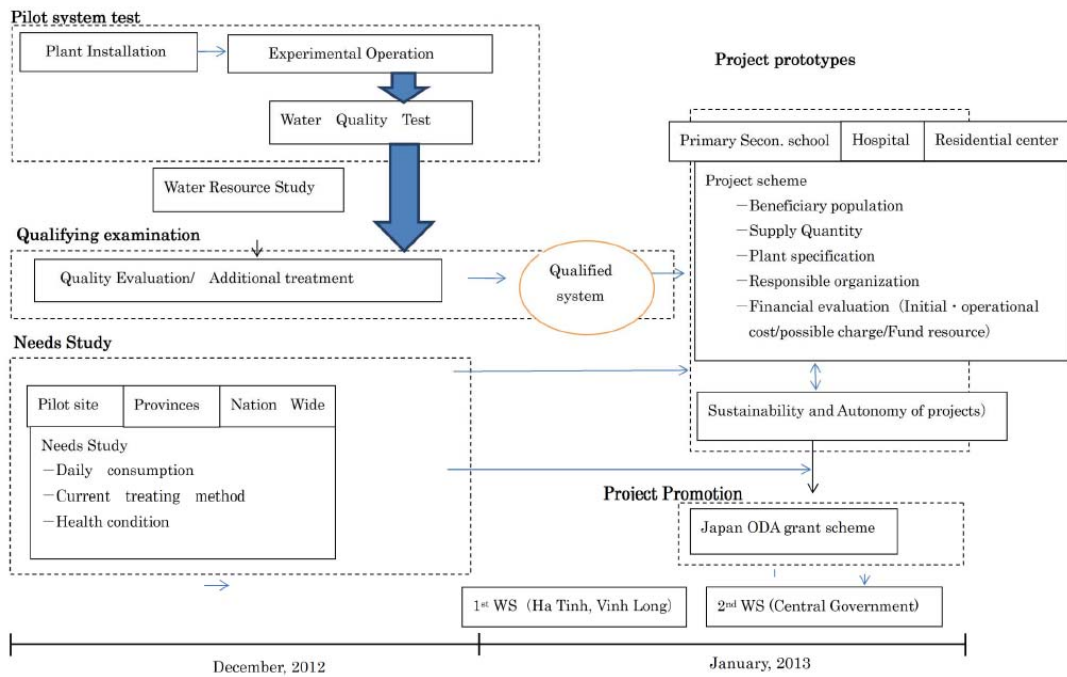


1. Introduction

1.1 Study Purpose is:

to promote *Small Scale Drinking Water Treatment and Supply Project (Project)* in rural areas which has no access to public water supply system, in anticipation of subsequent *Japanese ODA grant scheme*.

1.2 Study Schedule



1.3 Study Site

Ha Tinh Province (3 sites)



Commune



General Hospital



Secondary School

1.3 Study Site

Vinh Long Province (3 sites)



Primary School



Primary School



Medical Center

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1.4 HOH is:

mixture of **Volcanic Sand** for flocculation (product name in Japan is KIYOMARU) and **Bleaching Powder** for disinfection,

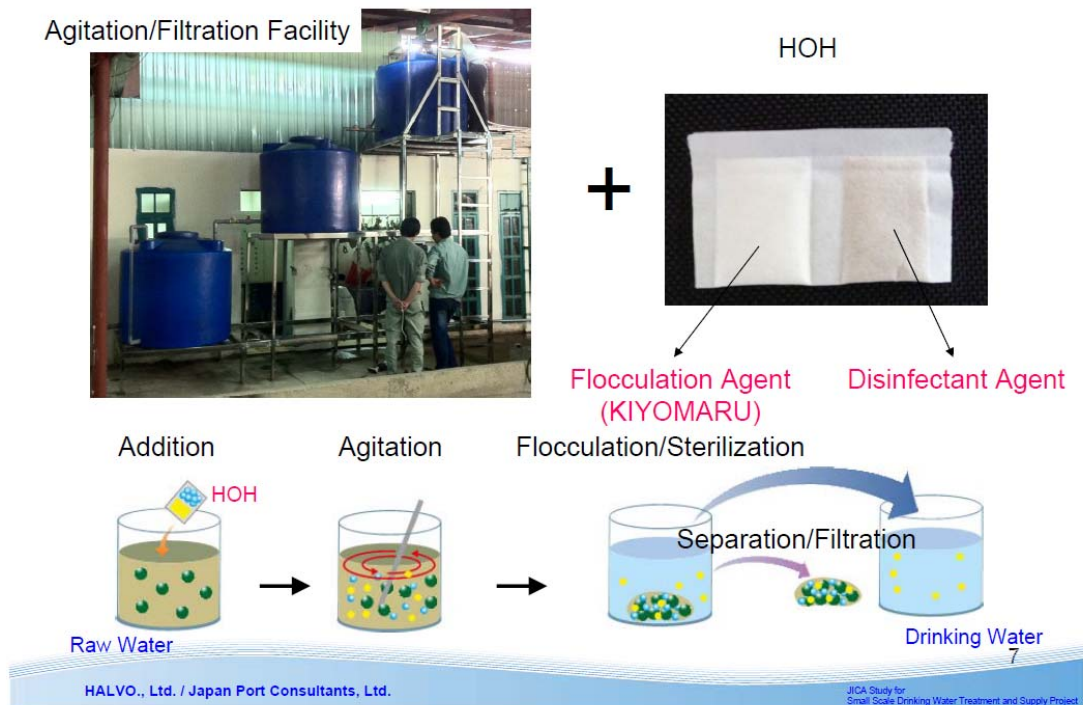
inorganic substance thus totally **eco-friendly** product,

possible to be produced with some kind of **sand in Vietnam**, and

an additive agent with very quick flocculation speed (about **5 times faster than** popular products being used in Vietnam).

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1.5 System of Drinking Water Treatment & Supply



2. Interim Results of Water Quality Testing

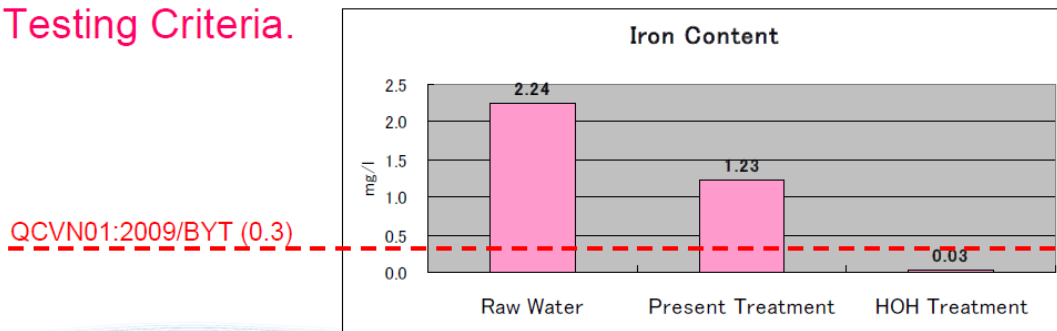
2.1 Testing Criteria

QCVN01: 2009/BYT

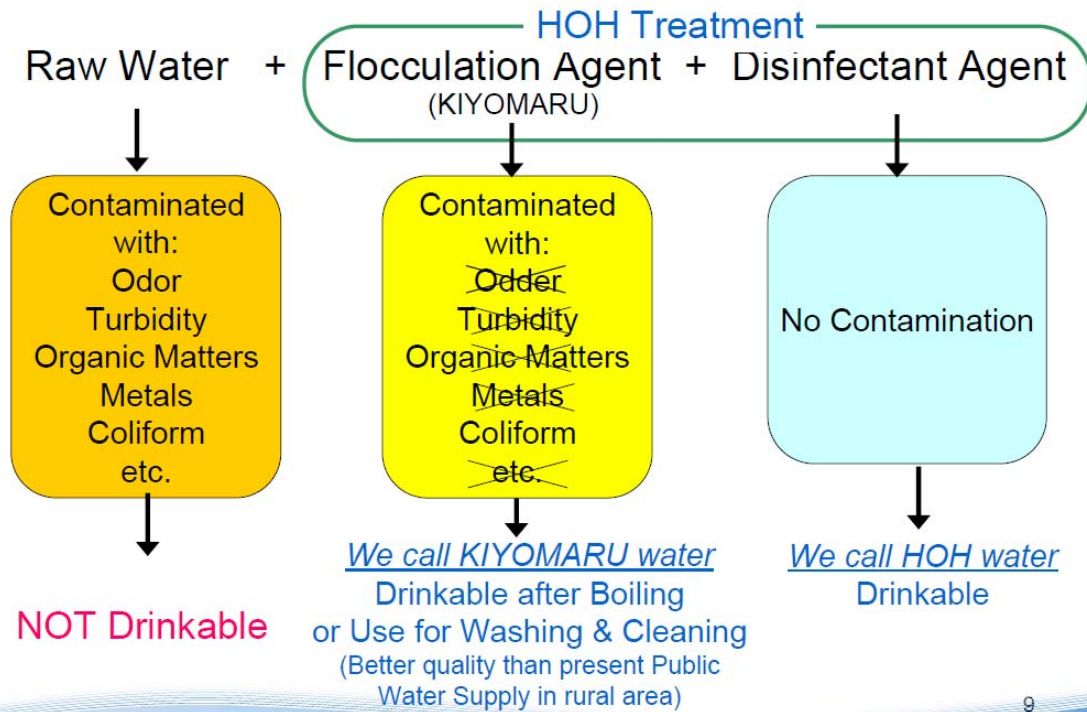
National Technical Regulation on Drinking Water Quality (109 testing parameters)

2.2 Testing Results

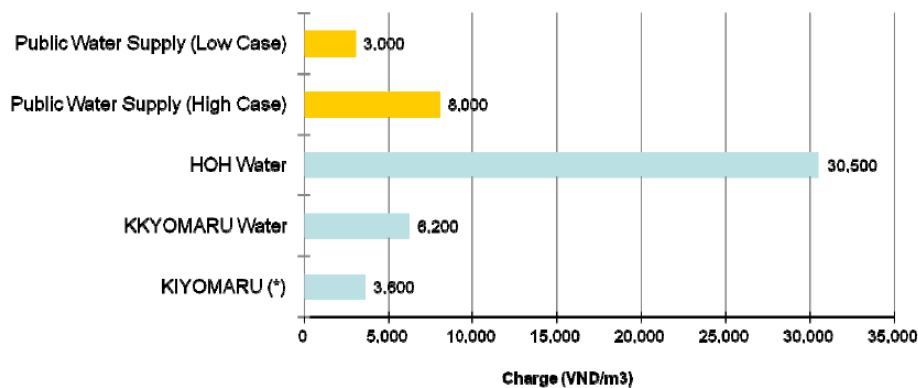
All water samples treated with HOH have met the Testing Criteria.



2.3 Image of Treated Water

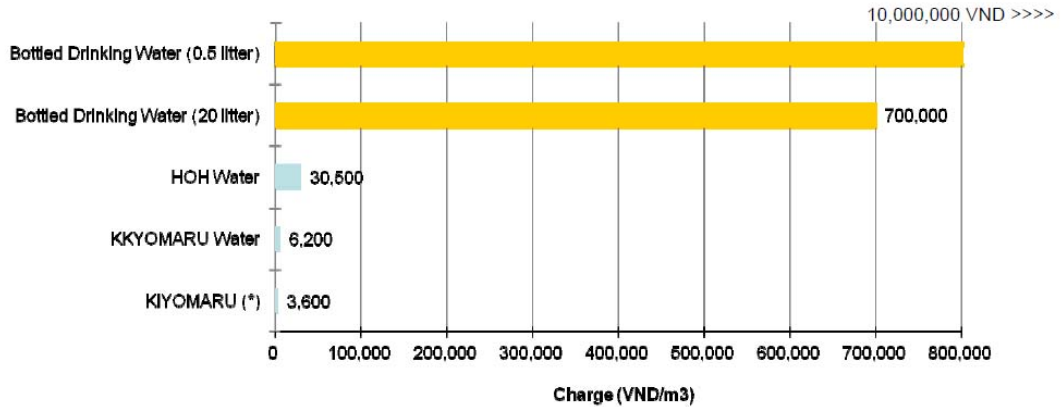


3. Cost Study



Note (*): Purer water produced at an existing public water supply station using Kiyomaru instead of the flocculation agent currently being used.

4. Market Study



Note: Charges of Bottled Drinking Water are averaged market prices.

5. Demand Study

5.1 Improvement Needs Category

KIYOMARU	⇒Quality improvement and Capacity Increase for water station
KIYOMARU water	⇒Increase of accessibility to public treated clean water in rural area
HOH water	⇒High needs for taste or emergent needs for drinkabe water

Current treatment system		Residential area	Public facilities	
			Schools	Hospitals
Urban water system				
Rural Supply	Water station	KIYOMARU	HOH water	HOH water
	Individual treatment	KIYOMARU water		
	No treatment	KIYOMARU water		
Isolated, Heavily polluted, Disaster area		HOH water		

5.2 Demand Volume

Ha Tinh Province

Improvement		Beneficiaries	Water treatment volume (m3/day)	Beneficial population(persons)
KIYOMARU (agent)	Alternative to Current treatment (Water station covered area)	Water Stations	45 Water stations 20,880	46,921 households 234,606 (17,7%)
KIYOMARU water	Supply of Domestic water (No access area to clean water)	Communities	Domestic water 17,630	198,090 (15%)
HOH water	Supply of Drinking water	Schools	223m3 (0.41m3/school)	541 schools 148,878 (pupils)
HOH water	Supply of Drinking water	Hospitals	6.4 m3 (0.23m3/hospital)	279 Hospitals 41,850 (Staffs, patients)

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Vinh Long

Improvement		Beneficiaries	Water treatment volume (m3/day)	Beneficial population(persons)
KIYOMARU (agent)	Alternative to Current treatment (Water station covered area)	Water Stations	106 Water stations 25,580	58,279 Households 285,665 (27.3%)
KIYOMARU water	Supply of Domestic water (No access area to clean water)	Communities	Domestic water 25,149	282,582 (27%)
HOH water	Supply of Drinking water	Schools	248m3 (0.68m3/school)	361 schools 165,149 (pupils)
HOH water	Supply of Drinking water	Hospitals	26.1 m3 (0.23m3/hospital)	116 Hospitals 17,400 (Staffs and patients)

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6. Project Formation

Beneficiary	Commune	Primary/Secondary School	Hospital
Supply System	Center>Vicinal Resident	Center>Student	Center>Staff
Supply Volume (m3/day)	10	0.75	0.23
Water Use (m3/day)	Domestic Use	Drinking water	Drinking water
Population Supplied	50 person (10 household)	500 persons (pupils)	150 persons (staffs, patients)
Supplier	Province	School	Hospital
Operator	Resident Leader	School Master	Hospital Staff
Cost Payer (Installation)	72 Mil. VND by Province	72 Mil. VND by School	72 Mil. VND by Hospital
Cost Payer (Operation)	22.3 Mil. VND/year by Commune	8.3 Mil. VND/year by School	2.5 Mil. VND/year by Hospital
Possible ODA Scheme	Grant (Installation Cost and Operation Training)	Grant (Installation Cost and Operation Training)	Grant (Installation Cost and Operation Training)
Potential Site	30 sites in rural/disaster/ contaminated area	30 sites in rural/disaster/ contaminated area	30 sites in rural/disaster/ contaminated area

資-6 參考資料

AN OVERVIEW OF THE DRINKING WATER SUPPLY SITUATION IN THE MEKONG RIVER DELTA, VIETNAM

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I. INTRODUCTION

The Mekong delta (MD), the most downstream part of the Mekong river (See figure 1), is known as the biggest "rice bowl" of Vietnam. The Delta has a population of 17 million inhabitants living in 4 million hectares of land. All the people living in the Delta have to depend totally on the water resources, mainly the surface water, for domestic drinking, crop irrigating, fish-shrimp raising, goods transporting and industrial producing. As a general rule, any increase in industrial and agricultural activity from upstream may affect to water quality problems more or less in the downstream.

As well as many other provinces in Vietnam, the MD are facing severe water problems. Especially since last decade, parallel with the fast-growing economy, situation of pollution, draught and flooding in the river are becoming worse more and more. To realize that the health of the people is one of factors to ensure sustainable development of the country, Vietnam government and international development agencies have implemented many water supply and environmental sanitation programs.

Notice that, in the present time, about 75% of the inhabitants in the urban and 35% in the suburban and rural have access to clean water, this figure drops to 20% in far and deep areas. Since last 20 years to now, many drinking water plants and wells have been built. Most of them are located in the cities, small towns and suburban. In the deep and far rural areas, farmers still access water directly from rivers, canals, ponds or shadow wells.

The Center of Rural Water Supply and Environmental Sanitation in each province is found since before 1990s and sponsored by UNICEF initially and Vietnam Central Government later. Their responsibilities are to serve clean water for rural people. For urban, there is Provincial Water Supply and Sewerage Company.

II. WATER SUPPLY SITUATION

II.1. Characteristics of water sources

In the MD, water is almost present all over. Water movement not only defines the biophysical environment of the MD but largely determines the production options and livelihood strategies of its inhabitants. For drinking water, there are 3 sources, i.e. rain water, surface water and ground water. Depending on the location and the periods of the year as well as the difference living conditions, the people should choose their own-ways for collecting, storing and treating the water for domestic use.

- **Rain water:** is used as one of favorite drinking water sources, special in the rural and suburban areas. In the urban places, rain water seems a minor source besides the tap water. The quantitative change of annual average rainfall in the MD is among 1,400 - 2,200 mm. About 90% of total rain water falls down the MD from May to October. In the delta, the dry season extends for 7 months resulting in serious shortage of rain water supply in many areas (See table 1).

- **Surface water:** is considered as a main source for water supply. Hydrological data records show that, each year, approximately 500 billion cubic meters (or nearly 15,000 m³/s) have flowed out to the sea via the delta. High rainfall combined with high flow of the river results in yearly flooding. Big flood occurs in the Mekong river for every 2, 3 or 4 years. There is a very big difference in discharge between wet season and dry season. In the 5 months of the wet season, from May to October, the river discharges 2/3 the total annual flow. The rest amount of river flow is distributed in 7 months, from November to May, of the dry season (about 1,700 m³/s), from December to April. The low discharge of river water also leads to the salinity intrusion and it becomes the major water use problem in the coastal lands of the delta.

Saline encroachment affects almost half of the MD. The salinity is caused by sea water intrusion in open mouths and estuaries. The phenomenon of salinity intrusion in the river branches is very complicated. The main factors that determine this process are river discharges, local rainfall and runoff, the tides and the depth of bars in the sea in front of the estuaries. Otherwise, in early rainy season, nearly 1,6 million hectares of the delta are infected by the acidity water due to the washing out aluminium and iron dissolve from the acid sulphate soil. Prevention saline water intrusion to depression may cause a potential acid sulphate soil become an activity acid sulphate soil upon drainage and oxidation.

Water quality of the Upper Mekong river is good with slightly alkaline, small dissolved salt content, and low potential toxic ions. The river carries 250 million ton of sediment per year. Sediments are rich in nutrients for agriculture cultivation but they are one of the drinking water treatment problems also. The sediment load of the river is not so high if compared with Red river in the North of Vietnam. It is highest during the rise in discharge during the flood season. Few data is available, but in August - September the sediment content, considered as total dissolved and suspended solids, would be about 300 mg/l, thereafter less than 50 mg/l. An Giang, Dong Thap, Can Tho and Vinh Long, that are provinces located on the upper Mekong River, can get greater convenience for building surface water treatment plants.

Data on small streams are scarce, water quality however may vary considerable. Rapid growths of industrialisation and urbanisation are led to increase water demand and also caused surface water pollution. Some streams flow through provinces/ cities and towns may be polluted by toxic chemicals at industrial production plants or domestic used waters, microbiological and biological aspects, insecticides,... There is no wastewater treatment plant in the city, except some wastewater treatment works in industrial zones.

The project of fresh-watering the Ca Mau Peninsula to be invested in enlarging irrigation systems, widening channels and canals, building drains, dikes, tanks, controlling salted and acid sulphate soil areas in the western and coastal part of the delta for increasing rice cultivation areas and improving the water supply to the people. So, implementing these project objectives are to seem difficulty due to many limited factors, such as capital lacking, environmental impacts, conflicts between rice farmers and shrimp farmers, project manager's skill, ...

Operation of water control system may have some disease incidence caused by altered hydrological regime. Water flow is one of important factors in transmission of diseases in

*An overview of the drinking water supply situation
in the Mekong river delta, Vietnam (Le Anh Tuan)*

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rural areas. Intestinal infections diseases including diarrhoea and dysentery occur more generally. Malaria and Dengue fever is seem common throughout the delta, especially in backish and stagnant water areas, like Ca Mau, Bac Lieu, Tra Vinh, ...

- **Groundwater:** is widely used in the many provinces along the coastal areas. Source of ground water is plentiful and present all over the delta. Ground water is exploited and pumped from 2 depth levels: at 80 - 120 meters for household wells and at 400 - 500 meters for groundwater plants (See Table 2). The upper level water is widely drilled and pumped out. UNICEF pump is commonly used but the water meet many problems with salinity and too high iron content. Salt water infiltration into ground water is very common in the coastal areas in the MD like Tien Giang, Ben Tre, Ca Mau, Kien Giang, etc. Although a lot of the wells have experienced quality problems of some kind - pH, high iron content, salinity and bad smell being most common - almost all plants for the future are based on increased groundwater withdrawal. The lower level water is better quality but it is costly in exploitation. Nevertheless, drilling the well very deep is necessary to be recommended.

II.2. Drinking water collection, treatment and distribution

Depending on the mean, place and time for water quality and quantity, the Mekong people have many ways for collection and treatment (See figure 2). Concerning the water supply, major problems in the delta, which effect people's living standards and health cares include: shortage of fresh water, salt water intrusion, acid sulphate soil, industrial and agricultural pollutions and lacking capital for water treatment and system distribution. Moreover, sustained development of the MD is threatened by large scale destruction of mangroves for shrimp cultivation that leads to the pollution of the estuarine water bodies and in the future possible by overexploitation and un-calculation of groundwater aquifer. Even minor changes to local water management technologies may have unexpected and far-search impact on the hydrological environments of the neighboring locations.

- Collecting rain water for domestic use is a traditional way in the MD. Storage of rain water in terra-cotta jars and cement-brick tanks or in large concrete containers is very common in rural, sub-urban areas and islands. The advantages of rain water in the MD are almost clean, purpose, easy to collect and very low cost. However, rain water is too short in the dry season and its storages are rather inoculated the mosquito pathogens or insect ovum. Otherwise, when falling from the air and flowing on the house roofs, aris-gutters rain water may be polluted by air-dust, bird-guano, ... A few of rain water analysis have recorded the acidity in the rain water in April, May yearly. No using of rain water in early rainy season is recommended as way to treat the air-dust and other pollutants deposited in the house-roofs after a long period of dry season.

- Freshwater from river and canal is widely used in the upper parts of the delta, where the water quality is not affected by high concentration of salinity and/or acidity and/or pollution. In An Giang and Kien Giang, building reservoirs in high lands for keeping stream water is one of the water collection ways.

Commonly, surface water taken from the rivers and streams is settled in settling tanks and then treated by aluminium sulphate (alum) and sand filter techniques. Finally, chlorination is used as a disinfectant. The purpose of sand filtration is to separate solid and liquid mixture. Alum treatment is used commonly in the delta for decreasing turbidity. This

chemical treatment will make surface water more clarify due to remove total suspended matter. Both sand filter and alum treatment are effective ways to remove total coliform bacteria as well. Depending on the special technical and financial conditions, gravity or pressure filtration, rapid or slow filtration will be chosen. Filter media are sand (size of 0.2 - 1 mm), gravel, activated coat, porous material or film are commonly used. Alum has been popular as a coagulant in treatment processes in the Mekong for quite a long time. In rural areas, villagers buy alum in solid form and stir it into river water in the storage jars. After a few minute stirring, the flocci are settled at the bottom of the jar. However, surface water treatment such as filtration and coagulation cannot ensure complete removal of the smallest bacteria and viruses as well as toxic matters from industrial and agricultural wastewater.

- Ground water is the main source for the lower parts of the delta such as coastal areas and poor water-distribution places. In rural water supply, the opinion the groundwater is the preferable choice is widespread both among staff working with water supply and villagers. In the MD, ferrous iron (Fe^{2+}) is found in groundwater commonly. It cause metallic taste and bad smell. Groundwater is pumped out and can be treated by aeration and filtration. Aeration is used to change iron content ferrous to ferric form (Fe^{3+}) and to reduce tastes and odours.

- Depending on the financial and management capacity, water suppliers can choice one of filtration processes, such as slow sand filter or pressure filters or upflow filters. Both surface and ground water are collected by electricity or hand pumps. Water Supply Plants are governed and placed in the cities and towns (see figure 3), all are the State-owned water suppliers. Treated water are stored in water tanks and distributed to households and other water users by pipe network mainly in cities, sub-urbans and small towns. Only 40 per cent to 50 per cent of the residents in the Mekong Delta have receive clean water from the State water plants.

According to NEDECO data sources: The clean water production for 15 towns in the Delta was some 142,000 m³ in 1990, of which some 40% was unaccounted for; ground water took a share of 41,000 m³/day. The urban demand was estimated at 245,000 m³/day. Industrial water use is estimated at 34,000 m³/day, entirely from ground water. In the rural area, some 19,500 small wells have been drilled with an abstraction capacity of 90,000 m³/day for water supply of about 2.6 million people.

- In accordance with a decision of Vietnam Government, from 3/2000 and depending on purpose of use, tap water prices were raised by 24.4% to 69.9%. New prices is listed as table 3. New charges seem no effect to the high income groups but it is really a problem for the poor communities.

III. DISCUSSION

Water in the MD is necessary to discuss in all its aspects. Although the amount of water on the delta is large if compared others regions on the world, but the capacity of clean water supply is finite in general and the demand is increasing due to a growing population, industrialization, urbanization and living standard.

- Water supply is become a potential developing market in the MD. In last ten years, Vietnam Central Government invested US\$ 1.3 billion into doubling the nation's water supply network. Besides the water supply projects built by the national budget, others are

generally funded through international organisations such as WB, ADB, UNICEF, UNDP and donor nations such as Finland, Denmark, France, Japan, the Netherlands, Australia, Sweden, South Korea and Germany. Looking at urban markets anywhere, we can count more than 20 trade-marks of bottled drinking water. This presents an increasing of number of drinking water suppliers if compared with a little number of them in the last decade. Water supply is as planned table 4 and table 5.

- It is noticeable that loss in water distribution systems is rather high, especial in the big cities. Up to 40%, even more, of water in Can Tho, Vinh Long, Long Xuyen and Ca Mau were lost through wastage or inefficiency. Average water loss stands at about 37% in the whole. In whole country, major causes of unaccounted for water as identified by provincial water companies, are: leaks in the distribution system; faulty meters and illegal taps (VN Water & Sewerage Ass. 2002), (See figure 4).

- Pollution of water both surface and ground had led to a decreasing amount of water available for use. It really threat the sustainability of the country if we have no any way and mean to control and to improve. It is necessary to balance water supply and demand based on the economical/ social/ environmental objectives of maximizing net benefits of water use.

- Being poor means limited capital resources to invest in living standard improvement related to clean water and environment. High prices of water supply will limit the number of water users in poor households.

- Decentralized water supply for rural communities is recommended. Development many small drinking water treatment plants inside or nearby communes or districts may get a low cost construction, a simple distribution and an easy management.

- Environmental education programmes should be introduced to the schools, communities widely. Mass communication media should have a role on raising people's awareness of water protection also. Others, a guidance how to save the tap water is also the way to decrease the water demand.

- Socialization and privatization of the water supply systems should be encouraged and conducted.

- The need for international collaboration and donor agencies to support the drinking water treatment technology, to train the water related staff and to facilitate cost-effective development is clear.

- Other far and wide problems such as gender development, poverty alleviation, climatic change, globalization and liberalization of trade, etc. related water supply should be put forward for public discussions further and later.

Le Anh Tuan
March, 2003

MAJOR REFERENCES

1. **Josefin Abrahamsson, Veronica Svensson** (2000). Rural Drinking Water - Quality and Supply in the Mekong River Delta (in English)
2. **Le Anh Tuan** (1995). Environment Impact Assessment on the Mekong Delta Irrigation projects. Cantho University (draft version, in English)
3. **NEDECO, Government of Vietnam, World Bank, Mekong Secretariat, UNDP** (1996). Master Plan for the Mekong Delta in Vietnam (in English)
4. **SIDA** (1999) Management and Use of Water Resources (in English)
5. **SR Vietnam, VN Water & Sewerage Association, World Bank**, (2002). Performance Benchmarking Urban Water Supply (in English, pdf. file)
6. **State of the Environment Vietnam** (2002). Specific characteristics of water resource and water supply in Vietnam.
(Website: [http://www.ricap.unep.org/reports/soe/vietnam/issues/ ...](http://www.ricap.unep.org/reports/soe/vietnam/issues/))
7. **Vietnam Government** (1998). Decision No 237/1998-QD-TTg dated December 12, 1998 on approving the National Target Programmes of Clean Water and Rural Environmental Sanitation (in Vietnamese)
8. **Vietnam Government, Ministry of Construction** (1998). Strategic Orientation of Urban Water Supply up to 2020 (in Vietnamese)
9. **Vietnam Government** (2000). Decision No 104/2000-QD-TTg dated August 25, 2000 on approving the National Strategy for Clean Water Supply and Rural Environmental Sanitation up to 2020 (in Vietnamese)

TABLE APPENDIX

Table 1: Roughly comparison the average monthly rainfall (mm) of some MD provinces

Month	1	2	3	4	5	6	7	8	9	10	11	12	Σ
Stations													
Can Tho	17	3	12	45	166	182	226	214	278	250	169	52	1604
Soc Trang	9	2	14	64	224	247	248	264	266	289	171	40	1840
Ca Mau	18	9	32	97	290	306	330	343	337	332	170	88	2360
Rach Gia	11	7	36	99	220	250	304	310	294	270	160	44	2015
Tan Chau	9	15	55	103	166	154	162	112	180	286	172	64	1478
Chau Doc	16	2	44	108	169	136	150	147	153	250	137	60	1385
Long Xuyen	12	2	13	97	211	162	194	197	235	287	144	57	1611
Phu Quoc	28	24	55	138	306	396	438	543	522	328	179	78	3038

Table 2: Calculated groundwater reserve of the Mekong River Delta

Aquifers	Area (km ²)	Flow rate (l/s.m)	Deep (m)	Reserve (x 1,000 m ³ /day)			
				Dynamic	Natural	Static	Elastic
Upper Pleistoxen	19,500	0.1 - 1.1	80	32	972.5	17,160	478
Lower Pleistoxen	23,500	0.9 - 1.5	60	30	-	14,100	1,763
Plitoxen	21,500	0.1- 1.5	120	27	-	25,800	2,688
Mioxen	28,300	0.2 - 0.9	100	7	-	25,650	3,420
Sum =				97	972.5	82,710	8,349
• Sum of Ground water reserve =				92,128,000 m ³ /day			
• Ground water safe yield =				1,069,000 m ³ /day			

Source: Hydrogeological Division No.8 and NEDECO (1991)

Table 3: Vietnam Tap water prices (effected on March, 1st, 2000)

Water users	Consumption rate (m ³ used/month)	Old charges (VN Dongs)	New charges (VN Dongs)
Households	Up to 4	1,300	1,700
	From 4 to 6	1,300	2,500
	From 6 to 10	1,500	3,200
	Over 10	1,500	4,000
Administrative agencies & government organisations	Up to 1	1,300	2,200
	Over 1	1,300	3,000
Production units	Over 1	3,100	4,000
Business and service units	Over 1	5,200	6,500

Note : Sur-charges added include:

Water use VAT (5%), Sewerage fee (180 VND/m³ water used), ...

Table 4: Water supply planned

Periods	Percentage of water supplied population (%)		Water supply rate (lit/day.person)		Estimated cost (million USD)	
	Urban	Rural	Urban	Rural	Urban	Rural
Up to 2010	95	85	120	60	2.165	unknown
Up to 2020	100	100	120	60	3.570	unknown

Data sources:

+ Vietnam National Strategy on Rural Water supply and Sanitation (1998)

+ Ministry of Construction (1998)

Table 5: Water Supply rates as planning stage in Vietnam

Water supply rate (litters/day.person)	Regions
50 - 60	% Mountain, Half-mountain half-plain areas
60 - 70	% Coastal areas
60 - 80	% In field areas
70 - 90	% Small and medium towns
80 - 100	% Sururban, Out-of town areas
100 - 120	% Cities, industrial zones
120 - 150	% Big cities

FIGURE APPENDIX

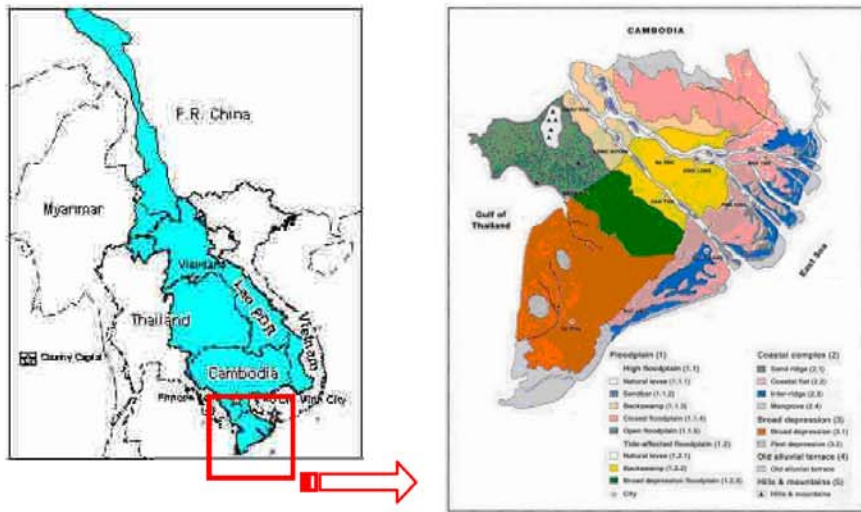


Figure 1: The Mekong River Basin and the MD landforms

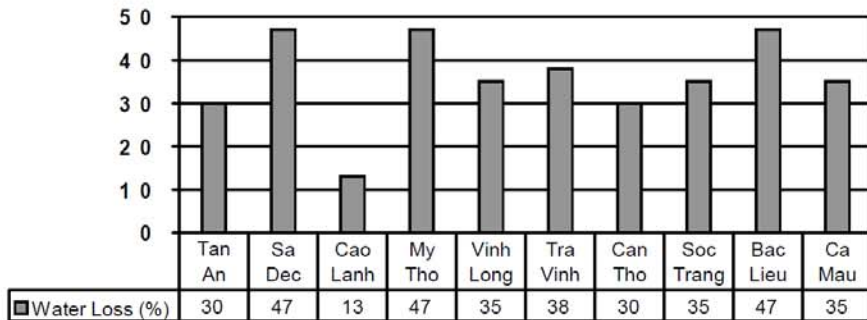


Figure 4: Average water loss (%) in some water supply plants
(Data sources: Ministry of Construction, 1998)

An overview of the drinking water supply situation in the Mekong river delta, Vietnam (Le Anh Tuan)

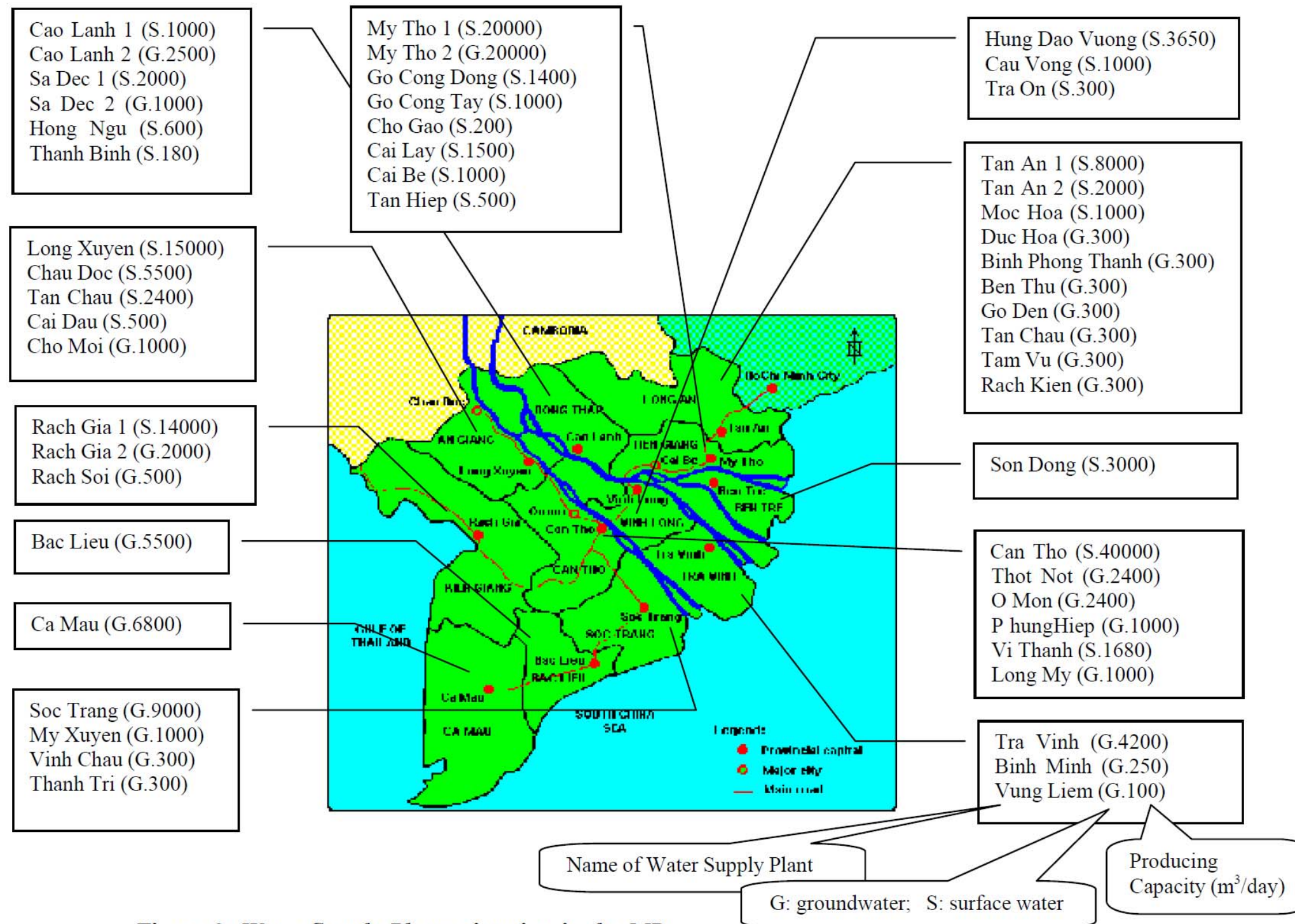


Figure 2: Water Supply Plants situation in the MD

An overview of the drinking water supply situation in the Mekong river delta, Vietnam (Le Anh Tuan)

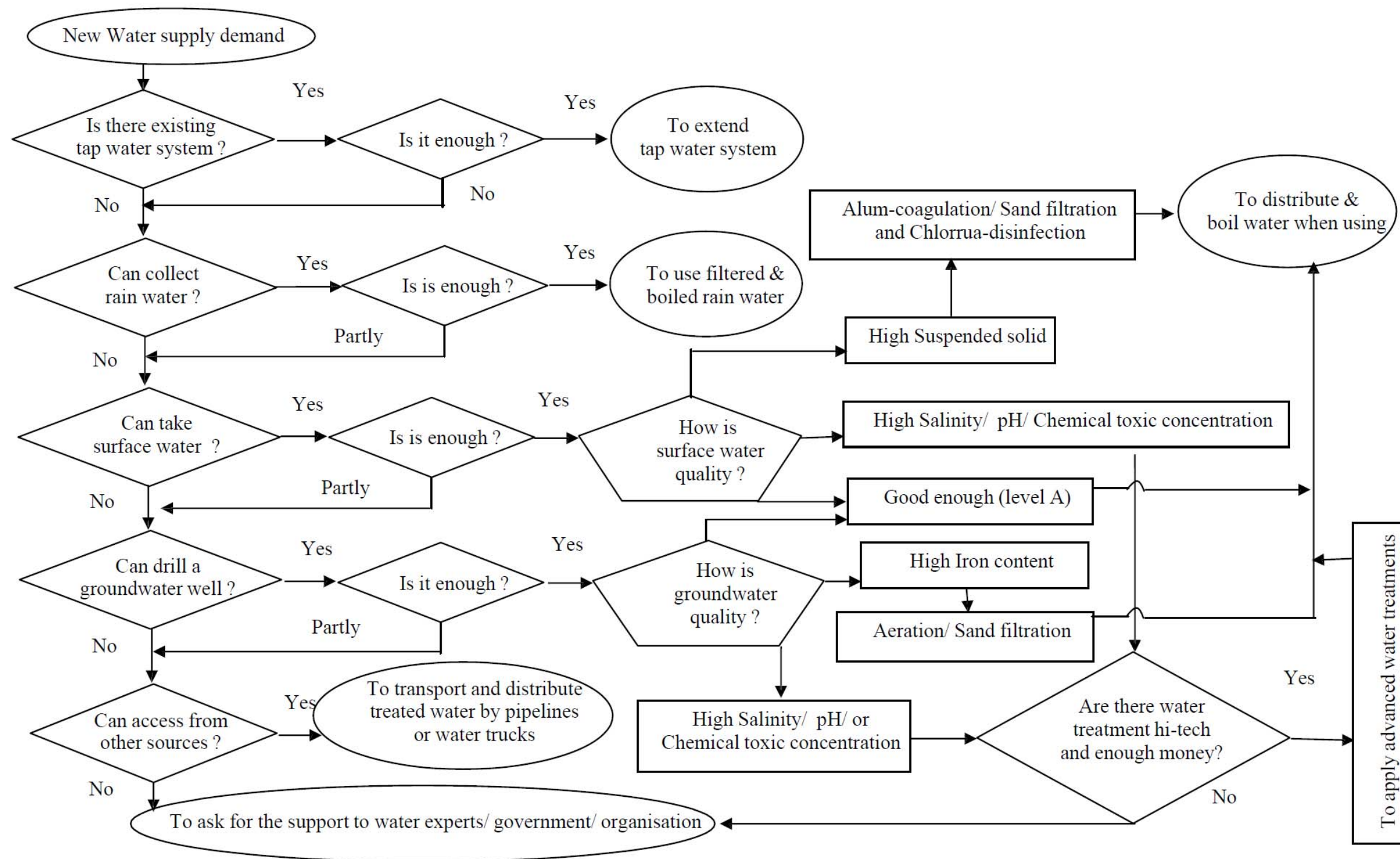


Figure 3: Commonly water abstraction & treatment alternatives in the MD (Tuan, 2003)