



JAPAN INTERNATIONAL COOPERATION AGENCY

FINAL REPORT

BASELINE SURVEY ON NATIONWIDE  
GROUND WATER QUALITY  
MONITORING IN THE PHILIPPINES

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# **FINAL REPORT ON THE BASELINE SURVEY ON NATIONWIDE GROUND WATER QUALITY MONITORING IN THE PHILIPPINES**

## **EXECUTIVE SUMMARY**

This Report is a narrative description of the process and results of the BASELINE SURVEY ON NATIONWIDE GROUNDWATER QUALITY MONITORING PROJECT. It highlights the water quality laboratory results, analysis and findings including recommendations.

The study was conducted in two phases. The first phase consisted of 61 water districts located in regions 7 and 8 in the visayas and regions 9, 10 11, 12, CARAGA and ARMM in Mindanao. The second phase covered 139 water districts located in regions 1, 2, 3, 4, 5 and CAR in Luzon and region 6 in the Visayas.

The over-all objective of the study is to establish a comprehensive water quality map nationwide that will serve as a baseline information to guide the respective water districts in monitoring ground water sources.

On a long term basis, the project is aimed at developing appropriate water treatment technologies based on the results of the survey.

## **HIGHLIGHTS OF THE GROUNDWATER QUALITY RESULTS AND ANALYSIS**

In the presentation of the final report to JICA and LWUA, there were comments and suggestions given for further explanation and clarifications. The Consultant responded and gave explicit explanations to the queries as pointed out by LWUA. The Consultants response is hereby attached as Additional Information/Data.

In addition, the Consultant undertook re-examination of samples for Total Solids and Total Dissolved Solids as requested by LWUA.

Report of the water quality analyses were presented in the form as prescribed in the Terms of Reference (TOR). Rectification done by Local Water Utilities Administration on the analyses report were incorporated in the summary of the Water Quality Test Results (Phase I and Phase II) to address inconsistencies in the individual parameters measured, when compared and/or evaluated in combination with other parameters.

Based on the analysis of results, the following tables show the summary of the non-complying parameters.



1. ODOR

No.	Water District	Source
1	Agoo	San Julian East Pumping Station #1
2	Agoo	Pumping Station #4, Sta. Barbara
3	Ilocos Norte	Tangib Pump Station
4	Lingayen	Pump Station #3
5	Binmaley	Pump Station #4
6	Binmaley	Pump Station #1 Caloocan Sur
7	San Carlos	Pump Station #1
8	Santiago	Lumidao Pumping Station
9	Tuguegarao	San Gabriel Pumping Station
10	Tuguegarao	Buntun Well Pumping Station #2
11	Morong City	Morong Pump Station #2
12	San Narciso	Palayas Pumping Station
13	Metro Lipa	Pump Station #184
14	Nasugbu	Cogonan Well #1
15	Nasugbu	Cogonan Well #2
16	Taysan	Ilaya Pumping Station
17	Dasmariñas	Zone 2 Pumping Station
18	GMA Cavite	Pump Station #8
19	Calamba	Villa Palao Banlic Pump Station #2
20	Pagsanjan	Pumping Station #1
21	San Pablo	Central Production Well
22	San Pedro	Camella Homes Subd. PS
23	Sta. Cruz	Mabini Pumping Station
24	Siniloan	Dela Rosa Well
25	Naujan	Amoguis Pumping Station
26	Puerto Princesa	Alvarez Pumping Station
27	Roxas Palawan	Pumping Station #3
28	Roxas Palawan	Pumping Station #2
29	Tanay Rizal	Tanay Market Pump Station

No.	Water District	Source
30	Infanta	Pumping Station #3
31	Macalelon	Pinagbayanan Well
32	Dingle-Pototan	DPWD Deepwell/PS Abangay PS
33	Metro Iloilo	MWD Pumping Station #1
34	Manapla	Pumping Station #1
35	Manapla	Pumping Station #2
36	Sagay City	PS-2 (Well #2)
37	Victoria's	VWD PS-2 (WD Well #2)

## 2. pH VALUE

No.	Water District	Source
1	Lingayen	Pump Station #3
2	Binmaley	Pump Station #1 Caloocan Sur
3	La Trinidad	Pump Station #8
4	Ramon	Pumping Station #1
5	Ramon	Pumping Station #2
6	Santiago	Lumidao Pumping Station
7	Bocau	Krus sa Wawa Pumping Station
8	Bocau	Tambubong Pumping Station
9	Marilao	Constantino P.S. #2
10	Marilao	Saog Pumping Station
11	Meycauyan	St. Francis Annex Pumping Station
12	Meycauyan	St. Francis Pumping Station #2
13	Norzagaray	Poblacion Pumping Station
14	Obando	Paco 1 Pumping Station
15	Obando	Robles Pumping Station
16	Cabanatuan	Lourdes Pump House
17	Cabanatuan	P. Garcia Pump House
18	Palayan	Palayan Pumping Station

No.	Water District	Source
19	Guagua	Guagua pumping Station #1
20	Masantol	Masantol Pump Station #2
21	San Fernando	San Fernando #14
22	Gerona	Gerona Pumping Station #1
23	Gerona	Gerona Pumping Station #3
24	Panique	Apulid Pumping Station
25	Panique	Cariño Pumping Station
26	Ramos	Ramos Pumping Station #1
27	Ramos	Ramos Pumping Station #2
28	Palauig	Palauig P.S. #1
29	Baler	Baler Central Well
30	Baler	Quezon Well
31	Naujan	Amoguis Pumping Station
32	Roxas (Or. Mindoro)	Pumping Station #2 Municipal Well
33	Roxas (Or. Mindoro)	Pumping Station #1 Market Well
34	Roxas Palawan	Pumping Station #2
35	Infanta	Pumping Station #3
36	Borbon	Poblacion Well
37	Pres. Roxas	Well #1
38	Cagayan De Oro	Well #1 Macasandig
39	Cagayan De Oro	Well #14
40	Gingoog	Well #6
41	Davao City	Well #30
42	Davao City	Well #1
43	Hagonoy	Well #1
44	Polomolok	Pump Station #4, Lower Dole
45	Tagum	Gemini Well
46	Buenavista	Well #2
47	Buenavista	Well #1
48	Butuan	Well #10
49	Nasipit	Well #1

## 3. TOTAL DISSOLVED SOLIDS

No.	Water District	Source
1	Agoo	San Julian East Pumping Station #1
2	Agoo	Pumping Station #4, Sta. Barbara
3	Ilocos Norte	Tangib Pump Station
4	Sarrat	Sarrat WD
5	Sinait	Pumping Station #1 Macabiag, Sinait
6	Sinait	Pumping Station #3 Bang-ay
7	Lingayen	Pump Station #4
8	San Carlos	Pump Station #1
9	San Carlos	Pumping Station #4 Coliling
10	Aparri	Pumping Station #3
11	Bocaue	Tambubong Pumping Station
12	Bulacan	San Nicholas Pumping Station
13	Bulacan	Tibig Pumping Station
14	Malolos	Fausta Subd. Pump Station
15	San Jose	Villa Ramos Pumping Station
16	Panique	Cariño Pumping Station
17	Lemery	P.S #2 Cahilan Brgy. Cahilan
18	Pagsanjan	Pumping Station #1
19	San Pedro	Camella Homes Subd. PS
20	Naujan	Poblacion Pumping Station
21	San Jose Occ. Mindoro	Pumping Station #1
22	Roxas Palawan	Pumping Station #3
23	Nabua	Santiago Old Pumping Station
24	Pili	PIWAD DA Pumping Station
25	Pili	PIWAD San Vicente Pumping Station
26	Gubat	Tiris Pumping Station
27	Sorsogon City	SCWD Pumping Station #7
28	Pontevedra	Pontevedra Pumping Station #1

No.	Water District	Source
29	Jordan	Pumping Station #1
30	Dingle-Pototan	DPWD Deepwell/PS Abangay PS
31	Metro Iloilo	MWD Pumping Station #1
32	New Lucena	NLWD Deepwell/Pumping Station
33	Bais	Talungon Well
34	Borbon	Poblacion Well
35	Sibulan	Deepwell #1 (Mainit)
36	Sibulan	Deepwell #2 (Cangmating)
37	Talibon	PS #4
38	Abuyog	Can-Ugid Well
39	Abuyog	Biton Well
40	Catbalogan	Guinsorongan Well
41	Isabel	Mahayag Well
42	Metro Hilongos	Poblacion Well
43	Metro Hilongos	Bato Well
44	Dipolog	Well #7
45	Pres. Roxas	Well #1
46	Carmen	Well #2
47	Davao City	Well #1
48	Glan	Well #4
49	Glan	Well #5
50	Hagonoy	Well #1
51	Kiblawan	Well #1
52	Panabo	Datu Abdul Well
53	San Isidro	Well #1
54	Tagum	Gemini Well
55	Pikit	Pump Station 2
56	Sultan Kudarat	PS - Esperanza
57	Bongao	Well #1
58	Buenavista	Well #2



No.	Water District	Source
59	Buenavista	Well #1
60	Butuan	Well #5

#### 4. TURBIDITY

No.	Water District	Source
1	Agooy	San Julian East Pumping Station #1
2	Agooy	Pumping Station #4, Sta. Barbara
3	Ilocos Norte	Tangib Pump Station
4	Binmaley	Pump Station #4
5	Binmaley	Pump Station #1 Calocan Sur
6	Santiago	Villasis Pumping Station
7	Morong City	Morong Pump Station #2
8	Metro Lipa	Pump Station #184
9	San Pablo	Sto. Angel Production Well
10	Roxas Palawan	Pumping Station #3
11	Roxas Palawan	Pumping Station #2
12	Tanay Rizal	Tanay Market Pump Station
13	Bacacay	Bacacay Pumping Station
14	Daraga	Budiao Well #2
15	Legaspi	Bogña Well #2
16	Legaspi	Mabinit Well #1
17	Aroroy	Filminera Well #1
18	Metro Naga	Villa Sonabella Pumping Station
19	Sorsogon City	SCWD Pumping Station #7
20	Pilar	Pilar Pumping Station #1
21	Pilar	Pilar Pumping Station #2
22	Pontevedra	Pontevedra Pumping Station #1
23	Panitan	Panitan Pumping Station
24	Manapla	Pumping Station #1

No.	Water District	Source
25	Victoria's	VWD PS-2 (WD Well #2)
26	Metro Roxas	Quiabog Pumping Station
27	Talibon	PS #5
28	Abuyog	Bito Well
29	Dipolog	Well #6
30	Carmen	Well #2
31	Tagum	Well #4
32	Tagum	Gemini Well
33	Midsayap	Abaga Well
34	Midsayap	Villarica Well
35	Mlang	Deepwell 2
36	Sultan Kudarat	PS - Esperanza

5. TOTAL HARDNESS

No.	Water District	Source
1	Dingras	Brgy. Puruganan Pumping Station #3
2	Sarrat	Sarrat WD
3	Sinait	Pumping Station #1 Macabiag, Sinait
4	Sinait	Pumping Station #3 Bang-ay
5	Lagansilang	Asist Campus
6	La Trinidad	Pump Station #8
7	San Jose	Villa Ramos Pumping Station
8	Lobo	Pump Station #1
9	Lobo	Pump Station #2
10	GMA Cavite	Pump Station #5
11	San Jose Occ. Mindoro	Pumping Station #4
12	Puerto Princesa	Alvarez Pumping Station
13	Macalelon	Pinagbayanan Well
14	Virac	Virac Pump Station

No.	Water District	Source
15	Pili	PIWAD DA Pumping Station
16	Donsol	Tres Marias Pumping Station #2
17	Gubat	Tiris Pumping Station
18	Gubat	Paco Pumping Station
19	Pontevedra	Pontevedra PS #1
20	Dingle-Pototan	DPWD Deepwell/PS Abangay PS
21	Sagay City	PS-1 (Well #14)
22	Bogo	Cogon Well
23	Bogo	Tupaz Well
24	Borbon	Poblacion Well
25	Metro Cebu	W-31Banilad Well
26	Metro Cebu	Well #1
27	Metro Siquijor	PS #1(Caitican)
28	Pinamungajan	Dakit Well
29	Pinamungajan	Pandacan Well
30	Talibon	PS #4
31	Abuyog	Bito Well
32	Catbalogan	Guinsorongan Well
33	Isabel	Mahayag Well
34	Sulat	Upper Sulat Well
35	Sulat	Lower Sulat Well
36	Dipolog	Well #7
37	Tucuran	Mabini Pumping Station
38	Davao City	Well #1
39	Glan	Well #4
40	Glan	Well #5
41	Mati	Well #2
42	Panabo	Datu Abdul Well
43	Panabo	Nigara Well
44	San Isidro	Well #1

No.	Water District	Source
45	Tagum	Well #4
46	Midsayap	Villarica Well
47	Pikit	Pump Station 1
48	Pikit	Pump Station 2
49	Bongao	Well #1
50	Bongao	Well #3
51	Butuan	Well #5
52	Tagbina	Well #1
53	Tagbina	Well #2

## 6. CHLORIDE

No.	Water District	Source
1	Agoo	Pumping Station #4, Sta. Barbara
2	Ilocos Norte	Tangib Pump Station
3	San Carlos	Pump Station #1
4	San Carlos	Pumping Station #4 Coliling
5	Lingayen	Pump Station #4
6	Bocaue	Tambubong Pumping Station
7	Bulacan	San Nicholas Pumping Station
8	Bulacan	Tibig Pumping Station
9	Malolos	Fausta Subd. Pump Station
10	Panique	Cariño Pumping Station
11	Naujan	Poblacion Pumping Station
12	Pontevedra	Pontevedra Pumping Station #1
13	Jordan	Pumping Station #1
14	New Lucena	NLWD Deepwell/Pumping Station
15	Sibulan	Deepwell #2 (Cangmating)
16	Catbalogan	Guinsorongan Well
17	Isabel	Mahayag Well
18	Pres. Roxas	Well #1

No.	Water District	Source
19	Pikit	Pump Station 2
20	Bongao	Well #1
21	Butuan	Well #5

## 7. COLOR

No.	Water District	Source
1	Agoo	San Julian East Pumping Station #1
2	Agoo	Pumping Station #4, Sta. Barbara
3	Ilocos Norte	Tangib Pump Station
4	Lingayen	Pump Station #3
5	Lingayen	Pump Station #4
6	Binmaley	Pump Station #4
7	Binmaley	Pump Station #1 Caloocan Sur
8	Mangaldan	Pump Station #7
9	Mangaldan	Pump Station #2
10	Santiago	Lumidao Pumping Station
11	Santiago	Villasis Pumping Station
12	San Narciso	Palayas Pumping Station
13	Metro Lipa	Pump Station #184
14	Roxas Palawan	Pumping Station #2
15	Daraga	Budiao Well #2
16	Tabaco	Tabaco Pumping Station
17	Nabua	Santiago Old Pumping Station
18	Legaspi	Bogña Well #2
19	Legaspi	Mabinit Well #1
20	Metro Naga	Villa Sonabella Pumping Station
21	Ibajay	Laguinbanua Pumping Station
22	Hamtic	Hamtic WD PS
23	Pontevedra	Pontevedra Pumping Station #1
24	Mambusao	Mambusao Pumping Station

No.	Water District	Source
25	Panitan	Panitan Pumping Station
26	Dingle-Pototan	DPWD Deepwell/PS Abangay PS
27	Metro Iloilo	MWD Pumping Station #1
28	Manapla	Pumping Station #1
29	Manapla	Pumping Station #2
30	Silay City	Silay WD PS-1 (WD Well #5)
31	Talibon	PS #5
32	Dipolog	Well #6
33	Carmen	Well #2
34	Hagonoy	Well #1
35	Tagum	Well #4
36	Tagum	Gemini Well
37	Midsayap	Villarica Well
38	Mlang	Deepwell 2
39	Tubod-Baroy	Pumping Station District 2
40	Bongao	Well #3
41	Butuan	Well #10

#### 8. NITRITE NITROGEN

No.	Water District	Source
1	Sta. Cruz	Pagsawitan Pumping Station STN #6
2	Abuyog	Bito Well
3	Hagonoy	Well #1

#### 9. FLOURIDE

No.	Water District	Source
1	San Jose	Malasin Pumping Station
2	Metro Naga	Villa Sonabella Pumping Station

**10. CYANIDE**

No.	Water District	Source
1	Baler	Quezon Well

**11. HYDROGEN SULFIDE**

No.	Water District	Source
1	Agoo	San Julian East Pumping Station #1
2	Agoo	Pumping Station #4, Sta. Barbara
3	Ilocos Norte	Tangib Pump Station
4	San Carlos	Pump Station #1
5	Binmaley	Pump Station #4
6	Binmaley	Pump Station #1 Calocan Sur
7	Lingayen	Pump Station #3
8	Morong City	Morong Pump Station #2
9	San Jose Del Monte	San Jose Del Monte PS #37
10	Masantol	Masantol Pump Station #2
11	Sasmuan	Sasmuan Pumping Station #1
12	Metro Lipa	Pump Station #184
13	Nasugbu	Cogonan Well #1
14	Nasugbu	Cogonan Well #2
15	Taysan	Ilaya Pumping Station
16	Taysan	Mataas na Lupa Pumping Station
17	Dasmariñas	Zone 2 Pumping Station
18	GMA Cavite	Pump Station #8
19	Calamba	Villa Palao Banlic Pump Station #2
20	Pagsanjan	Pumping Station #1
21	San Pablo	Central Production Well
22	Siniloan	Dela Rosa Well
23	Puerto Princesa	Alvarez Pumping Station
24	Roxas Palawan	Pumping Station #3

No.	Water District	Source
25	Roxas Palawan	Pumping Station #2
26	Macalelon	Pinagbayanan Well
27	Daraga	Salvacion Pumping Station
28	Tabaco	Tabaco Pumping Station
29	Virac	Virac Pump Station
30	Bato	San Vicente Pumping Station #2
31	Nabua	Santiago Old Pumping Station
32	Pili	PIWAD DA Pumping Station
33	Legaspi	Bogña Well #2
34	Legaspi	Mabinit Well #1
35	Aroroy	Filminera Well #1
36	Donsol	Tres Marias Pumping Station #1
37	Dingle-Pototan	DPWD Deepwell/PS Abangay PS
38	Metro Iloilo	MWD Pumping Station #1
39	Manapla	Pumping Station #1
40	Manapla	Pumping Station #2
41	Sagay City	PS-2 (Well #2)
42	Victoria's	VWD PS-2 (WD Well #2)
43	Bogo	Cogon Well
44	Metro Cebu	Well #1

## 12. MERCURY

No.	Water District	Source
1	San Jose	Capilihan Pumping Station
2	Camarines Norte	CNWD Well No. 4
3	Paracale	Tugos Pumping Station
4	Marawi City	Pumping Station #4



**13. LEAD**

No.	Water District	Source
1	Metro La Union	Pumping Station #10 Naguirangan
2	Baguio City	Pinsao
3	Dasmariñas	City Land Pump Station
4	Marawi City	Pumping Station #5

**14. TOTAL IRON**

No.	Water District	Source
1	Ilocos Norte	Tangib Pump Station
2	Santiago	Villasis Pumping Station
3	Roxas Palawan	Pumping Station #3
4	Roxas Palawan	Pumping Station #2
5	Tanay Rizal	Tanay Market Pump Station
6	Bacacay	Bacacay Pumping Station
7	Daraga	Budiao Well #2
8	Tabaco	Tabaco Pumping Station
9	Legaspi	Bogña Well #2
10	Legaspi	Mabinit Well #1
11	Aroroy	Filminera Well #1
12	Gubat	Tiris Pumping Station
13	Sorsogon City	SCWD Pumping Station #2
14	Pontevedra	Pontevedra Pumping Station #1
15	Mambusao	Mambusao Pumping Station
16	Panitan	Panitan Pumping Station
17	Dingle-Pototan	DPWD Deepwell/PS Abangay PS
18	Talibon	PS #5
19	Abuyog	Bito Well
20	Dipolog	Well #6
21	Carmen	Well #2

No.	Water District	Source
22	Midsayap	Villarica Well
23	Mlang	Deepwell 2
24	Tubod-Baroy	Pumping Station District 2
25	Marawi City	Pumping Station #5
26	Butuan	Well #5

#### 15. TOTAL MANGANESE

No.	Water District	Source
1	Sinait	Pumping Station #3Bang-ay
2	Tuguegarao	San Gabriel Pumping Station
3	Tuguegarao	Buntun Well Pumping Station #2
4	Bustos	Cambaog Pumping Station
5	Bustos	San Pedro Pumping Station
6	Subic	Pamatawan P.S. #2
7	Nasugbu	Cogonan Well #1
8	San Pablo	Sto. Angel Production Well
9	San Pedro	Camella Homes Subd. PS
10	Roxas Palawan	Pumping Station #3
11	Aroroy	Filminera Well #1
12	Pontevedra	Pontevedra Pumping Station #1
13	Mambusao	Mambusao Pumping Station
14	Abuyog	Bito Well
15	Panabo	Nigara Well
16	Tagum	Well #4
17	Midsayap	Villarica Well
18	Sultan Kudarat	PS - Esparanza

**16. ALUMINUM**

No.	Water District	Source
1	Baguio City	Pinsao
2	Pinamungajan	Dakit Well
3	Pinamungajan	Pandacan Well
4	Abuyog	Can-Ugid Well
5	Abuyog	Bito Well
6	Metro Hilongos	Poblacion Well
7	Valencia	Well #3
8	Mlang	Deepwell 2
9	Mlang	Deepwell 1
10	Kabacan	Pump Station 1
11	Kabacan	Pump Station 2

**17. ARSENIC**

No.	Water District	Source
1	Dasmariñas	City Land Pump Station
2	Sibulan	Deepwell #1 (Mainit)
3	Sibulan	Deepwell #2 (Cangmating)
4	Pagadian	Well #3
5	Pres. Roxas	Well #1
6	San Isidro	Well #1
7	Tubod-Baroy	Well #1

**18. CHROMIUM**

No.	Water District	Source
1	Manapla	Pumping Station #1

## 19. SELENIUM

No.	Water District	Source
1	Mati	Well #2

## 20. HEPTACHLOR EXPOXIDE

No.	Water District	Source
1	Infanta	Pumping Station #3
2	Buenavista	Pumping Station #2
3	Bogo	Tupaz Well
4	Pinamungajan	Pandacan Well
5	Catbalogan	Guinsorongan Well
6	Dipolog	Well #7
7	Kibawe	Well #3
8	Butuan	Well #10

## RECOMMENDATIONS

The above results have identified the Water Districts, the specific water source and the parameters that have exceeded the standards of PNSDW.

The study is only limited to one (1) sample per water source, therefore it is recommended that confirmatory sampling and analysis be conducted on water sources that have exceeded the limits on heavy metals, organic parameters and selected parameters and other non-complying parameters.

It is further recommended that additional test and sampling be conducted to establish trend. Conclusive findings on the water quality based on the established trend will then be the reference/basis in the conduct of strategic assessment on the options and alternatives that will address the water quality problem on specific water districts.

### 1. INTRODUCTION

This Final Report on the Baseline Survey on Nationwide Ground Water Quality Monitoring in the Philippines compiles the field activities on the conduct of the water sampling, laboratory test results and analysis of samples collected from the target 200 Water Districts in Luzon, Visayas and Mindanao. The conduct of the survey was divided into two (2) Phases.

Phase I covered 61 Water Districts in the 8 regions of the Visayas and Mindanao. The areas covered include Regions 7 (Central Visayas), 8 (Eastern Visayas), 9 (Western Mindanao), 10 (Northern Mindanao), 11 (Southern Mindanao), 12 (Central Mindanao), ARMM and Caraga. Of the total water districts considered for Phase 1, seventeen (17) Water Districts were not included in the list where Consultant will engage in actual water sampling and collection. These water districts are located in ARMM and portions of Regions 9 and 12. LWUA made the coordination with the 17 Water Districts on the water quality sampling and transport to Manila.

Phase II of the project covered 139 Water Districts in the 5 regions of Luzon and region 6 in the Visayas. These are Regions 1 (Ilocos Region), 2 (Cagayan Valley), CAR, 3 (Central Luzon), 4 (Southern Luzon), 5 (the Bicol Region) and 6 (Western Visayas). Included in Phase II are 5 Water Districts located in Mindanao that were originally included in Phase I but were not able to submit samples for test and analysis.

## **2. SURVEY TEAM ORGANIZATION AND CLUSTERING OF WATER DISTRICTS**

Basically, there are 5 survey teams supervised by a team leader and composed of a water supply engineer and a junior engineer assigned in one cluster.

For Phase I, the water districts were clustered into 5 based on political subdivision, geographic location and accessibility. The clusterings are region 7 (island provinces), 8 (island provinces), 9 (Western Mindanao), 10 and CARAGA (clustered as one), 11 and 12 (clustered as one). The water samples from the 17 Water Districts identified by JICA/LWUA will be taken and shipped to Manila by their respective local personnel of the Water Districts in coordination with LWUA. Tables 2-1 presents the team composition and area of assignment for Phase I while table 2-2 presents the list of seventeen (17) Water Districts assigned to LWUA and the respective Water Districts.

For Phase II, regional clustering of Water Districts were followed considering the geographical locations of the target Water Districts and the big number of sites and samples per region. The Three (3) Water Districts in Mindanao included in Phase II are Norala WD, Ipil WD and Siasi WD in Sulu. These are the Water Districts included in Phase I who were not able to send samples Table 2.3 presents the team composition and area of assignment for Phase II.

## **3. CONDUCT OF WATER SAMPLING**

The INTERTEK Testing Laboratory was commissioned to perform the required water quality analyses of samples both for Phase I and II. As requested by JICA and LWUA, one (1) sample each from the five Water Districts in Phase II were analyzed by a different laboratory for purpose of comparison. These Water Districts are Paracale WD, San Jose City WD (Nueva Ecija), Baguio WD, Dasmarias WD in Cavite and Metro Roxas WD in Capiz. The laboratory prepared all the sample containers and paraphernalia. This preparation includes sterilization of containers, placing of fixing agents for sample preservation and packaging of sample containers per survey group. This procedure was done to ensure that all sampling materials are ready prior to actual shipping of sampling materials to the designated areas. Considering that different sample preservations are required for the various parameters needed, five samples bottles were prepared for each sampling site as follows:

- 4-liter amber glass for organic (pesticides) parameters;
- 4-liter plastic container for BOD/COD and other physical parameters;
- 2-liter plastic container for heavy metals; and
- 2 bottles for Dissolved Oxygen.

Physical parameters such as pH and temperature were taken in the field. In addition to actual water sampling, well location thru the GPS instrument was taken including well discharge and other useful technical information. Photographs of actual sampling point were likewise taken.

All sampling containers were securely sealed and properly labeled with the following information:

- Sample Number/Name
- Date and Time of Sampling
- Location of Source
- Description/Remarks

The same information was placed in the "Chain of Custody" form provided by the laboratory for proper identification.

All sample containers are placed in a Styrofoam box with ice of sufficient amount to last until reaching the airport. During transport, sample bottles were placed inside a double heavy duty plastic bags with newspaper padding on all sides of the box to absorb the moisture from the chilled water samples. Carton spacers are also placed in between sample bottles to avoid breakage during handling.

The laboratory is responsible in picking up all the samples from the Manila Domestic Airport or at the designated bus terminals and are brought directly to the laboratory. For the 32 sites coming from the seventeen (17) water districts, samples were picked up at Manila domestic airport by the laboratory personnel.

For Phase I, field activities started on March 2003 covering the target 61 water districts. The actual water sampling was completed as scheduled. Three (3) water districts in Mindanao were not able to send the samples during the contract period. These are Noralla in South Cotabato, Ipil in Zamboanga Del Sur and Siasi in Sulu.

For Phase 2, water sampling activities started on 27 May 2001 covering the target 139 Water District and the 3 water districts carried over from Phase I. Field activities were completed on 8 August 2003 or about 15 days behind the target schedule.

Due to the delay, JICA amended the Implementation period from 16 May to 15 September.

#### **4. RESULTS OF WATER SAMPLING ACTIVITIES AND TEST ANALYSIS**

Prior to the conduct of actual collection of water samples, the team coordinated with the respective water districts to brief them on the purpose of the field activity, to confirm the well sources where samples will be taken and to schedule the date and time of the actual water sampling. The water districts provided guide for the teams at the actual sampling site.

Tables 4.1 and 4.2 present the water quality test results for Phases I and II for individual water districts and summary by regions, respectively. These tables contain the results of the water sample analysis as well as the information as required in the TOR such as coordinates of the well site and relevant well data.

## **5. PROBLEMS ENCOUNTERED**

In general, distant location of majority of the water districts and air cargo handling were the usual problems encountered during the conduct of Phase I of the survey. The travel time between regional centers and most of the water districts ranges from 2 to 8 hours depending on the location and road conditions. In regions 8 and 9, the team encountered difficulty in scheduling the actual water sampling because of the changing airline schedule. The team has to adjust the sampling date and time to fit the airline schedule.

Although it was anticipated that the airline procedure and requirement on wet cargo handling is very tedious, the procedure became even longer with the safety and security measures being implemented by airport security personnel due to the recent bombings in Mindanao.

In spite of the above problems that were encountered, the Consultant was able to complete the activity as scheduled.

For Phase II, the problem was more on the mobility of the survey team. Traffic especially in areas near metro-manila has been an everyday problem in north Luzon and south Luzon expressways and almost all urban centers in regions 3 and 4. In June and July 2003, 4 typhoons hit Luzon causing floods and power outages especially in regions 2, 3 and 4. This aggravated the mobility of the survey. As a result, the team has to extend an average of 15 more days in the field to complete the water quality sampling. In region 2, the survey team waited for the restoration of electricity that energizes the pumping stations.

The last batch of water samples reached the laboratory on August 9, 2003. With this delay, the laboratory completed the test and analysis on August 30 and the water quality results were subsequently delivered to the Consultant by end of August.

This delay has directly affected the preparation of the Final report and the completion of the Water Quality Map.

6. DETAILS OF THE RECTIFICATION DONE BY LWUA

Parameters	Conditions/Basis of Computation
1. Odor and Hydrogen Sulfide (H <sub>2</sub> S)	<ul style="list-style-type: none"> <li>• Field observation/analyses served as the starting point of evaluation. If Field Odor is unobjectionable ≈ no H<sub>2</sub>S. Whatever lab result of H<sub>2</sub>S = 0</li> <li>• If for Field Analysis Odor is objectionable ≈ H<sub>2</sub>S (lab result) confirmed, computed gravimetrically as H<sub>2</sub>S not as Sulfide (S<sup>-</sup>)</li> <li>• Odor verified with the Water Districts (WD's).</li> </ul>
2. Conductivity, Total Dissolved Solids (TDS) and Total Solids (TS)	<p><u>Conductivity, TDS, and TS are directly related</u></p> <ul style="list-style-type: none"> <li>• TDS should not be greater than TS. If TDS &gt; TS; re-examination required. If not possible, TDS is computed from reported values of major cationic and ionic constituents that are indicators of general Water Quality.</li> <li>• TS value cannot be derived through analytical computation due to insufficient data (Total Suspended Solids value needed but not measured), leave the data <u>blank</u>.</li> <li>• TS value verified with the WD's.</li> </ul>
3. pH Value and Acidity	<p>Water with pH Value close to 8.3, Acidity = 0, Acceptable. Standard endpoint for filtration of Total Acidity using Phenolphthalein as indicator.</p>
4. Nitrite and Nitrate	<p>Values were computed using gravimetric factors based on the molecular weight known concentrations of the compound to come up with the required concentration as specified in the Terms of Reference (TOR)</p>







LIST OF TABLES



REGION 1



## RESULT OF ANALYSIS

1	Name of WD	Agoo
2	Date of Analysis	June 6 - June 20, 2003
3	Area number	1 - Region 1
4	Province	La Union

1	Name of source	Pumping Station #4, Sta. Barbara
2	Location	N 16° 19' 37.3"
		E 120° 21' 38.7"
3	Depth Borehole; meter	46
4	Discharge Flowrate; liters/sec	10
5	Date of Well Operation	No data
6	Disinfection Unit;	No data
	Gas Chlorinator	
	Hypochlorinator	

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	O*		26	Potassium	mg/L		12.86	
2	Temperature	°C		28.6*		27	Calcium	mg/L		16.84	
3	pH		6.5-8.5	8.1*		28	Magnesium	mg/L		7.84	
4	Color	Units	5	100		29	Silica	mg/L		36	
5	Turbidity	NTU	5	20.90		30	Total Iron	mg/L	1	0.91	0.001
6	Conductivity	uS/cm		2130		31	Total Manganese	mg/L	0.5	0.3	0.006
7	Total Dissolved Solids	mg/L	500	1232		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		1251		33	Zinc	mg/L	5 <sup>@</sup>	0.4	0.002
9	Chloride	mg/L	250	474		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		53		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	74		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		6.16	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.10 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	1.09 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.71		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0.10 <sup>1</sup>	0.01	45	Heptachlor	µg/L	0.03	0.02	0.01
21	DO (DO%)	mg/L		1.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		3		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.14	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	141			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA)

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Alaminos
2	Date of Analysis	June 24-July 07, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #1
2	Location	N 16° 7' 20.3"
		E 119° 0' 12.5"
3	Depth Borehole; meter	101
4	Discharge Flowrate; liters/sec	25
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator
		No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		2.84	
2	Temperature	°C		29.8*		27	Calcium	mg/L		34.96	
3	pH		6.5-8.5	7.6*		28	Magnesium	mg/L		7.83	
4	Color	Units	5	<5		29	Silica	mg/L		47	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		583		31	Total Manganese	mg/L	0.5	<MDL	0.006
7	Total Dissolved Solids	mg/L	500	355		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		362		33	Zinc	mg/L	5 <sup>②</sup>	<MDL	0.002
9	Chloride	mg/L	250	10		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		216		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		24		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>②</sup>	120		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.28		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		1.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		3.0		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>②</sup>	13.12			II			<MDL	0.02

Note: <sup>②</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Alaminos
2	Date of Analysis	June 20-July 07, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pumping Station #2
2	Location	N 16° 7' 14.4"
		E 119° 59' 22.1"
3	Depth Borehole; meter	116
4	Discharge Flowrate; liters/sec	18
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator
		No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		2.58	
2	Temperature	°C		28.2*		27	Calcium	mg/L		74.66	
3	pH		6.5-8.5	7.4*		28	Magnesium	mg/L		8.02	
4	Color	Units	5	<5		29	Silica	mg/L		21	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		503		31	Total Manganese	mg/L	0.5	<MDL	0.006
7	Total Dissolved Solids	mg/L	500	238		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		275		33	Zinc	mg/L	5 <sup>①</sup>	<MDL	0.002
9	Chloride	mg/L	250	7		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		248		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		21		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>②</sup>	219		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.25		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		1.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		5		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>②</sup>	5.58			II			<MDL	0.02

Note: <sup>②</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination



## RESULT OF ANALYSIS

1	Name of WD	Metro La Union
2	Date of Analysis	June 6 - June 23, 2003
3	Area number	1 - Region 1
4	Province	La Union

1	Name of source	Pumping Station #2, Ballay
2	Location	N 16° 31' 3.9"
		E 120° 21' 43.6"
3	Depth Borehole; meter	28
4	Discharge Flowrate; liters/sec	22
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator
		No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		6.98	
2	Temperature	°C		29.4*		27	Calcium	mg/L		36.96	
3	pH		6.5-8.5	7.3*		28	Magnesium	mg/L		5.4	
4	Color	Units	5	<5		29	Silica	mg/L		42	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	ND	0.001
6	Conductivity	µS/cm		499		31	Total Manganese	mg/L	0.5	ND	0.006
7	Total Dissolved Solids	mg/L	500	143 <sup>+</sup>		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		353 <sup>+</sup>		33	Zinc	mg/L	5 <sup>®</sup>	0.05	0.002
9	Chloride	mg/L	250	13		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		27		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		14		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	114		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		3.01	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.432		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		10		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.14	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	7.92			II			<MDL	0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Binmaley
2	Date of Analysis	June 25-July 09, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #1 Caloocan Sur
2	Location	N 16° 1' 28.7" E 120° 17' 39.4" Binmaley WD, Caloocan Sur, Binmaley, Pangasinan
3	Depth Borehole; meter	250
4	Discharge Flowrate; liters/sec	26.8
5	Date of Well Operation	No data
6	Disinfection Unit; Gas Chlorinator Hypochlorinator	No data

PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1 Odor		U	O*		26 Potassium	mg/L		0.18	
2 Temperature	°C		32.6*		27 Calcium	mg/L		7.98	
3 pH		6.5-8.5	8.6*		28 Magnesium	mg/L		1.03	
4 Color	Units	5	50		29 Silica	mg/L		66	
5 Turbidity	NTU	5	11		30 Total Iron	mg/L	1	<MDL	0.001
6 Conductivity	µS/cm		540		31 Total Manganese	mg/L	0.5	0.03	0.006
7 Total Dissolved Solids	mg/L	500	354		32 Aluminum	mg/L	0.2	<MDL	0.01
8 Total Solids	mg/L		356		33 Zinc	mg/L	5 <sup>@</sup>	0.02	0.002
9 Chloride	mg/L	250	20		34 Copper	mg/L	1	<MDL	0.001
10 Total Alkalinity	mg/L		244		35 Arsenic	mg/L	0.01	<MDL	0.01
11 Acidity	mg/L		0 <sup>3</sup>		36 Chromium	mg/L	0.05	<MDL	0.003
12 Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	24		37 Cadmium	mg/L	0.003	<MDL	0.003
13 Sulfate	mg/L	250	0		38 Selenium	mg/L	0.01	<MDL	0.001
14 Phosphate	mg/L		<MDL	0.1	39 Lead	mg/L	0.01	<MDL	0.005
15 Nitrite	mg/L	3	0.03 <sup>1</sup>	0.001	40 Mercury	mg/L	0.001	<MDL	0.001
16 Nitrate	mg/L	50	0	0.001	41 Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17 Ammonia-Nitrogen	mg/L		<MDL	0.20	42 Chlordane	µg/L	0.2	<MDL	0.02
18 Fluoride	mg/L	1	0.31		43 DDT	µg/L	2	<MDL	0.01
19 Cyanide	mg/L	0.07	0	0.002	44 Endrin	µg/L	0.2	<MDL	0.02
20 Hydrogen Sulfide	mg/L	0.05	0.17 <sup>1</sup>	0.01	45 Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21 DO (DO%)	mg/L		2		46 Lindane	µg/L	2	<MDL	0.01
22 COD	mg/L		0		47 Methoxychlor	µg/L	20	<MDL	0.02
23 BOD	mg/L		18		48 Toxaphene	µg/L		<MDL	0.02
24 Surfactant	mg/L		0.09	0.05	49 Endosulfan I	µg/L		<MDL	0.01
25 Sodium	mg/L	200 <sup>@</sup>	36.33		II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Binmaley
2	Date of Analysis	June 25-July 09, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #4
2	Location	N 16° 1' 14.6"
		E 120° 16' 0.4"
3	Depth Borehole; meter	209
4	Discharge Flowrate; liters/sec	25
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator
		No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	O*		26	Potassium	mg/L		1.43	
2	Temperature	°C		32.8*		27	Calcium	mg/L		9.6	
3	pH		6.5-8.5	8.5*		28	Magnesium	mg/L		0.81	
4	Color	Units	5	25		29	Silica	mg/L		82	
5	Turbidity	NTU	5	6		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		541		31	Total Manganese	mg/L	0.5	<MDL	0.006
7	Total Dissolved Solids	mg/L	500	339		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		348		33	Zinc	mg/L	5 <sup>®</sup>	<MDL	0.002
9	Chloride	mg/L	250	28		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		229		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		0 <sup>3</sup>		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	27		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.13 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.04		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0.15 <sup>1</sup>	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03		0.01
21	DO (DO%)	mg/L		3		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		7		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.05	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	15.43			II				0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Dagupan
2	Date of Analysis	June 20-July 04, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Bolosan Pumping Station	
2	Location	N 16° 3' 7.8"	Dagupan WD, Brgy Bolosan,
		E 120° 21' 42.5"	Dagupan City, Pangasinan
3	Depth Borehole; meter	150	
4	Discharge Flowrate; liters/sec	19	
5	Date of Well Operation	No data	
6	Disinfection Unit;	Gas Chlorinator	No data
		Hypochlorinator	

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		2.74	
2	Temperature	°C		29.7*		27	Calcium	mg/L		10.17	
3	pH		6.5-8.5	8.4*		28	Magnesium	mg/L		0.54	
4	Color	Units	5	<5		29	Silica	mg/L		75	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	$\mu$ S/cm		322		31	Total Manganese	mg/L	0.5	0.04	0.006
7	Total Dissolved Solids	mg/L	500	244		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		253		33	Zinc	mg/L	5 <sup>@</sup>	0.02	0.002
9	Chloride	mg/L	250	3		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		55		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		0 <sup>3</sup>		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	28		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	$\mu$ g/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	$\mu$ g/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.17		43	DDT	$\mu$ g/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	$\mu$ g/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	$\mu$ g/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2.0		46	Lindane	$\mu$ g/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	$\mu$ g/L	20	<MDL	0.02
23	BOD	mg/L		<1		48	Toxaphene	$\mu$ g/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	$\mu$ g/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	20.12			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Ilocos Norte
2	Date of Analysis	June 11 - June 25
3	Area number	1 - Region 1
4	Province	Ilocos Norte

1	Name of source	Brgy 29 Pumping Station #4
2	Location	N 18° 10' 56"
		E 120° 36' 28.7"
3	Depth Borehole; meter	31
4	Discharge Flowrate; liters/sec	17
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		6.35	
2	Temperature	°C		29.7*		27	Calcium	mg/L		46.9	
3	pH		6.5-8.5	7.4*		28	Magnesium	mg/L		5.76	
4	Color	Units	5	<5		29	Silica	mg/L		40	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	uS/cm		391		31	Total Manganese	mg/L	0.5	0.28	0.006
7	Total Dissolved Solids	mg/L	500	226		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		234		33	Zinc	mg/L	5 <sup>®</sup>	<MDL	0.002
9	Chloride	mg/L	250	15		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		22		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		9		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	141		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		3	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.04	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.16		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		8		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	16.54			II			<MDL	0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

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MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	San Quintin
2	Date of Analysis	June 25-July 09, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #1, Brgy. Gonzalo
2	Location	N 15° 58' 49.6"
		E 120° 49' 10.8"
3	Depth Borehole; meter	120
4	Discharge Flowrate; liters/sec	6.9
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		2.35	
2	Temperature	°C		27.1*		27	Calcium	mg/L		32.5	
3	pH		6.5-8.5	8*		28	Magnesium	mg/L		6.16	
4	Color	Units	5	<5		29	Silica	mg/L		39	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		285		31	Total Manganese	mg/L	0.5	<MDL	0.006
7	Total Dissolved Solids	mg/L	500	190		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		214 <sup>+</sup>		33	Zinc	mg/L	5 <sup>®</sup>	0.008	0.002
9	Chloride	mg/L	250	5		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		134		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	0.05	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	106		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.15		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		3.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		3.0		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.08	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	32.1			II			<MDL	0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

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MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Dingras
2	Date of Analysis	June 9 - June 23, 2003
3	Area number	1 - Region 1
4	Province	Ilocos Norte

1	Name of source	Pumping Station #2, Brgy	
2	Location	N 18° 5' 45.5"	Guerrero Dingras, Dingras WD
		E 120° 42' 18"	Dingras, Ilocos Norte
3	Depth Borehole; meter	30	
4	Discharge Flowrate; liters/sec	5	
5	Date of Well Operation	No data	
6	Disinfection Unit;	Gas Chlorinator	No data
		Hypochlorinator	

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		3.64	
2	Temperature	°C		29*		27	Calcium	mg/L		25	
3	pH		6.5-8.5	7.9*		28	Magnesium	mg/L		2.27	
4	Color	Units	5	5.0		29	Silica	mg/L		51	
5	Turbidity	NTU	5	5.0		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		231		31	Total Manganese	mg/L	0.5	0.03	0.006
7	Total Dissolved Solids	mg/L	500	192		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		200		33	Zinc	mg/L	5 <sup>®</sup>	0.07	0.002
9	Chloride	mg/L	250	1		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		6		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		4		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	72		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		3	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.09 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.13		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		3.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		<1		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.14	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	8.72			II			<MDL	0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

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MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Dingras
2	Date of Analysis	June 6 - June 20, 2003
3	Area number	1 - Region 1
4	Province	Ilocos Norte

1	Name of source	Brgy. Puruganan Pumping
2	Location	N 18° 6' 40.6"
		E 120° 41' 36.7"
3	Depth Borehole; meter	70
4	Discharge Flowrate; liters/sec	12
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator
		No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		2.94	
2	Temperature	°C		28.8*		27	Calcium	mg/L		106.18	
3	pH		6.5-8.5	7.5*		28	Magnesium	mg/L		13.45	
4	Color	Units	5	<5		29	Silica	mg/L		73	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	0.36	0.001
6	Conductivity	$\mu$ S/cm		622		31	Total Manganese	mg/L	0.5	0.11	0.006
7	Total Dissolved Solids	mg/L	500	349		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		455		33	Zinc	mg/L	5 <sup>@</sup>	0.08	0.002
9	Chloride	mg/L	250	7		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		42		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		18		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	320		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		3	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.35 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	$\mu$ g/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	$\mu$ g/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.19		43	DDT	$\mu$ g/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	$\mu$ g/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0	0.01	45	Heptachlor/Heptachlor Epoxide	$\mu$ g/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2		46	Lindane	$\mu$ g/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	$\mu$ g/L	20	<MDL	0.02
23	BOD	mg/L		4.0		48	Toxaphene	$\mu$ g/L		<MDL	0.02
24	Surfactant	mg/L		0.11	0.05	49	Endosulfan I	$\mu$ g/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	18.45			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination



## RESULT OF ANALYSIS

1	Name of WD	Lingayen
2	Date of Analysis	June 24-July 08, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #3
2	Location	N 16° 1' 31.7" E 120° 14' 18" Lingayen WD, Brgy. Tomon, Lingayen, Pangasinan
3	Depth Borehole; meter	200
4	Discharge Flowrate; liters/sec	No Data
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator Hypochlorinator No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	O*		26	Potassium	mg/L		5.94	
2	Temperature	°C		32.5*		27	Calcium	mg/L		12.58	
3	pH		6.5-8.5	8.7*		28	Magnesium	mg/L		1.21	
4	Color	Units	5	10		29	Silica	mg/L		25	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	uS/cm		774		31	Total Manganese	mg/L	0.5	<MDL	0.006
7	Total Dissolved Solids	mg/L	500	406		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		438		33	Zinc	mg/L	5 <sup>@</sup>	<MDL	0.002
9	Chloride	mg/L	250	118		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		192		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		0 <sup>3</sup>		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	36		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.90 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.16		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0.09 <sup>1</sup>	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		1		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		2		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.05	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	39.33			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Lingayen
2	Date of Analysis	June 24-July 08, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #4
2	Location	N 16° 1' 56.9" E 120° 14' 23.6" Lingayen WD, Brgy Libsong Ea Lingayen, Pangasinan
3	Depth Borehole; meter	250
4	Discharge Flowrate; liters/sec	25
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator Hypochlorinator No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		5.2	
2	Temperature	°C		34*		27	Calcium	mg/L		27.64	
3	pH		6.5-8.5	8.5*		28	Magnesium	mg/L		2.43	
4	Color	Units	5	29		29	Silica	mg/L		29	
5	Turbidity	NTU	5	5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	$\mu$ S/cm		1059 <sup>2</sup>		31	Total Manganese	mg/L	0.5	0.05	0.006
7	Total Dissolved Solids	mg/L	500	678		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		709		33	Zinc	mg/L	5 <sup>@</sup>	<MDL	0.002
9	Chloride	mg/L	250	332		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		80		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		0 <sup>3</sup>		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	79		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.05 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	$\mu$ g/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	$\mu$ g/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.21		43	DDT	$\mu$ g/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	$\mu$ g/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	$\mu$ g/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2		46	Lindane	$\mu$ g/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	$\mu$ g/L	20	<MDL	0.02
23	BOD	mg/L		10		48	Toxaphene	$\mu$ g/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	$\mu$ g/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	57.3			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Sinait
2	Date of Analysis	July 3 - July 15, 2003
3	Area number	1 - Region 1
4	Province	Ilocos Sur

1	Name of source	Pumping Station #1 Macabiag,
2	Location	N 17° 52' 4"
		E 120° 27' 18.7"
3	Depth Borehole; meter	40
4	Discharge Flowrate; liters/sec	No Data
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		7.81	
2	Temperature	°C		30.1*		27	Calcium	mg/L		181.44	
3	pH		6.5-8.5	7.4*		28	Magnesium	mg/L		17.12	
4	Color	Units	5	<5		29	Silica	mg/L		41	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		1190		31	Total Manganese	mg/L	0.5	0.34	0.006
7	Total Dissolved Solids	mg/L	500	640		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		727		33	Zinc	mg/L	5 <sup>®</sup>	<MDL	0.002
9	Chloride	mg/L	250	91		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		365		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		64		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	524		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.01 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	5.0 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.11		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		4		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		4.0		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	20.32			II			<MDL	0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Mangaldan
2	Date of Analysis	June 20-July 04, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #2
2	Location	N 16° 3' 34.5"
		E 120° 24' 19.5"
3	Depth Borehole; meter	145
4	Discharge Flowrate; liters/sec	25
5	Date of Well Operation	No data
6	Disinfection	Gas Chlorinator
	Unit;	Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		2.07	
2	Temperature	°C		28.6*		27	Calcium	mg/L		26.21	
3	pH		6.5-8.5	8.2*		28	Magnesium	mg/L		12.6	
4	Color	Units	5	10		29	Silica	mg/L		36	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	ND	0.001
6	Conductivity	µS/cm		602		31	Total Manganese	mg/L	0.5	0.42	0.006
7	Total Dissolved Solids	mg/L	500	343		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		500		33	Zinc	mg/L	5 <sup>@</sup>	0.02	0.002
9	Chloride	mg/L	250	18		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		124		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	0.02	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	117		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		2	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.003 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.24		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		9		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	34.56			II			<MDL	0.02

- Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Mangaldan
2	Date of Analysis	June 20-July 04, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #7
2	Location	N 16° 2' 40.1"
		E 120° 24' 50.6"
3	Depth Borehole; meter	101
4	Discharge Flowrate; liters/sec	25
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator
		No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		4.04	
2	Temperature	°C		28.4*		27	Calcium	mg/L		47.51	
3	pH		6.5-8.5	7.9*		28	Magnesium	mg/L		5.36	
4	Color	Units	5	10		29	Silica	mg/L		42	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	$\mu$ S/cm		577		31	Total Manganese	mg/L	0.5	0.15	0.006
7	Total Dissolved Solids	mg/L	500	318		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		401		33	Zinc	mg/L	5 <sup>@</sup>	0.02	0.002
9	Chloride	mg/L	250	29		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		228		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		15		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	141		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	1.23 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	$\mu$ g/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	$\mu$ g/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.15		43	DDT	$\mu$ g/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	$\mu$ g/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	$\mu$ g/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		3.0		46	Lindane	$\mu$ g/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	$\mu$ g/L	20	<MDL	0.02
23	BOD	mg/L		5.0		48	Toxaphene	$\mu$ g/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	$\mu$ g/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	17.89			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Metro La Union
2	Date of Analysis	June 6 - June 23, 2003
3	Area number	1 - Region 1
4	Province	La Union

1	Name of source	Pumping Station #10
2	Location	N 16° 40' 9.7"
		E 120° 23' 30.8"
3	Depth Borehole; meter	60
4	Discharge Flowrate; liters/sec	25
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		1.14	
2	Temperature	°C		28.8*		27	Calcium	mg/L		111.02	
3	pH		6.5-8.5	8.1*		28	Magnesium	mg/L		4.48	
4	Color	Units	5	<5		29	Silica	mg/L		56	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	2.8	0.001
6	Conductivity	µS/cm		180 <sup>2</sup>		31	Total Manganese	mg/L	0.5	1.74	0.006
7	Total Dissolved Solids	mg/L	500	115 <sup>+</sup>		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		221		33	Zinc	mg/L	5 <sup>®</sup>	0.22	0.002
9	Chloride	mg/L	250	10		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		27		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	37.89		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		4.24	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.77 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.35 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		0	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.41		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		<1		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.13	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	54.53			II			<MDL	0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Sta Maria
2	Date of Analysis	June 19-July 02, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #1 Poblacion We
2	Location	N 15° 58' 59"
		E 120° 41' 51.9"
3	Depth Borehole; meter	80
4	Discharge Flowrate; liters/sec	16
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		8.64	
2	Temperature	°C		27.6*		27	Calcium	mg/L		72.82	
3	pH		6.5-8.5	8.1*		28	Magnesium	mg/L		5.68	
4	Color	Units	5	<5		29	Silica	mg/L		41	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		422		31	Total Manganese	mg/L	0.5	0.09	0.006
7	Total Dissolved Solids	mg/L	500	274		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		281		33	Zinc	mg/L	5 <sup>@</sup>	0.17	0.002
9	Chloride	mg/L	250	<MDL		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		98		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	205		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.17 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.08		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		6		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		<1		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.05	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	10.02			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Sinait
2	Date of Analysis	July 3 - July 15, 2003
3	Area number	1 - Region 1
4	Province	Ilocos Sur

1	Name of source	Pumping Station #3 Bang-ay
2	Location	N 17° 51' 53.7"
		E 120° 27' 22.1"
3	Depth Borehole; meter	7
4	Discharge Flowrate; liters/sec	No Data
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		7.1	
2	Temperature	°C		29.2*		27	Calcium	mg/L		182.76	
3	pH		6.5-8.5	7.5*		28	Magnesium	mg/L		16.86	
4	Color	Units	5	<5		29	Silica	mg/L		34	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	uS/cm		1174		31	Total Manganese	mg/L	0.5	0.66	0.006
7	Total Dissolved Solids	mg/L	500	663		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		728		33	Zinc	mg/L	5 <sup>@</sup>	<MDL	0.002
9	Chloride	mg/L	250	87		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		358		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		93		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	526		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.1 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	2.91 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.25		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		2		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	21.62			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination



## RESULT OF ANALYSIS

1	Name of WD	Rosario
2	Date of Analysis	July 02 - July 15, 2003
3	Area number	1 - Region 1
4	Province	La Union

1	Name of source	Pumping Station #1
2	Location	N 16° 13' 46.5"
		E 120° 21' 15.3"
3	Depth Borehole; meter	No data
4	Discharge Flowrate; liters/sec	8.33
5	Date of Well Operation	No data
6	Disinfection Unit:	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		2.88	
2	Temperature	°C		27.5*		27	Calcium	mg/L		45.6	
3	pH		6.5-8.5	7.2*		28	Magnesium	mg/L		2.26	
4	Color	Units	5	<5		29	Silica	mg/L		39	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	uS/cm		454		31	Total Manganese	mg/L	0.5	<MDL	0.006
7	Total Dissolved Solids	mg/L	500	290		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		296		33	Zinc	mg/L	5 <sup>@</sup>	<MDL	0.002
9	Chloride	mg/L	250	7		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		128		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		32		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	123		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	2.3 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.13		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		5		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		<1		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	2.7			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Dagupan
2	Date of Analysis	June 20-July 04, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Salisay Pumping Station
2	Location	N 16° 2' 49.3"
		E 120° 22' 25.4"
3	Depth Borehole; meter	167
4	Discharge Flowrate; liters/sec	32.6
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator
		No data

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		0.07	
2	Temperature	°C		29.8*		27	Calcium	mg/L		11.37	
3	pH		6.5-8.5	8.3*		28	Magnesium	mg/L		0.82	
4	Color	Units	5	<5		29	Silica	mg/L		60	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	$\mu$ S/cm		335		31	Total Manganese	mg/L	0.5	0.07	0.006
7	Total Dissolved Solids	mg/L	500	222		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		254		33	Zinc	mg/L	5 <sup>@</sup>	0.01	0.002
9	Chloride	mg/L	250	6		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		53		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		0 <sup>3</sup>		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	32		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	$\mu$ g/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	$\mu$ g/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.15		43	DDT	$\mu$ g/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	$\mu$ g/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	$\mu$ g/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2		46	Lindane	$\mu$ g/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	$\mu$ g/L	20	<MDL	0.02
23	BOD	mg/L		5		48	Toxaphene	$\mu$ g/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	$\mu$ g/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	22.22			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor

+ Re-examination result dated October 2003 (Interlek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

**RESULT OF ANALYSIS**

1	Name of WD	San Carlos
2	Date of Analysis	June 19-July 02, 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #1 Cacaritan
2	Location	N 15° 56' 32.8"
		E 120° 20' 11.5"
3	Depth Borehole; meter	No Data
4	Discharge Flowrate; liters/sec	8
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	O*		26	Potassium	mg/L		5.6	
2	Temperature	°C		29.6*		27	Calcium	mg/L		45.2	
3	pH		6.5-8.5	8*		28	Magnesium	mg/L		9.12	
4	Color	Units	5	<5		29	Silica	mg/L		45	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	uS/cm		1803 <sup>2</sup>		31	Total Manganese	mg/L	0.5	0.06	0.006
7	Total Dissolved Solids	mg/L	500	1154		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		1263		33	Zinc	mg/L	5 <sup>@</sup>	0.24	0.002
9	Chloride	mg/L	250	675		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		74		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	275		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.32		43	DDT	µg/L	2	0.01	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0.18 <sup>1</sup>	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		4		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		<1		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.09	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	79.92			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

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MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	San Carlos
2	Date of Analysis	June 2003
3	Area number	1 - Region 1
4	Province	Pangasinan

1	Name of source	Pump Station #4 Cacaritan
2	Location	N 15° 55' 19.4"
		E 120° 22' 22.1"
3	Depth Borehole; meter	250
4	Discharge Flowrate; liters/sec	10
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		9.49	
2	Temperature	°C		30.6*		27	Calcium	mg/L		76.65	
3	pH		6.5-8.5	8*		28	Magnesium	mg/L		6.62	
4	Color	Units	5	<5		29	Silica	mg/L		74	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		1559 <sup>2</sup>		31	Total Manganese	mg/L	0.5	0.17	0.006
7	Total Dissolved Solids	mg/L	500	998		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		1022		33	Zinc	mg/L	5 <sup>@</sup>	0.22	0.002
9	Chloride	mg/L	250	495		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		92		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	218		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		<MDL	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.87 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.17 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.16		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor	µg/L	0.03	0.01	0.01
21	DO (DO%)	mg/L		3.0		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		<1		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		0.06	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	72.26			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Agoo
2	Date of Analysis	June 2003
3	Area number	1 - Region 1
4	Province	La Union

1	Name of source	San Julian East PS #1	
2	Location	N 16° 19' 30.3"	Agoo WD, San Julian East, Brgy. Agoo, La Union
		E 120° 21' 15.3"	
3	Depth Borehole; meter	30	
4	Discharge Flowrate; liters/sec	4	
5	Date of Well Operation	No data	
6	Disinfection Unit;	Gas Chlorinator	No data
		Hypochlorinator	

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	O*		26	Potassium	mg/L		13.89	
2	Temperature	°C		28.8*		27	Calcium	mg/L		1.68	
3	pH		6.5-8.5	8.5*		28	Magnesium	mg/L		4.88	
4	Color	Units	5	25		29	Silica	mg/L		43	
5	Turbidity	NTU	5	6.00		30	Total Iron	mg/L	1	0.26	0.001
6	Conductivity	$\mu$ S/cm		767		31	Total Manganese	mg/L	0.5	0.08	0.006
7	Total Dissolved Solids	mg/L	500	512		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		525		33	Zinc	mg/L	5 <sup>®</sup>	0.04	0.002
9	Chloride	mg/L	250	42		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		42		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		0 <sup>3</sup>		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>®</sup>	24		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		6	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.39 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	$\mu$ g/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	$\mu$ g/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.64		43	DDT	$\mu$ g/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	$\mu$ g/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0.14 <sup>1</sup>	0.01	45	Heptachlor	$\mu$ g/L	0.03	0.01	0.01
21	DO (DO%)	mg/L		3.0		46	Lindane	$\mu$ g/L	2	<MDL	0.01
22	COD	mg/L		0.0		47	Methoxychlor	$\mu$ g/L	20	<MDL	0.02
23	BOD	mg/L		1.0		48	Toxaphene	$\mu$ g/L		<MDL	0.02
24	Surfactant	mg/L		0.15	0.05	49	Endosulfan I	$\mu$ g/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>®</sup>	44.12			II			<MDL	0.02

Note: <sup>®</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

U Unobjectionable Odor, O = Objectionable Odor.

+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA)

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Narvacan
2	Date of Analysis	June 7 - June 23, 2003
3	Area number	1 - Region 1
4	Province	Ilocos Sur

1	Name of source	San Pablo Narvacan PS	
2	Location	N 17° 26' 20.9"	Station #1, Narvacan WD, San Pablo Narvacan, Ilocos Sur
		E 120° 30' 18.7"	
3	Depth Borehole; meter	No data	
4	Discharge Flowrate; liters/sec	7.3	
5	Date of Well Operation	No data	
6	Disinfection Unit;	Gas Chlorinator	No data
		Hypochlorinator	

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		6.34	
2	Temperature	°C		29.9*		27	Calcium	mg/L		12.45	
3	pH		6.5-8.5	8.3*		28	Magnesium	mg/L		2.23	
4	Color	Units	5	<5		29	Silica	mg/L		54.44	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	0.11	0.001
6	Conductivity	µS/cm		813		31	Total Manganese	mg/L	0.5	0.03	0.006
7	Total Dissolved Solids	mg/L	500	420		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		581		33	Zinc	mg/L	5 <sup>@</sup>	<MDL	0.002
9	Chloride	mg/L	250	32		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		44		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		0 <sup>3</sup>		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	40		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		10.67	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.07 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.04 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.19		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2.7		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		1.0		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	46.26			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

### RESULT OF ANALYSIS

1	Name of WD	Sarrat
2	Date of Analysis	June 11 - June 25, 2003
3	Area number	1 - Region 1
4	Province	Ilocos Norte

1	Name of source	Pumping Station #1, Brgy 2
2	Location	N 18° 6' 40.6"
		E 120° 41' 36.7"
3	Depth Borehole; meter	No data
4	Discharge Flowrate; liters/sec	No data
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	U*		26	Potassium	mg/L		8.22	
2	Temperature	°C		30.2*		27	Calcium	mg/L		131.25	
3	pH		6.5-8.5	7*		28	Magnesium	mg/L		8.35	
4	Color	Units	5	<5		29	Silica	mg/L		56	
5	Turbidity	NTU	5	<5		30	Total Iron	mg/L	1	<MDL	0.001
6	Conductivity	µS/cm		852		31	Total Manganese	mg/L	0.5	0.02	0.006
7	Total Dissolved Solids	mg/L	500	512		32	Aluminum	mg/L	0.2	ND	0.01
8	Total Solids	mg/L		527		33	Zinc	mg/L	5 <sup>@</sup>	<MDL	0.002
9	Chloride	mg/L	250	52		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		39		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		38		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	362		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		4	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	0.10 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.09 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	µg/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	µg/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.12		43	DDT	µg/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	µg/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	-	0.01	45	Heptachlor/Heptachlor Epoxide	µg/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		2		46	Lindane	µg/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	µg/L	20	<MDL	0.02
23	BOD	mg/L		6		48	Toxaphene	µg/L		<MDL	0.02
24	Surfactant	mg/L		<MDL	0.05	49	Endosulfan I	µg/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	17.14			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

\* On Site Analysis (CEST Inc.)

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+ Re-examination result dated October 2003 (Intertek Laboratory)

MDL Method Detection Limit

As computed by Local Water Utilities Administration (LWUA).

<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination

## RESULT OF ANALYSIS

1	Name of WD	Ilocos Norte
2	Date of Analysis	June 11 - June 25, 2003
3	Area number	1 - Region 1
4	Province	Ilocos Norte

1	Name of source	Tangid Pump Station
2	Location	N 18° 11' 42.5"
		E 120° 34' 0.4"
3	Depth Borehole; meter	54
4	Discharge Flowrate; liters/sec	12
5	Date of Well Operation	No data
6	Disinfection Unit;	Gas Chlorinator
		Hypochlorinator

	PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL		PARAMETERS	UNIT	PNSDW Limit	CONCENTRATION	MDL
1	Odor		U	O*		26	Potassium	mg/L		13.72	
2	Temperature	°C		30*		27	Calcium	mg/L		22.58	
3	pH		6.5-8.5	8.1*		28	Magnesium	mg/L		7.61	
4	Color	Units	5	67		29	Silica	mg/L		66	
5	Turbidity	NTU	5	280		30	Total Iron	mg/L	1	7.04	0.001
6	Conductivity	$\mu$ S/cm		2630		31	Total Manganese	mg/L	0.5	0.12	0.006
7	Total Dissolved Solids	mg/L	500	1496		32	Aluminum	mg/L	0.2	<MDL	0.01
8	Total Solids	mg/L		2426		33	Zinc	mg/L	5 <sup>@</sup>	0.03	0.002
9	Chloride	mg/L	250	390		34	Copper	mg/L	1	<MDL	0.001
10	Total Alkalinity	mg/L		100		35	Arsenic	mg/L	0.01	<MDL	0.01
11	Acidity	mg/L		-		36	Chromium	mg/L	0.05	<MDL	0.003
12	Hardness (as CaCO <sub>3</sub> )	mg/L	300 <sup>@</sup>	88		37	Cadmium	mg/L	0.003	<MDL	0.003
13	Sulfate	mg/L	250	0		38	Selenium	mg/L	0.01	<MDL	0.001
14	Phosphate	mg/L		24	0.1	39	Lead	mg/L	0.01	<MDL	0.005
15	Nitrite	mg/L	3	2.20 <sup>1</sup>	0.001	40	Mercury	mg/L	0.001	<MDL	0.001
16	Nitrate	mg/L	50	0.64 <sup>1</sup>	0.001	41	Aldrin & Dieldrin	$\mu$ g/L	0.03	<MDL	0.02
17	Ammonia-Nitrogen	mg/L		<MDL	0.20	42	Chlordane	$\mu$ g/L	0.2	<MDL	0.02
18	Fluoride	mg/L	1	0.74		43	DDT	$\mu$ g/L	2	<MDL	0.01
19	Cyanide	mg/L	0.07	0	0.002	44	Endrin	$\mu$ g/L	0.2	<MDL	0.02
20	Hydrogen Sulfide	mg/L	0.05	0.61 <sup>1</sup>	0.01	45	Heptachlor/Heptachlor Epoxide	$\mu$ g/L	0.03	<MDL	0.01
21	DO (DO%)	mg/L		3.0		46	Lindane	$\mu$ g/L	2	<MDL	0.01
22	COD	mg/L		0		47	Methoxychlor	$\mu$ g/L	20	<MDL	0.02
23	BOD	mg/L		8		48	Toxaphene	$\mu$ g/L		<MDL	0.02
24	Surfactant	mg/L		0.17	0.05	49	Endosulfan I	$\mu$ g/L		<MDL	0.01
25	Sodium	mg/L	200 <sup>@</sup>	101.92			II			<MDL	0.02

Note: <sup>@</sup> Secondary Standard; compliance with the standard and analysis are not obligatory

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<sup>1</sup> Estimation derived from gravimetric factor

<sup>2</sup> Estimation derived from major Cationic and Anionic constituents

<sup>3</sup> Acidity value qualified

- No basis for determination



