HA'APAI AID

CRI TONGA

In partnership with

OMNI SERVICES TONGA

& The Church of Jesus Christ Latter Day Saints

Assessment: FALELOA

Wednesday, January 15th 2014

Missionary Home

Round Plastic Tank 5,000lt
Water Level: No Water

Church Building

Square Cement Tank 40,000lt
Water Level: No Water

Square Cement Tank 40,000lt
Water Level: Half Full
Note: Looks to have leaks inside. Water clear, no odor. Bottom layered with dirt. Texture a little rough.

OMNI team preparing to sanitize a 5,000lt tank for a local family that had their house completely destroyed. They are now, like many others, living in a blue tent

A father with his daughter watching as the OMNI team prepares the generator to power the sanitizer.
Below is the CRI Director (Alice Vuna) testing the water before and after it's cleaned

Children waiting for the water tanks to be sanitized

Thursday, January 15th 2014
Starting Time: 7:01am

Work Done:

Water Testing

Sanitized

A 10yr old child trying to pull nails out with a kitchen knife of a destroyed rafter from his roof, to collect for the rebuilding of his house.

Notes: 2nd Councilor in the Stake Presidency asked that we sanitize only, do to the fact that it has a leak at the tap. Which is broken. He also informed us that the tank is used for the shower and toilets. Not for drinking.
He pointed out tanks in the surrounding areas that they have been using for drinking water, and asked us to service these tanks as well.

Round Plastic Tanks 5,000lt
Round Cement Tank 10,000lt
Water Level: Full

OMNI team respectively: Crew Member Kale Vaiola, Team Leader Helani Kinikini & Crew Member Topui Tupou with a local child as they sanitize the water tanks

Work Done

Water Testing
Sanitized

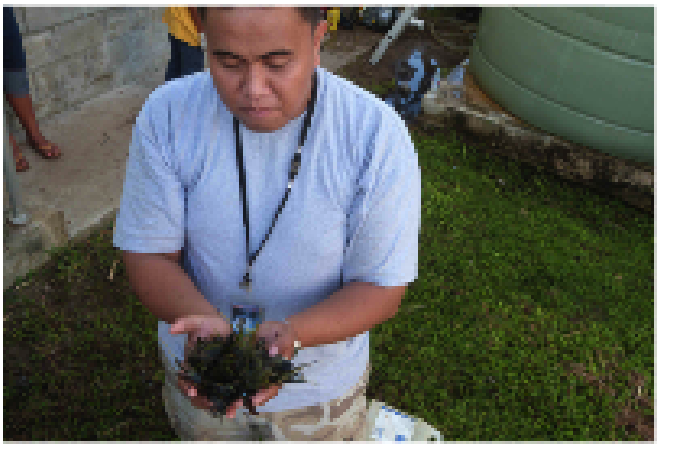
Notes: Tanks in good condition. Water clear, no odor. The bottom had a light layer of dirt. The homeowners asked that we take no water out of the tanks. We tested the water to make sure sanitizing would

Topui taking water samples for testing

ASSESSMENT: KOULO
Wednesday, January 15th 2014

Missionary Home

Round Plastic Tank 5,000lt
Water Level: ¼ full
Note: Clean, colorless, odorless



OMNI Executive Mumui Tautua'a extracting the debris from the motor of the water pumps as it clogged up.

Church Building
Round Plastic Tank 20,000lt
Water Level: Full
Note: Dark water, unable to see bottom of tank. Bad rotten egg smell. Sticky texture.
Recommendation: Clean & Sanitize

Thursday, January 17th 2014
Starting Time: 6:30am

Work Done:

Cleaned/Vacuum
Sanitized

Round Plastic Tanks 20,000lt
Water Level: Full
Notes: Too much debris in tank caused the pumps to clog up. Must empty and clean tank manually.
We are going to sanitize tanks in the surrounding area so as to insure healthier drinking water for all concerned.

Round Plastic Tanks 10,000lt
Round Cement Tanks 10,000lt
Water Level: Full
Notes: The majority of the tanks were a little salty before our sanitizing process. After we sanitized it the taste was wonderful.

ASSESSMENT: PANGAI

Wednesday, January 15th 2014

Lady Mele Fakafanua Tu'iha'angana, with CRI Director Alice Vuna discussing the importance of clean rainwater catchment systems as the OMNI team sanitizes her drinking water.

Missionary Home

Round Plastic Tank 5,000lt
Water Level: No Water
Note: Knocked off its stand

Church Building

Round Plastic Tank 5,000lt

Water Level: Half Full
Note: Dark bottom, water funny soapy look. No odor, texture funny. Need to find lids to close openings
Recommendation: Cleaning & Sanitizing

Thursday, January 16th 2014
Starting Time: 3:50pm

Work Done:

None

Children have been swimming inside the water tanks. No work has been done here yet. Will have to talk to Pres. Fehoko to get his take on the problem.

Saturday, January 18th 2014
Starting time: 6am

We were unable to keep the appointment to the outer islands due to visitors from overseas occupying the boat we were to take. We therefore went to local community houses to clean their water tanks. Among them were Governor Tui Ha'angana, Stake President Tonga'onevai, Bishop Tonga'onevai and a missionary home. We checked and cleaned as many water tanks as was possible that morning. Our driver then had other obligations to fill, so that afternoon we had to load our equipment in a wheel barrel and push it around for the rest of that day. As we headed to Ha'apai High School we cleaned homes along the way. We commenced work at Ha'apai High School. This would be an ongoing job as they have so many tanks. Each day after completing our schedule we went and serviced a few more tanks.

Every tank we came across with netting was in a state much like this

Completing the work on Monday, after returning from the outer islands.

Finish Time: 7:15pm

Sunday, January 19th 2014
Starting Time: 9:30am

No vehicle arrived this morning so we continued our work by pushing our wheel barrel around the surrounding area. Included in the tanks we checked and cleaned were Tonga Communication Corporation, the Pastor for the Methodist Church, and the Pastor for the Tonga Tau'ataina Church and many other homes in the surrounding area. As stated above, we again went to Ha'apai High School to complete a few more tanks.

The OMNI team was resourceful and determined when they heard that the vehicle that was designated for them wasn't coming. Everything in a wheel barrel and off they go. They are cleaning the tanks of their mothers, fathers, brothers and sisters, and their children. What would you expect?

ASSESSMENT: **HIHIFO**

Wednesday, January 15th 2014

Church Building

Helani servicing the water pumps after a long morning. Getting them ready for another 7 hours after lunch workday.

Square Cement Tank 40,000lt
Water Level: Full
Note: Color green/brown, can't see the bottom of the tank, smells funny, rough texture
Recommendation: Clean/Vacuum & Sanitize

2pm Wednesday, January 15th 2014
Sanitized for 2 hours
Note: Water's clear, can see the dirty bottom of the tank. Texture much better, salty taste gone. Odor gone. Awaiting screen to catch small leaves arriving from Tonga tomorrow.

Friday, January 17th 2014
Starting Time: 1:00pm

Work Done:

Cleaned/Vacuum
Sanitized

Helani Vacuuming a 40,000lt Square Cement Tank

Square Cement Tank 40,000lt
Water Level: Full
Notes: Started vacuuming but there was so much sludge and dirt at the bottom of the tank that the vacuum has stalled numerous times. We've decided to stop vacuuming and just sanitize the tank. We sanitized the tank Wednesday, Thursday & Friday. Total hours of Sanitizing were 12 hours. Screen has been added to the opening of the tank to keep the majority of the dirt and leaves from inside. The results are that the water is clear and there is no odor, and the texture is better.

Assessment: Loto Foa

Wednesday, January 15th 2014

Missionary Home

Round Plastic Tank 5,000lt
Water Level: No Water

Church Building

Round Plastic Tank 10,000lt

Water Level: Full
Notes: Water has a light green color to it bad odor and texture. Heavy film of dirt covers the bottom.
Recommendation: Clean/Vacuum and Sanitize

Kale letting a little girl try the newly sanitized water…after tastes testing it himself first.

Thursday, January 15th 2014
Starting Time: 9:07am

Work Done:

3yr old girl looking on as the grime being vacuumed from the tank comes out pure water. Indicating that the grime is all out of the tank, and ready to be sanitized.

Water Testing
Cleaning/Vacuuming
Sanitized

Notes: Thick sludge at the bottom of the tank. No clear visual of the bottom. Smell of rotted eggs. Texture sticky. Water testing done and saved. We found out about local tanks that have been used to serve the community. This came as a recommendation.

Round Tank 5,000lt
Round Tank 10,000lt
Note: Large ozone machine used here due to the bad condition of the water. The water is clean and the texture is good. The taste is good, with a little chlorine powder taste still there.

ASSESSMENT: **FOTUA**

Wednesday, January 15th 2014

Church Building

Black Round Tank 10,000lt
Water Level: Full
Note: Tank had a bad smell and the water was light green, thick sludge at the bottom, texture sticky gravely feel.

Small Round Tanks 5,000lt
Water Level: No Water

Recommendations: Cleaning/Vacuuming & Sanitizing

Thursday, January 16th 2014
Starting Time: 10:30am

Work Done:

Sanitized only

Round Plastic Tanks 5,000lt
Water Level: Full
Notes: At the bishops direction we worked on other tanks being used for human consumption. He pointed us out to these tanks that have been supporting the community.

Round Cement Tanks 10,000lt
Water Level: Full
Note: Sanitized only. They are afraid of losing water

ASSESSMENT: **FANGALE'O UNGA**

Wednesday, January 15th 2014

Church Building

Square Cement Tank 40,000lt
Water Level: No Water

Square Cement Tank 40,000lt
Water Level: Full
Note: Color green, smells a little lingering odor, rough texture
Recommendation: Clean/Vacuum & Sanitize

Thursday, January 16th 2014
Starting Time: 10:30am

Work Done:

Cleaned/Vacuum
Sanitized

Square Cement Tanks 40,000lt
Water Level: Full
Notes: This chapel is very dirty. There was rotten food, clothes and trash everywhere, there was even human waste around the sides of cement tank. It's recommended that this place be cleaned ASAP

Square Cement Tanks 40,000lt
Water Level: Full
Note: Tanks around the church area were also cleaned to help the community with healthier drinking water

Monday, January 20th 2014
Starting time: 6:00am

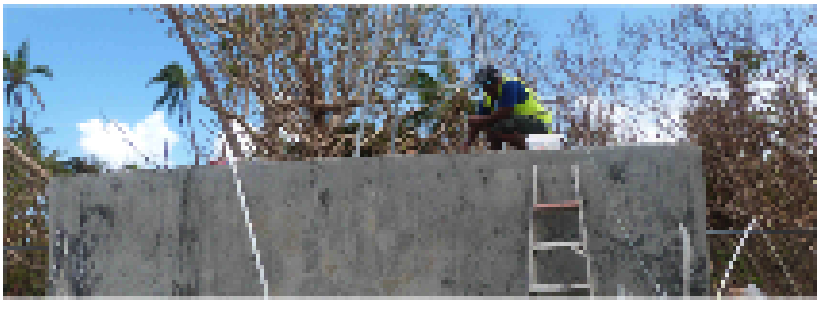
We started in Pangai and completed the work there before leaving to the outer islands.

Loading the LDS Church's boat, Nephi, with supplies and equipment to go and clean and sanitizing the tanks in the outer islands, Kotosi and 'Uiha

Outer Islands:

We departed from Ha'apai at 9:45am.

Our first stop was **Felemea**. It had a 50,000lt square cement tank full of water. The texture of the water was rough, brownish in color with a slight odor.

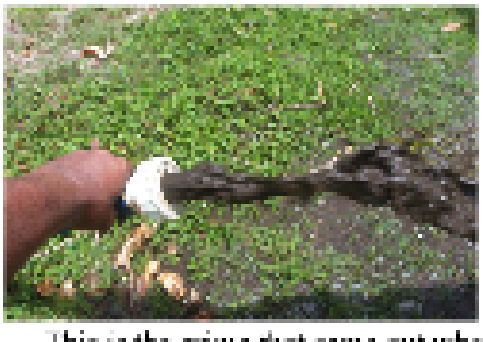


Work Done:

Cleaned/Vacuum Sanitized

Note: 11:30 we completed the work on this tank. We had a very hard time with the vacuuming because of the amount of dirt in the tank. Everything went well in the end and the water was left very clear. The texture came out good, the color was clear and there was no odor. We taste tested it and it was very good.

The second tank was a 40,000lt square cement tank full of water. The texture was hard, the color was clear and it had no odor. We only sanitize this tank. After the job was completed the texture was good, the water still clear and odorless. The taste was

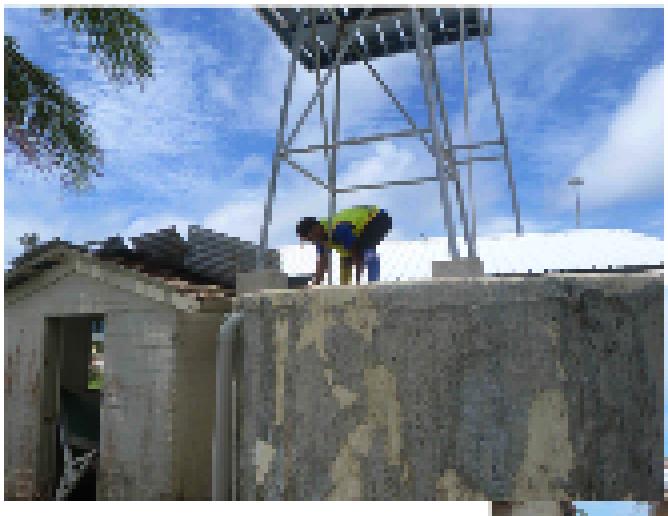


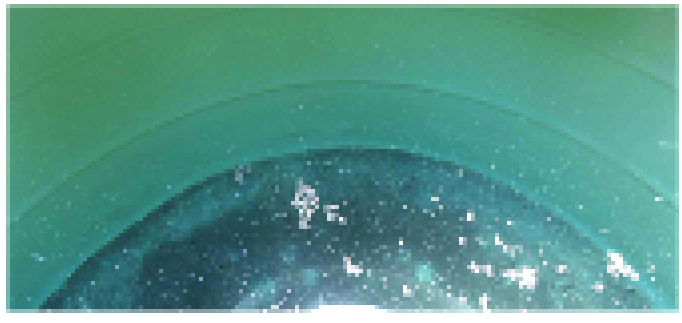
This is the grime that came out when we vacuum the sludge from the bottom of the water tanks.

The amount of debris in the tanks was constantly clogging the pumps up.

Sanitizing the water tanks with Ozone pumped

Our next stop was **'Uiha**. The chapel had a 20,000lt square cement tank with no water in it due to a leak. We went and cleaned and sanitized the missionary home's tank also. It has a 10,000lt round plastic tank. The color was clear, but the texture was not so good and it tasted a little salty. We sanitized only and the results were that the texture came out good and it tasted great, no salt detected. We





Top left & bottom right: The before and after picture of the tank we vacuumed in Ha'apai

We then went to **Kauvai**, to the village of **Ha'ano**. It had two square tanks at 50,000lt. One was empty due to a broken tap and cracks. The other one was filled with vai tupu. The tank was full, the color was clear, there was a slight odor, the texture was sticky and the bottom was dirty.

Work Done:

Clean/Vacuum
Sanitized

Note: The color remained clear, the odor was gone, the texture was good and the taste was great.

Our last stop was **Fakakai**. It had a 100,000lt square cement tank with no water in it. There was also another square cement tank at 50,000lt with very little water, which was very dirty. There was no tap in this tank and we were informed that the water gets towed by bucket from the top of the tank.

We returned to the main island of Ha'apai at 4:26pm

And from there we went to USP to finish the tanks. We got done when the sun was still out so we packed the wheel barrel and went around to serve the locals that requested our help.

We returned to Ha'apai at 4:26pm

We commenced work on Ha'apai High School until we finished the remainder of the tanks.
In total, there were 25. 10 of these tanks were empty. 9 of them were half full to three quarters full. 6 tanks were totally full.
All the full tanks were dirty at the bottom. 5 out of the 9 tanks had dirty bottoms, whereas the 4 other tanks were clean. We vacuumed the 5 full tanks only but sanitized them all. We did not vacuum the tanks that were half full to three quarters full because of the fear of any water loss from the locals.

Finished Work: 7:32pm

Tuesday, January 21st 2014
Start Time: 4:30am

Today was our last day in Ha'apai, but we have members of the Church of Jesus Christ of Latter-day Saints (Numai Paletu'a among others) that have come to ask for there tanks to be cleaned. So we again packed our equipment in wheel barrels and went to work. Among her and other local residents tanks completed was the 100,000lt tank at the Tonga Hou'eiki Church building. Minister Sami Kolo was overjoyed to see the difference in the water.
We completed that tank at 8:30am and then went straight to the airport for the 2nd part of the Ha'apai group to return to Tonga.

Summary of Tanks

Total Tanks Checked: 214
Tanks Either Cleaned and/or Sanitized: 118
Tanks with No Water: 31
Tanks with Broken Taps, Cracks or Leaks: 27
Tanks with Low Water: 38

We came in quietly, no publicity stunts for attention or recognition. We were there to serve our brothers and sisters and children that were in need. Our business is in the cleaning of the rainwater catchment systems. That is what we do.

RECOMMENDATION

We have completed the assigned work on Ha'apai island and the outer islands to the best of our abilities. We would recommend that ALL CHURCH cements be checked. They all seem to have been neglected, and maintenance little to none at all.

They all need to be cleaned out properly and then sanitized again. Also, gutters to be cleaned. Gutters should be checked and netting put up in places needed. Overhanging trees need to be cut down or removed, and members and community need to be taught how to maintain their water tanks and the surrounding areas to keep their drinking water healthy for all concerned.

Crew Member Kale Vaiola, Field Representative Inoke Mo'unga, CRI Tonga Director Alice Vuna, Crew Member Topui Tupou, and Team Leader Helani Kinikini on our way to Ha'apai.

COSTING FOR PROJECT

OMNI SERVICES TONGA
Costing Summary of Work Rendered

Cleaning & Sanitizing Water Tanks

(x2) 100,000lt Square Cement Tank
Cleaning & Sanitizing $150
Additional Charge for Each 10,000lt Exceeding $100

Total: $2,100

(x6) 50,000lt Square Cement Tank
Cleaning & Sanitizing $150
Additional Charge for Each 10,000lt Exceeding $100

Total: $3,300

(x3) 40,000lt Square Cement Tank
Cleaning & Sanitizing $150
Additional Charge for Each 10,000lt Exceeding $100

Total: $1,350

(x7) 20,000lt Round Cement Tanks
Cleaning & Sanitizing $150
Additional Charge for Each 10,000lt Exceeding $100

Total: $1,750

(x9) 10,000lt Round Cement/Plastic Tanks
Cleaning & Sanitizing $150

Total: $1,350

TOTAL COST: $9,850

Sanitizing Water Tanks

(x9) 40,000lt Square Cement Tanks
Sanitizing First 10,000lt $50
Additional Charge for Every 5,000lt Exceeding $30

Total: $2,070

(x19) 20,000lt Round Cement Tank
Sanitizing First 10,000lt $50
Additional Charge for Every 5,000lt Exceeding $30

Total: $2,090

(x37) 10,000lt Round Cement & Plastic Tank
Sanitizing 10,000lt $50

Total: $1,850

(x26) 5,000lt Round Cement & Plastic Tanks
Sanitizing Minimal $50

Total: $1,300

SANITIZING COST: $7,310

Note There was 96 tanks that we could not service because they either had no water (31), or the water level was too low (38), or because there were leaks do to broken taps or cracks in the water tanks (27).

TOTAL PROJECT COSTING: $17,160
OMNI's Disaster Relief Discount: Pro bono

PRO FORMA INVOICE

ESTIMATE No.14
ESTIMATE Date: 16-11-2014
P.O. No.

By: OMNI Services
Address: P.O. Box 1006
Fangaloto, Nuku'alofa
Kingdom of Tonga
Phone: +676 844 9857
E-mail:
omnitonga@aol.com

BILL TO: Promotional
DATE: 16-11-2014
JOB NAME: Ha'apai Aid
Contact Person: Brother Hamblin
Company/Organization: LDS Church
Address: Ha'apai

Phone:
E-Mail:

Prod No.	ITEM	DESCRIPTION	Units	Cost Per Unit	Amount
	Package Deal,All Inclusive	Vacuum & Ozone 100,000	2	$150.00	$300.00
	Additional Cleaning	Charge for Tanks Over 10,000lt	18	$100.00	$1,800.00
	Package Deal,All Inclusive	Vacuum & Ozone 50,000	6	$150.00	$900.00
	Additional Cleaning	Charge for Tanks Over 10,000lt	24	$100.00	$2,400.00
	Package Deal,All Inclusive	Vacuum & Ozone 40,000	3	$150.00	$450.00
	Additional Cleaning	Charge for Tanks Over 10,000lt	9	$100.00	$900.00
	Package Deal,All Inclusive	Vacuum & Ozone 20,000	7	$150.00	$1,050.00
	Additional Cleaning	Charge for Tanks Over 10,000lt	7	$100.00	$700.00
	Package Deal,All Inclusive	Vacuum & Ozone 10,000	9	$150.00	$1,350.00
		Total for Cleaning & Sanitizing		Total	$9,850.00
	Disinfection 40,000	Disinfect with Ozone, Standard Tank	9	$50.00	$450.00
	Addition Disinfection	Disinfect for Tanks Over 5,000	54	$30.00	$1,620.00
	Disinfection 20,000	Disinfect with Ozone, Standard Tank	19	$50.00	$950.00
	Addition Disinfection	Disinfect for Tanks Over 5,000	38	$30.00	$1,140.00
	Disinfection 10,000	Disinfect with Ozone, Standard Tank	37	$50.00	$1,850.00
	Disinfection 5,000	Disinfect with Ozone, Standard Tank	26	$50.00	$1,300.00
				Total	$7,310.00
				Total Cost	$17,160.00
		Disaster Relief Discount		Discount	Pro bono

Water Quality Data:Pangai (Palolo Vi)

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm		Minerals from Roof	<500ppm	
pH	0-14		Calcium or Seawater	6.5-8.5	
Calcium	mg/l			200	
Hardness	(GH)ppm		Calcium/Seawater	<300	
Nitrite	mg/l			50	
Nitrate	mg/l		Organics	10	
Ammonia	mg/l			0.5	
Chlorine	mg/l		Outside source	<5mg/l	
Alkalinity	(KH) ppm		Calcium/Seawater	<100ppm	
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N				
Taste?	Y/N				
Turbidity	Y/N				
Color	Y/N				
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					

WATER QUALITY DATA HIHIFO

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	712	Minerals from roof	<500ppm	312
pH	0-14	8.4	Calcium or Seawater	6.5-8.5	7.2
Calcium	mg/l			200	
Hardness	(GH)ppm	300	Calcium/Seawater	<300	75
Nitrite	mg/l	0		50	
Nitrate	mg/l	0.5	Organics	10	0.1
Ammonia	mg/l			0.5	
Chlorine	mg/l	5	Outside Source	<5mg/l	0
Alkalinity	(KH) ppm	300	Calcium/Seawater	<100ppm	80
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	Y	Slight Odor	Describe	N
Taste?	Y/N	Y	Slightly Salty	After Ozone	None
Turbidity	Y/N	Y	Not Clear	Cloudy or clear water	Clear
Color	Y/N	Y	Brownish	What color	Clear
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
1		15-Jan	Hihifo	A. Vuna	
COMMENTS					

Sample No.and location if taken for further testing

Total Dissolved Solids (TDS), Hardness and Alkalinity exceeded WHO Guidelines. All were brought down to more acceptable levels by Ozonization.

Chlorine (Cl) was at the maximum safe level. Also removed by Ozone.

Color, Odor and Taste greatly improved after cleaning and Ozonization. Ozonation took aproximately 2 hours.

Water Quality Data: Loto Foa CHAPEL

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	831	Minerals from Roof	<500ppm	113
pH	0-14	6.2	Calcium or Seawater	6.5-8.5	6.8
Calcium	mg/l			200	
Hardness	(GH)ppm	300	Calcium/Seawater	<300	150
Nitrite	mg/l	0		50	0
Nitrate	mg/l	5	Organics	10	1.5
Ammonia	mg/l			0.5	
Chlorine	mg/l	0.5	Outside source	<5mg/l	0
Alkalinity	(KH) ppm	300	Calcium/Seawater	<100ppm	0
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N		Rotten Egg Smell	Heavy Sludge	No Odor
Taste?	Y/N			Taste Bad	Improved
Turbidity	Y/N		Cloudy	Very Cloudy	Clearer
Color	Y/N		Brownish	Brown	Clearer
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					

Thick layer of sludge present on bottom of tank. Heavy duty Vacuuming required. Effluent from Vacuum slimy with odor of H2S (Hydrogen Sulfide) from Anaerobic bacterial activity. Only occurs in thick layers of sludge and poor maintenance.Nitrate levels and low pH resulting from Aerobic bacteria on top layer of sludge.

Took Ozonizer 3 hours to return water to acceptable levels.

pH levels still low but now within WHO giudelines. Next rain will improve this.

Water Quality Data: Pres Tongaonevai Hihifo

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	71	Minerals from Roof	<500ppm	17
pH	0-14	7.2	Calcium or Seawater	6.5-8.5	7.2
Calcium	mg/l			200	
Hardness	(GH)ppm	150	Calcium/Seawater	<300	75
Nitrite	mg/l	0		50	
Nitrate	mg/l	1	Organics	10	0.5
Ammonia	mg/l			0.5	
Chlorine	mg/l	2	Outside source	<5mg/l	1
Alkalinity	(KH) ppm	80	Calcium/Seawater	<100ppm	80
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	N	None		
Taste?	Y/N	N	Slight mineral	Alkalinity or Chlorine	Improved
Turbidity	Y/N	N	Clear		
Color	Y/N	N	Clear		
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					

Starting water quality good. Ozone reduced levels even further. Chlorine levels reduced by half.
Alkalinity probably linked to the type of Chlorine used. No data on Chlorine taste provided.

Water Quality Data: Palolo Vi (Pangai)

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	338	Minerals from Roof	<500ppm	53
pH	0-14	6.2	Calcium or Seawater	6.5-8.5	6.8
Calcium	mg/l			200	
Hardness	(GH)ppm	125	Calcium/Seawater	<300	0
Nitrite	mg/l	0		50	
Nitrate	mg/l	1	Organics	10	0.5
Ammonia	mg/l			0.5	
Chlorine	mg/l	1	Outside source	<5mg/l	0.5
Alkalinity	(KH) ppm	40	Calcium/Seawater	<100ppm	40
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	N			
Taste?	Y/N	Y	Slighly Salty	Hardness/TDS	Much Improved
Turbidity	Y/N	Y	Slightly Cloudy	Dissolved Solids	Clear
Color	Y/N	Y	Very Light Beige	Dissolved Organics	Clear
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					

Sample No.and location if taken for further testing

Initial off taste and color probably due to high Total Dissolved Solids. Ozone reduced that significantly.
Low pH (below 7.0) linked to presence of Nitirites which is an indicator of Aerobic bacterial activity in sludge layer.
After service all levels well within WHO guidelines.

Water Quality Data: Vili Toutai (Hihifo)

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	117	Minerals from Roof	<500ppm	
pH	0-14	7.8	Calcium or Seawater	6.5-8.5	7.2
Calcium	mg/l			200	
Hardness	(GH)ppm	300	Calcium/Seawater	<300	75
Nitrite	mg/l	0		50	
Nitrate	mg/l	3	Organics	10	0.5
Ammonia	mg/l			0.5	
Chlorine	mg/l	1	Outside source	<5mg/l	0.5
Alkalinity	(KH) ppm	40	Calcium/Seawater	<100ppm	20
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	N			
Taste?	Y/N	Y	Slight mineral	Hardness	Improved
Turbidity	Y/N	Y	cloudy	Dissolved solids	Clear
Color	Y/N	Y	murky	Suspended solids	Clearer
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					

No data for TDS after Ozone. But Turbidy improved after Ozonization. All other parameters significantly improved after service.

Water Quality Data: Uiha

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	637	Minerals from Roof	<500ppm	
pH	0-14	6.8	Calcium or Seawater	6.5-8.5	
Calcium	mg/l			200	
Hardness	(GH)ppm	25	Calcium/Seawater	<300	
Nitrite	mg/l	0		50	
Nitrate	mg/l	0.5	Organics	10	
Ammonia	mg/l			0.5	
Chlorine	mg/l	1	Outside source	<5mg/l	
Alkalinity	(KH) ppm	0	Calcium/Seawater	<100ppm	
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	N			
Taste?	Y/N	Y	Mineral Taste		
Turbidity	Y/N	N			
Color	Y/N	N			
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					

Water Quality Data: Faleloa Chapel

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	111	Minerals from Roof	<500ppm	30
pH	0-14	7.2	Calcium or Seawater	6.5-8.5	7.2
Calcium	mg/l			200	
Hardness	(GH)ppm	75	Calcium/Seawater	<300	25
Nitrite	mg/l	0		50	
Nitrate	mg/l	1	Organics	10	0
Ammonia	mg/l			0.5	
Chlorine	mg/l	1	Outside source	<5mg/l	0.5
Alkalinity	(KH) ppm	40	Calcium/Seawater	<100ppm	30
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	N		Describe	
Taste?	Y/N	N		After Ozone	
Turbidity	Y/N	Y	Cloudy	Cloudy or clear water	Cleared up
Color	Y/N	N		What color	
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					

Sample No.and location if taken for further testing

Water quality within parameters set by WHO (World Health Org). Chlorine present at 1mg/l. Must have been added. Still below maximum accepted levels.
Tank had Leak

Water Quality Data: Felemea Tank 1

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	358	Minerals from Roof	<500ppm	106
pH	0-14	6.2	Calcium or Seawater	6.5-8.5	6.8
Calcium	mg/l			200	
Hardness	(GH)ppm	300	Calcium/Seawater	<300	75
Nitrite	mg/l	0		50	
Nitrate	mg/l	1	Organics	10	0.5
Ammonia	mg/l			0.5	
Chlorine	mg/l	2	Outside source	<5mg/l	0.5
Alkalinity	(KH) ppm	40	Calcium/Seawater	<100ppm	30
Colliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	N			
Taste?	Y/N	N			
Turbidity	Y/N	Y	Cloudy	Total Dissolved Solids	Clearer
Color	Y/N	Y	Greenish	Algae	Light beige
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					

Initial low pH (below 7.0) probably a result of both anerobic bacterial activity ocurring in sludge layer indicated by low Nitrate levels and the presence of greenish water. Usually caused by algae when one part of the tank is exposed to sunlight. like an open port. Both are harmless.

Chlorine must have been added recently or algae would have died out.

Hardness levels initially high but significantly reduced by Ozone. Sometimes present in cement tanks from leaching.

Final levels after treatment all well within WHO guidelines.

Water Quality Data: Felemea 2

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	368	Minerals from Roof	<500ppm	53
pH	0-14	6.8	Calcium or Seawater	6.5-8.5	6.8
Calcium	mg/l			200	
Hardness	(GH)ppm	300	Calcium/Seawater	<300	150
Nitrite	mg/l	0		50	
Nitrate	mg/l	0	Organics	10	
Ammonia	mg/l			0.5	
Chlorine	mg/l	2	Outside source	<5mg/l	0.5
Alkalinity	(KH) ppm	165	Calcium/Seawater	<100ppm	80
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	N			
Taste?	Y/N	Y	Slight Mineral	TDS and Hardenss	No Taste
Turbidity	Y/N	Y	Slightly Cloudy	High TDS	Clear
Color	Y/N	Y	Very light Brown	TDS	Clear
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					

TDS significantly improved. pH unchanged. Hardness reduced by half. Alkalinity reduced by half. Some leaching from concrete can affect Hardness and Alkalinity. pH below 7.0 (acidic) can affect this.
Final result after service all water quality below WHO guidelines.

Water Quality Data: Governors House Pangai

Test	Unit	Result	Possible Source	WHO Guideline	After Ozone
TDS	ppm	637	Minerals from Roof	<500ppm	215
pH	0-14	7.2	Calcium or Seawater	6.5-8.5	7.2
Calcium	mg/l			200	
Hardness	(GH)ppm	300	Calcium/Seawater	<300	125
Nitrite	mg/l	0		50	
Nitrate	mg/l	1	Organics	10	0
Ammonia	mg/l	0		0.5	
Chlorine	mg/l	0	Outside source	<5mg/l	
Alkalinity	(KH) ppm	80	Calcium/Seawater	<100ppm	40
Coliform Test	Pos/Neg				
Observed	**Code**	**Yes/No**	**Description**	**Cause**	**After Ozone**
Odor	Y/N	Y	Unpleasant odor	Describe	No Odor
Taste?	Y/N	N	No dicernable taste	After Ozone	Pleasant Taste
Turbidity	Y/N	N		Cloudy or clear water	Clear
Color	Y/N	N		What color	Clear
Tank No.	**Name**	**Serviced**	**Location**	**Tested By**	
		15/01/14		A. Vuna	
COMMENTS					
Sample No.and location if taken for further testing					