

Technical and Health Issues Guide for Follow-up Visits

I. Objective

The objective of this guide is to provide individuals conducting LWW follow-up visits resources to assess the overall status of a LWW system, diagnose, troubleshoot, and correct common problems. These problems include not only equipment and operating problems, but also water quality, system maintenance, and issues with the Clean Water Covenants. Periodic follow-up visits are not only a condition of all Clean Water Covenants, but they are also a key element in the sustainability of the LWW system. Individuals conducting these visits should have a copy of the latest Clean Water Systems Handbook (CWSH). They should also have foreign language versions of these handbooks or training materials. A copy of the Clean Water Covenant will provide the Follow-up Team with important background information.

With prior scheduling, individuals conducting these follow-up visits can make special arrangements to have a member of the LWW Task Force or a CWU instructor available to assist via telephone or email during the visit. Individuals conducting these visits are required to assess the sustainability of the systems they check using the materials provided in the Appendices. Some of this work may be started before the visit in order to best utilize the time in country.

Because these visits provide an excellent training opportunity for the local system operators, every effort must be made to ensure that **the Operating Partners conduct the troubleshooting and corrective action while the Initiating Partner teaches, supervises, and assists. Remember: Flexibility and Creativity are essential!**

Some checklist items such as water quality cannot always be checked in the field. Individuals are encouraged to pack a few 100 to 250 ml bottles for bringing back samples for further analysis. Because these follow-up visits will involve concepts taught in all the CWU classes, teams are encouraged to have members with CWU 101, 102, and 103 experience.

Follow-up visits should include an assessment of the status of all health and hygiene education issues. In these cases, the follow-up team must contact the lead health & hygiene trainer for the site to get first-hand information. In many cases, it will be difficult to collect the data and/or information to quantify changes or improvements. In these cases, use your best judgment and your relationship with the Operating Partner to honestly assess the viability of the program.

Each follow-up visit should include questions and comments concerning applicable government regulations. If operations have been shut down because of government regulations, make a note of the reason and duration of the shutdown. List all corrective actions that were taken to comply with the regulations. Note the names, titles, and contact information for anyone outside of LWW that assisted in resolving the issue. Note any on-going special precautions that have been implemented.

Diplomatically question the status of the “micro-business”. Note the volume of free or subsidized water provided by the Operating Partner. Note any high visibility expenditures by the Operating Partner. The purchase of a pickup truck, for example, would be a high-visibility expenditure for distributing clean water.

Individuals or teams conducting Follow-up Visits are required to submit an On-line Trip Report and a Follow-up Trip Report covering each installation they visit. Copies of these documents are included in the Appendices. Copies of the Follow-up Visit Report shall be forwarded to the Living Waters Office in Franklin, TN and the network coordinator, if applicable. Electronic submission of these reports via email is preferred. In lieu of the On-line Trip Report, Initiating Partners can access the Status of Projects (SOP) Database and update their project information on line.

II. Technical Assessment and Troubleshooting Procedures

- A. **System Overview** (to be done with local system operator and their IOM manual)
1. Review the Daily Operational Record and the FORS Daily Operational Record, as appropriate.
 - a. Check the water meter readings. Calculate the average flow through the system in gallons per minute.
 - b. Check the trends on the pressure gauges and note when the filters were cleaned and/or changed.
 - c. Check any bottling records to see how many bottles were filled and distributed.
 - d. Reinforce with the local operator the importance of maintaining complete and accurate records. Record the water meter readings and any inconsistencies to include in the LWW Follow-up Visit report.
 2. Have the local operator take you through the layout and operation of their system. Do this before starting any equipment. This is your opportunity to assess and increase the knowledge of the local operator. **Be patient.**
 - a. Check inlet water supply.
 - b. Trace the water flow and valving through the system.
 - c. Check the condition of the holding tanks. Remove the cover from each tank and look for algae buildup, other contaminants, or unusual odors.
 3. Have the local operator go through a routine system start-up. If there are specific equipment problems that have kept the system down and inoperable, diagnose, troubleshoot, and correct those problems before attempting startup.

- a. Make notes of steps or checks omitted. Allow the operator to finish their routine before correcting their procedures.
 - **Remember: Flexibility and creativity are essential!**
 - b. After the system has been started, have the local operator follow the water flow again and record all data on the Daily Operations Record and FORS Daily Operational Record.
 - c. Run the system for about 10 minutes. If there are any water quality or taste issues, take a sample of finished water for testing by Test America Labs back in the United States.
 - d. Verify the operation of all electrical switches and circuit breakers.
 - e. Run some of the other water quality tests provided in the Field Test Kit including the PathoScreen test. Save the results of these tests for your Follow-up Visit report.
4. If there are specific technical or equipment problems on start-up, diagnose, troubleshoot, and correct these problems at this point. Start with the problems most obvious to the local operator. If there are no technical problems, have the operator shut down and drain the system. Proceed with the preventative maintenance checks.
 5. Take digital photos of good and bad features of the system so that others can learn from this follow-up visit.

B. Preventative Maintenance Checks (Can be performed in this or any order.)

Note: The completion of any of these checks will be determined by the amount of time the Initiating Partner has to spend at the site.

1. Have the local operator dismantle, remove, and inspect the trash filter.
 - a. Note the condition of the pleats.
 - b. Clean the trash filter in the bleach solution per the IOM manual.
 - c. Install the filter after cleaning it.
2. Have the local operator dismantle, remove, and inspect each big blue filter.
 - a. Note the condition and time in service for your report.
 - b. Note the condition of the o-rings.
 - c. Replace these filters and/or o-rings based on your inspection.
 - d. If you are going to Chlorine shock the system before start-up, do not install the Big Blue filters. Install them after shocking and rinsing the system.
3. Go through the Daily and Monthly Ozonator Operating Checklists.
 - a. Have the local operator show you what they look for when performing these checks.
 - b. Take the Ozonator off the board and operate it for about 10-15 minutes. If any of the Ozonator components will reach their useful life within the next 6 months, replace them, and save the old component as a spare. Mark the installation date on the component and keep records for your Follow-up Visit report. See Ozonator IOM manual preventative maintenance guide.
 - c. If you are going to shock the system with chlorine bleach, do not reconnect the ozonator feed tubing to the venturi until after the

- whole system has been shock treated with chlorine and thoroughly rinsed.
4. Disconnect the electrical connection at the breaker box to de-energize the electrical system on the board.
 - a. Remove the cover from the breaker panel and inspect the connections to the circuit breakers. Ensure the continuity of the grounds in the system. Check the supply voltage to the system.
 - b. Remove the covers from the plugs and switches and inspect the connections. Ensure the continuity of the grounds.
 - c. Inspect the plugs and power wiring on all electrical equipment for signs of damage. If the installation has a grounding rod outside, check the rod, clamp, and the ground wire.
 - d. Replace any electrical components that show signs of a short, arcing wires, or corrosion buildup on the wires or connections.
 5. Check the Water Softener per the ROS Section in the handbook. Perform each check as time permits.
 - a. Check the level of resin in the tank. Add more as needed.
 - b. Check the level of salt in the brine tank. Add more as needed.
 - c. Verify the frequency of regeneration vs. the chart in the handbook (Figure 36).
 - d. Verify that the Bypass valve on the Softener Controller works correctly. Check the screens in the lines for contamination.
 - e. Regenerate the softener per the ROS Section in the handbook.
 6. Check the Reverse Osmosis system per the ROS Section in the handbook. Perform each check as time permits.
 - a. Perform a Clean-in-Place (CIP) on the RO system. This could take 1-2 days.
 - b. Verify the flow, path, and destination of the wastewater from the RO system.
 - c. Check the operating records including product flow, ROG-2 (high pressure pump output), TDS of product, and changes over time.
 - d. If you are going to Chlorine shock the system before the next start-up, leave the Softener and Reverse Osmosis disconnected from the board.
 7. If the system shows any signs of algae in the piping, tanks, or other components, plan to perform a system shocking with chlorine bleach prior to restarting it.
 - a. Follow the procedure in the Clean Water Systems Handbook (CWSH).

C. Water Quality Checks

1. Check the inlet source of water for flow, pressure, chlorine, hardness, and contaminants such as color, odor, and particulates.
2. Ask the local operator if anything has changed with regard to the reliability of the water supply. Compare those results with the responses on the Water Issues Survey.

3. Take a sample of the inlet water, if there are any questions about water quality.
4. Perform the water quality tests outlined in the Field Test Kit manual.
5. Break one of the unions in the system before the ozonator injection (venturi) and after the trash filter to see if there is any algae or other contamination in the piping.
6. Plan to perform a chlorine shocking of the system if any contamination is detected in the system.
7. If any contamination is detected in the tanks, drain them, and clean them with bleach as outlined in the *CWSH Section 4.7 Testing and Start-up*.

D. Bottling Station Checks

1. Check all of the cleaned bottles that are ready for filling for odor or evidence of contamination.
2. Have the local operator show you how they clean bottles and fill them.
3. Check the cleaning spray nozzle for pluggage. Check the pressure spray can and wand for corrosion.
4. Ask questions about any visits from the Health Department or local authorities. Record the number of visits and inspection results in your report.

III. Living Waters Health, Hygiene, and Education Assessment

A. The Health, Hygiene, and Education aspects of a Living Waters Follow-up Visit should include the following elements:

1. A summary of water operations data
2. Personal interviews of individuals using the water
3. A summary of continuing education offered and delivered
4. An assessment of community awareness of the water project and Living Waters for the World.
5. An overall assessment of the viability and sustainability of the site.

B. Water Operations Data

As your team tours the site, examine the records, and question the operating partners, your team should ask both open-ended and specific questions to complete the assessment. Basic information such as outlined in the Follow-up Visit Report presents a picture of the sustainability of the site. If an answer is based on written documented records, you should note that versus information offered with no back-up. Also pay close attention to personal stories of success or failure. In some cases, the information from these stories can make or break a successful installation.

C. Personal Interviews

Personal interviews should be as non-threatening as possible. It is important to put the person at ease to learn from their experience. There are no right or wrong answers. Follow-up trips are not intended to be critical, find fault with an installation, or assign blame. It is important that LWW learn from each visit, so that they can maintain sustainable installations in the future.

D. Health and Disease Data

Health and disease data may or may not be available for an installation. Teams should refer to the initial Water Issues Survey document and follow up on statistics reported. Personal testimony in this area may be important. Stories such as “Marie missed a lot of school last year, but this year she has missed no school because she and her family drink water purified by the LWW system at their church” should be recorded, but highlighted that the facts are unsubstantiated.

E. Continuing Education

For Continuing Education, teams should try to interview individuals that were trained, certified, and recognized at the LWW Dedication service. Recording the number and ages of participants of subsequent training sessions will provide an indication of sustainability at the site. Note any staff or personnel turnover. In some cases, new people may not have the depth of training and commitment that the original people had. Follow-up visits provide a way to plant new seeds and establish the Living Waters relationships that will make the installation more sustainable for the future.

F. Community Awareness and Response

1. As the team conducts interviews, remarks about the community and people not necessarily associated with Living Waters will arise. Note the context of those comments and their potential impact on Living Waters. Note both positive and negative comments since each can have a separate but distinct impact on sustainability.
2. Carefully inquire about competition among water producers and the prices charged by each of them. Try and determine if the site is making or losing money on the project. Compliance with the original business plan is a local decision. Be tactful as you collect this information and avoid judgments concerning their business practices.
3. Try and determine the impact the LWW System has had on the church or organization operating the system. Has the organization grown or lost members? How else has it benefitted the community?
4. Issues involving regulatory or public officials should be noted. Many areas of the world deal with these individuals in “special ways” to gain their favor. Living Waters relies on the Operating Partner to deal with these issues and to comply with all government regulations at all times.

IV. Living Waters for the World Overall Site Assessment

- A. After all the checklists, site tours, and interviews have been conducted, it is the responsibility of the team to make an overall site assessment.
- B. If the site is productive, viable, and contributes to the Living Waters for the World Mission, please note that in the report and check the Sustainable blank. Success of the site and mission is not measured by profit and loss on water operations. Sites should be measured by the number and extent of the people being served and helped. A heavily subsidized site that is having an impact in their community is sustainable as long as both Partners recognize what’s happening and agree to continue the relationship through the Clean Water Covenants.

- C. If the Follow-up team believes that an installation is at risk, they should communicate their findings to Living Waters for the World staff as soon as possible after the trip. The Clean Water Covenant process has allowances to transfer or terminate responsibilities for the Initiating partners and Operating partners.
- D. Use the rating system in Section IX of the Living Waters Installation Interview as a guideline for making overall assessments. If your team feels that the site is viable and sustainable, check “Sustainable” box. If the site has issues that threaten its survivability, check the “At Risk” box. If your team feels that the site can be salvaged, please mark that box and include recommendations or additional details as to what it will take to achieve a sustainable installation.

V. Follow-up Visit Trip Report

- A. The Follow-up Visit Trip Report should use the one-page format checklist attached in Appendix A. The one-page format and short responses can be input into the SOP Database by the Initiating Partner. Do not feel limited to the single page format, however. Utilize the Additional Comments Section to expand your responses outlined in the report. Use the Installation Interview Information and Guideline and any other documents or resources as needed to document completion of the Follow-up Visit.
- B. One goal of the Sustainability Committee of Living Waters for the World is that all systems survive and continue to serve those in need until they no longer serve a useful purpose. If contaminated water from a municipal system corrects itself and starts providing a reliable supply of safe, uncontaminated water, then a system could be shut down and redeployed for another use. “Clean Water for all God’s Children” is our ultimate goal. Living Waters provides one way to get there, but not the only way.
- C. Another indication of a sustainable system is if the Operating Partner is producing water without the assistance (technical or financial) of the Initiating Partner. If a site is at this stage, there is no need to renew the covenant.

Appendices

- A. Follow-up Trip Report (Based on Yucatan Network document)
- B. Example Follow-up Trip Report Example – Chuina, Mexico
- C. LWW Installation Status Interview Information and Guide
- D. Health/Hygiene Education Questions for Inclusion in Follow-up Visit

Appendix A Follow-up Trip Report

(To be completed by the Initiating Partner after each follow-up visit)

Name of Facility: _____

Date of Visit / Number of Visit: _____

Names of interviewers: _____

Names of those visited: _____

General Information: Appearance/cleanliness (1-10, 10=cleanest): _____

Hours of operation: _____

Production (numbers of garrafones): _____

Does the community like the water? Taste? Price? _____

How many families served? _____

How much water do they give away? _____

Cost for those who can pay: _____

Last health department visit: _____

What were the results of the visit? _____

Is there a noticeable increase in water sales or feedback about water taste? _____

Details of Operation:

How many operators, paid or volunteer? _____

Do they have adequate supply of bottles? Labels? _____

Last time filters checked or changed: _____

Any observed reduction on flow rate indicating membrane problems (tank fill time used as an indicator) _____

Observed flow rate (product : waste ratio): _____

Log Book:

Are they keeping good records of:

Numbers of bottles dispensed? _____

Amount of money exchanged? _____

Scheduled maintenance dates? _____

Needs: _____

LWW Working Relationship:

Do they communicate regularly with their presbytery LWW coordinator? _____

How? _____

Has the presbytery LWW coordinator checked in with them regularly? _____

Have they HAD problems, and if so how did they get resolved? _____

If they had a problem, who would they contact? _____

Educational Effectiveness:

Have they been continuing the education? _____

How? _____

Overall Assessment: Sustainable _____ At Risk _____ Salvageable _____

Additional comments:

Appendix B

Example Follow-up Trip Report – Chuina, Yucatan, 2007

Name of Facility: Iglesia “Puerta del Cielo,” in Chuiná

Date of Visit: May 19, 2007

Names of interviewers: Jim and Cindy Barnett

Names of those visited: Pastor Wimmer Bernardo Árias, Elders Edgar Efraín Vargas Góngora and Federico Ordóñez

General Observations

General appearance/cleanliness (1-10; 10=cleanest): 9

Hours of operation: M-Sat, 6:00 a.m. – 3:00 p.m.

Production (numbers of garrafones): 70/day

Does the community like the water? Taste? Price? Yes, yes, yes

How many families served? 100 families (half of the 200-family community)

How much water do they give away? 10 families, primary school, clinic

Cost for those who can pay: 6 pesos to the community, 5 pesos to church members who resell the water for 6 pesos

Last health department visit: none yet

Operation Details

How many operators, paid or volunteer? One main operator with 2 assistants, all paid.

Do they have adequate supply of bottles? Labels? Not enough bottles. No labels.

Last time filters checked or changed: March 17, 2007

Any observed reduction on flow rate indicating membrane problems (tank fill time used as an indicator)? 3 ½ hours current tank fill;

No change since system was new

Observed flow rate (product:waste ratio): 1: 1

Log Book

Are they keeping good records of—numbers of bottles dispensed? yes

--amount of money exchanged? yes

--scheduled maintenance dates? yes

---parts or supplies that they lack? Yes

LWW Working Relationship

Do they communicate regularly with their presbytery LWW coordinator? Yes

How? Telephone

Has the presbytery LWW coordinator checked in with them regularly? Yes, he came twice the week we were there.

Have they HAD problems, and if so how did they get resolved? Haven’t had problems yet.

If they had a problem, who would they contact? Call Carlos Árias

Educational Effectiveness

Have they been continuing the education? How? No, the DVD does not work.

Can the children still sing “Usa esta agua” song? yes

Other evidence of education anywhere in the community? Public schools

Any noticeable change in health? None so far.

Ask a few people at random what they use the water for. Drinking, cooking, brushing teeth.

Any new people coming to worship because they came there for water? no

Other possible benefits of the system? Good for the local economy.

Anyone in the community have e-mail? no

Would that person be willing to be communicator to the US team?

Additional comments: Once in compliance with health department regulations, they would like to advertise their water by placing a large sign outside the church. The use of water for cooking has increased due to the low cost of the water. The women of the church sell and distribute the water.

Appendix D

Health/Hygiene Education Questions for Inclusion in Follow-Up Visit

Water consumption:

- Number of households using the water: _____
- Average consumption per household per week: _____
- Average consumption per person per week: _____
- Used in the school? _____ How much each week? _____

Visit homes of three or four families who use the water.

Ask about their health, and their use of the water, and whether they have seen change in their health and their habits.

Ascertain whether they use this water for everything that enters the body: _____

Do children in the community remember the lessons? the songs? the activities? _____

Health Indicators:

- Increase/decrease in cases of diarrhea in children: _____
- adults: _____
- Increase/decrease in absenteeism from school: _____
- work: _____

General impression of change in health of community, as perceived by:

- health officials (nurse, doctor) _____
- pastor & pastor's wife _____
- teacher _____
- elders _____
- other (specify) _____

Continuation of Education:

- Identify one or more of the original health/hygiene teachers.
- Have they continued to offer the education? _____
- How often? _____
- How many (total) have been educated? _____
- Who? (adults, children, men, women, etc.) _____
- Do they think people understand the content? _____
- Is the curriculum at the right 'level' for the community? _____
- Can they see evidence of change in health habits? _____
- Examples: _____
- _____
- Have they created any new methods or lessons? _____
- Are all of the original educators still involved? _____ New ones? _____
- Is there need for more materials to continue the educations? _____
- Specify: _____

Visit the water building: are posters and educational materials in evidence? _____

Are there educational materials to be sent with bottles? _____

If water production is interrupted, what do they use for water? _____

Does this happen frequently? _____ Health changes when this happens? _____