



MORNING STAR CENTER FOR SOCIAL PROGRESS

WATER PROJECT FOR THE COMMUNITY OF MIKONGA, DR CONGO (2010)



MSC will use UFL-420 System to purify water in Mikonga community, DR Congo



Utilizing one 4 inch x 20 inch ultra-filtration cartridge, this system automatically forward flushes the cartridge to keep it clean. It removes colloidal material, particulates, cysts, bacteria and substantially reduces the amount of viruses that may be present in potable water supplies.

- Max Operating Pressure: 100psi (690kPa)
- Max Operating Temperature: 40° Celsius or 104° Fahrenheit
- Maximum Trans Membrane Pressure: 45psi (3.1 bars)
- Ph Range: 3-10
- Size: 292mmW x 711mmH x 159mmD
- Weight: 11.3kg
- Retail Price per Filter: **\$1,762.40**
- Quantity: 2
- Total Price: **\$3,534.80**

Web site: <http://www.dispense.co.za>



Drilling Truck from Sofoco

Morning Star Center will contract a local drilling company to drill the water well and install the pump.

Name of the Company: Sofoco

Web site: <http://www.sofoco.com>



Well Drilling Process



Drilling Cost: \$300.00 per meter or **\$300.00** per 3.28 feet

Required Depth: 60 meters or 197 feet

Pump Installation + Equipment + Labor: **\$4,000.00**

Total Cost per Well: **\$22,000.00**

Morning Star Center Water Engineers – Volunteers

Morning Star Center will benefit from the professional assistance of a water engineer graduate from Colorado School of Mines to ensure that the ultra-filtration system is installed at the highest standard. This engineer helped develop water projects for other local and international organizations. Morning Star will pay for his airfare ticket to DR Congo which is approximately **\$2,500.00**

Parts required to install the two UFL-420 systems and make them operational will cost approximately **\$4,000.00**

Example of required parts: pump (\$300x2), PVC pipes, pressure tank (\$70x4), check valves, ball valves, solenoid valves, generator (\$500x2), screen filter, 800 gallon water tank (\$600x2), etc.

The estimate total cost for the construction of one water well and two sites for the UFL-421 systems: **\$32,034.80**



Morning Star Center for Social Progress

Safe Water Project – June 2010
for
Impoverished African Communities

Location: Mikonga, DR Congo
Population: 140,929 (Approx.)

"The DR Congo is among those African countries that have unhealthy water conditions. While exact statistics are difficult, it is estimated that around 100 people per day (mostly children) die in the DRC due to unhealthy water conditions, mainly from the diseases mentioned above." - Global Ministries.

<http://www.globalministries.org/get-involved/justice-and-advocacy/water/globalization-water-and-the-co.html>

Thank you for your gift of water to save lives and prevent deadly illnesses related to dirty water.

This project will provide clean and safe water that will save many lives and prevent deadly illnesses



This river is "all-in-one" for the local people – It is used as a source of drinking water, a place to take showers, do laundry, dishes, and defecate.

This place is one of the worse environmental disasters in the world, a dangerous place to stay around, and a source of deadly diseases. It is located in Mikonga, DR Congo.



**This water project will transform Mikonga community and bring hope for the best.
Join Morning Star Center as we *Dig for Hope* and bring *Water for Life!***



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Benefits of Morning Star Water Project in Mikonga

"Your water project is very important to our community of Mikonga," a local woman told us in June 2009. "The river water is used for drinking, cooking, bathing, washing clothes and watering crops such as tomatoes and vegetables. That water has so much bacteria that are making us sick and even killing adults and children. We know that the water we are drinking is not safe for our health, but we don't have a choice."

With the Morning Star Water Project, the number of water-borne diseases such as bacterial and protozoal diarrhea, hepatitis A, and typhoid fever, worms, cholera, and dysentery will sensibly decrease in the impoverished community of Mikonga, DR Congo. Moreover, the Morning Star Water Project in Mikonga will be used as the primary water source for the local hospital, improving the health of the large number of pregnant women who are patients there.

Facts about waterborne diseases:

Hepatitis A - viral disease that interferes with the functioning of the liver; spread through consumption of food or water contaminated with fecal matter, principally in areas of poor sanitation; victims exhibit fever, jaundice, and diarrhea; 15% of victims will experience prolonged symptoms over 6-9 months; vaccine available.

Hepatitis E - water-borne viral disease that interferes with the functioning of the liver; most commonly spread through fecal contamination of drinking water; victims exhibit jaundice, fatigue, abdominal pain, and dark colored urine.

Typhoid fever - bacterial disease spread through contact with food or water contaminated by fecal matter or sewage; victims exhibit sustained high fevers; left untreated, mortality rates can reach 20%.

Water contact diseases acquired through swimming or wading in freshwater lakes, streams, and rivers:

Leptospirosis - bacterial disease that affects animals and humans; infection occurs through contact with water, food, or soil contaminated by animal urine; symptoms include high fever, severe headache, vomiting, jaundice, and diarrhea; untreated, the disease can result in kidney damage, liver failure, meningitis, or respiratory distress; fatality rates are low but left untreated recovery can take months.

Schistosomiasis - caused by parasitic trematode flatworm *Schistosoma*; fresh water snails act as intermediate host and release larval form of parasite that penetrates the skin of people exposed to contaminated water; worms mature and reproduce in the blood vessels, liver, kidneys, and intestines releasing eggs, which become trapped in tissues triggering an immune response; may manifest as either urinary or intestinal disease resulting in decreased work or learning capacity; mortality, while generally low, may occur in advanced cases usually due to bladder cancer; endemic in 74 developing countries with 80% of infected people living in sub-Saharan Africa; humans act as the reservoir for this parasite.

Real death case in Mikonga related to unclean water from the river

Name/Age/Date of Death: Modekay Ilunga/57/March 8, 2010

Cause of Death: Typhoid, abdominal bloating, worms, and typhus due to the using of unclean water from the river and also no access to medical clinic for appropriate treatment.

About Modekay: Modekay was unemployed, but a very skilled carpenter and builder. Modekay was very excited to make doors and windows for the Morning Star Medical Clinic program as it will be used to provide medical assistance to their impoverished community of Mikonga. He died and left behind a widow with 13 children, 8 boys and 5 girls. Among these children there are 3 sets of twins. The oldest is a 25 years old girl and the youngest are 4 year old twins.



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Morning Star Center Water Project Plan

Objective:

Provide safe and reliable drinking water for the community of Mikonga, DR Congo.

Possible Sources:

Groundwater well

Equipment on site:

UF filter elements

Option 1: Groundwater well with hand pump

A local well drilling company has stated that there is water about 60m below the surface. This option would involve drilling a well for water supply. Pumping for this option would be manual. Major elements include:

- Well drilling (to be completed by outside contractor)
- Manual hand pump

Well with hand pump:

Pros:	Cons:
Low technology solution	Hard adaptation to automated water systems
Low maintenance demand	High physical demand
High reliability	Low production

The benefit of a hand pumped groundwater well is that it can produce good quality water reliably with very little maintenance. Initial water quality testing is required to confirm safety.

Option 2: Groundwater well with powered pump

Similar to option 1; however, an electric pump is used. Major elements include:

- Well drilling (to be completed by outside contractor)
- Electric pump
 - Gasoline generator
 - Short-term storage tank

Well with electric pump:

Pros:	Cons:
Moderate technology solution	Expensive
Moderate maintenance demand	Low physical demand
Moderate reliability	Moderate to high production

Benefits of this option are similar to Option 2, but the major physical demand of pumping is removed. Electrical pumping the well adds significant cost, complexity, and O&M. A pumping test will also be performed to determine maximum production.



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Summary Costs

Groundwater, Hand pump

	Cost	Unit	Line Total
Well Drilling	\$ 300 /m	60 m	\$ 18,000
Hand Pump	\$ 4,000 /ea	1 ea	\$ 4,000

Sub-total	\$ 22,000
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Groundwater, Electric pump

	Cost	Unit	Line Total
Well Drilling	\$ 300 /m	60 m	\$ 18,000
Electric Pump	\$ 7,000 /ea	1 ea	\$ 7,000
Generator	\$ 379 /ea	1 ea	\$ 379
Plumbing	\$ 200 /ea	1 ea	\$ 200
Eq tank	\$ 110 /ea	1 ea	\$ 110

Generac 4KCD5

Sub-total	\$ 25,379
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Criteria:

	Cost	Production, GPD	Unit cost of water, \$/GPD	Cost Score	1 is bad, 5 is good					Total Score
					Complexity	Maintenance	Water Quality	Reliability	Physical demands	
Criteria Weight				30%	20%	10%	10%	20%	10%	100%
Option 1: Groundwater well with hand pump	\$ 22,000	3600	\$ 6.11	1.0	5	5	3	5	1	3.2
Option 2: Groundwater well with powered pump	\$ 25,000	14400	\$ 1.74	4.0	3	3	3	3	5	3.5
	<i>(using MSC costs)</i>			<i>Normalized cost</i>						

THANK YOU

Morning Star Water Project Team