

FRESH WATER FOR IRAQ'S CHOLERA STRICKEN REGIONS

Mark Snyder Electric addresses the problem of getting fresh water to cholera stricken populations when they need it, not weeks or months later.

September 2009 Rescue Green Magazine



9 Panel Solar PV System for 3cu/m



Trailer Mounted UF System for 3 cu/m

You will not read much about it in the news but there has been an outbreak of cholera in Iraq. 2000 people have been infected, 5 have died and more are coming down with symptoms daily. The Ministry of Water Resources has contracted with Iraq Global to provide water purification systems that can be deployed in off-grid areas and provide potable water for rural populations. Iraq Global under the leadership of Dr. Labib Sultan has contracted with Mark Snyder Electric of Poway, CA to provide 325 mobile water purification systems to aid the disease stricken regions of Iraq.

Mark Snyder, an internationally recognized solar energy expert and innovator, has designed a remarkable system that uses 100% solar energy to bring water under pressure from any local source to the filtration unit, process it at a minimum rate of 1000 liters of water per hour of sunlight, a volume that can serve the needs of a village of 500 families. Once these units are in-country, they can be deployed within a day's notice either by truck or by rail and be operational within another day or two of set-up time depending on the availability of local skilled technicians.

The Deluxe SPX Tracking Ultra Filtration System is a unique response to the need for clean, fresh water in regions where healthy water is a precious and rare commodity. This system

utilizes state-of-the-art technologies innovatively combined with ancient knowledge about solar movements and passive cooling to provide a mobile, efficient and compact approach to water filtration for small rural communities.

Each system is comprised of three major sub-systems: the water intake system; the water filtration system and the solar energy system. The water intake system uses an enormous 20 foot long "straw" to draw water from a river, lake or marsh and deliver it under pressure to the filtration unit. In the straw is a submersible pump operating on direct current from half of the solar panels that draws the water through "gill slits" cut into the wall of the straw below the water line. Acting as the first line of filtration, these gills screen out all large contaminants and feed the water to a "gravel pack" within the straw. The gravel pack filters the water a second time and then the pump forces the water into the "river hose" for delivery to the filtration unit.

The river hose is a 20 meter long flexible pvc hose surrounded by thermoplastic insulation and wrapped in a highly reflective metallic tape. The insulation and tape serve a dual purpose: first to keep the water from direct sunlight and thus minimize algae growth and second to keep the water as cool as possible from the intense desert sun. Because the pump is substantially overpowered, an additional 20 meters of hose could be added to facilitate less accessible water sources

The second sub-system, the water unit is a trailer borne filtration system made by pure Aqua to provide a minimum of 1000 liters of potable water per hour. It uses a multi-stage filtration process, involving membranes and screen filters, and includes a back wash cycle to clean the filter/membranes hourly. Additionally, an injection tank and valve are provided to inject a 20% chlorine solution monthly for membrane maintenance.

Water enters the filtration unit at the top where MSE has designed an ingeniously simple radiator to dissipate heat from the unit and keep the water as cool as possible. The radiator is made of PVC pipe through which the cool river water is slowly pushed, absorbing heat and then entering the filtration system.

The last sub-system is the solar energy system, designed by Mark Snyder in collaboration with Zomeworks of Albuquerque, NM, one of the nation's most experienced builders of passive solar tracking systems. Zomeworks, under the leadership of Steve Baer Dave

Nevins, created a uniquely suited base and wind resistant ground support arrangement. Attaching 10 foot long trussed "outriggers" to the central mast gives massive leverage against the powerful winds that roll across the Iraqi desert. On the end of each outrigger sits a 55 gallon oil drum, a plentiful resource in Iraq filled with sand, another renewable resource. The barrels are tightly strapped to the outrigger and sit on flat "shoes" that distribute their weight.

The free-standing mobile solar panel array utilizes six Sharp 175 watt panels, generating just over one kilowatt of power, evenly distributed between the filtration system (running on alternating current) and the submersible pump (running on direct current). Current modifications being considered include a trailer mounted tracking system and a floating platform-deployed straw for water bodies that are two shallow near shore (marsh and swamp areas in tidal zones and estuaries) to utilize the submersible pump. Desalinization is the next major advancement, if that technology can be economically downsized for trailer borne systems, there will be no limit to the global market for these units.

These are the first increment of MSE's contract with Iraq Global, 150-3000 liter systems are next, followed by 75-5000 liter systems. There appears to be world-wide interest in these systems, inquiries have been received from Mongolia, Jordan, central Africa and South America. These systems are uniquely suited for areas hit by drought, hurricane/typhoon, earthquake, flood, tsunamis, mudslides, cholera, typhus and almost any other calamity that might befall a rural population. Needing nothing more than a small towing vehicle, the units can reach anywhere that has a road or a trail. Weighing in at about 3400 pounds, they can also be dropped in by helicopter or off-loaded from railcars.

Each unit can be installed by two men, one a qualified electrician or pump technician, the other a helper. Loading and unloading may require additional manpower but only for a limited time. The heaviest component weights about 250 pounds and can be tilted into place by two men.