COMMERCIAL APPLICATIONS REQUIREMENTS DOCUMENT

Mobile Potable Water Treatment System

for

Sustained Emergency Response and Recovery

November 2011

Contents

1. General Description of Operational Capability

Water is a basic necessity for human life. In the event of a natural disaster or terrorist attack, our nation must have effective and efficient options to establish and restore local sources of potable water in our communities. In these emergency cases, our reliance on bulk water re-distribution is inefficient, expensive and dependent upon a robust transportation infrastructure. The logistics associated with the delivery of bottled water supplies can also be quite expensive, considering that it can take 6 truckloads of water to simply stage a single day's potable water supply to 10,000 people, not to mention staging costs and transportation to distribution sites.

Methods to access local water sources for the purposes of delivering potable water can improve both logistics planning and cost. Mobile water treatment solutions also provide additional benefits, such as utilization of water distribution infrastructure that might obviate distribution logistics. When multiple mobile treatment systems are combined, it will be possible to increase the scale of local water treatment applications. This DHS requirement calls for both the development of stand-alone and system-of-systems water treatment solutions.

Implementing local modular water treatment operations will provide a cost advantage when sustained response is necessary. With mobile treatment systems products, government agencies, emergency management professionals and first responder teams can mitigate costly reliance upon trucking methods potable water into affected areas. Mobile treatment systems also add an important technology to our national options for responding to national emergencies and disasters.

The water treatment capabilities described in this Commercial Applications Requirements Document (CARD) will result in the development of products that are self-contained, independently powered, water pumping and treatment systems that can be operationally set up to produce potable water in less than thirty minutes after deployment to an appropriate raw water source. While knowledgeable operators and water infrastructure officials may be available to set up and initiate water treatment operations, these commercial units will be operable by persons without specialized training under the guidance and oversight of authorized officials. These systems will provide a reliable cost saving technology that can be used in a number of scenarios where potable water is no longer available through traditional means.

1.1 Capability Gap

The conventional method of providing potable water in the wake of a disaster is often costly and logistically complex. Normally, potable water is distributed to communities by trucking in bottled water, hauled water or using alternately powered treatment systems. In the event of a catastrophic incident, cascading failures of infrastructure systems may occur. Water supply systems may be rendered inoperable or capacity-limited, or contaminated. Transportation infrastructure may also be damaged limiting transportation options that would be necessary to enable the traditional potable water distribution options. The availability of electricity may also be limited or the grid may be non-functional. These and other potential infrastructure challenges lead to the need to identify an alternate stand-alone capacity for producing potable water.

Proposed systems will eliminate single points of failure by presenting a stand-alone design that is amenable to flexible methods of transport by air, land or water while bringing an effective water treatment capability to users that incorporates an independent power source.

Individual use systems are widely available and can be considered as part of the solution spectrum for mobile emergency drinking water. Discussions regarding the stockpiling and distribution of and training on such individual systems are ongoing, and center on potentially staging such equipment for emergency distribution at locations such as first responder buildings. For the purposes of this CARD, small personal (individual use) water treatment systems (such as cup based purifiers) are not considered.

1.2 Overall Mission Area Description

The provision of potable water to communities affected either by natural disasters or terrorist events is understandably a top priority for first responders, emergency management authorities at all levels of government concerned with short and medium term disaster response and relief efforts.

Proposed systems will provide a mobile stand-alone potable water treatment resource to federal, state, territory and tribal preparedness and/or response teams and emergency management professionals. A proposed system will be transportable using a variety of options (by air, land and/or water) even in the most adverse conditions. A proposed system will be easy-to-deploy, easy-to-use and will produce potable water from raw water sources.

Proposed systems will provide for water testing to characterize and determine the appropriateness of raw source water selection prior to use. Federal, state and local regulations apply to drinking water, therefore, applications of the proposed system need to be clear for emergency applications across the 50 states, 8 territories and tribal regions. At a minimum, these systems must comply with the National Primary Drinking Water Regulations set forth as required by the Safe Drinking Water Act. As a result, the system will be documented with respect to the contaminants, and the level of contaminants, that a proposed system can remove.

Any proposed system will be low cost, low maintenance, providing high quality and high yield output. A system will primarily be used to pump and treat water for public consumption. The system may also provide additional ancillary benefits such as an alternate power source to operate its pumps as well as provide DC and AC load centers into which other critical equipment could be plugged in and engaged. Ancillary benefits may add to the utility of the treatment system in areas that have been devastated by a natural disaster or terrorist event where infrastructure, electrical, transportation and water resources have been compromised. However, these additional functions should be considered optional.

1.3 Description of the Proposed Product or System

A proposed system will be a self-contained, independently powered water treatment system contained in a space efficient footprint. The complete system with ancillary components and supplies will be deployable to any site where there is level ground using a 4K (pounds) or greater all terrain forklift truck, helicopter, truck or boat and at a minimum shall easily fit into a standard 20’ shipping container, with internal dimensions approximately 7’x7’x19’. The system will specify and/or provide the methods necessary to evaluate raw water sources for suitability to the treatment system. The results of this evaluation should conform to local regulatory standards, including any specific provisions for emergency deployments of water treatment systems.

While training may be required for water quality determination, no special training will be required to operate the proposed system in production mode, and a system will be operable, pumping and treating water and supplying electricity in less than 30 minutes after arrival on site and after a positive suitability determination for a raw source. A proposed system will reliably and adequately produce safe and potable water in accordance with federal guidelines as set forth in National Primary Drinking Water Regulations at a minimum. The proposed system should also be designed to meet the individual state, territory or tribal requirements with a period of one to two years after DHS certification.

The system design will provide for a collapsible storage tank that shall come standard with each unit, storing water so it is available when needed by first responders and community members. Because water treatment systems perform optimally when operated on a continuous basis, scalable storage solutions for excess water production must be addressed. Provisions for regular testing and characterization of both raw source and treated water will be provided with the system to assure compliance with relevant regulations.

A proposed system will contain an internal power source so that the system can operate 24/7. Optionally, the system generator may also provide electricity to run generators, lights, tools or other command station equipment.

1.4 Supporting Analysis

In an emergency, it is necessary to respond to the need for potable water and to have at the ready, means to deploy products and methods that can satisfy public needs for water. Governments and individuals have several options should the water supply infrastructure fails as a result of an event. Within approximately 24 hours, official requests for water may begin to result in water delivery to affected areas. As early as 5-7 days into the recovery process, the expense of acquiring, delivering and distributing water can be mitigated by the installation of an alternate water treatment system.

To be effective, water treatment response must be easy to deploy, integrable with the local distribution system, well understood, and represent acceptable water quality with respect to federal, state and local guidelines and regulations.

On the continuum of responses, the emergency mobile water treatment approach represents an important option in meeting the local demand for potable water. In establishing this capability, the desire is to mitigate risk to the US population in the face of significant or catastrophic disasters that damage the drinking water infrastructure. The deployment of emergency mobile water treatment systems can provide a high volume source for drinking water for a local community at a rate of three gallons per person per day.

1.5 Mission the Proposed System Will Accomplish

Any proposed system will provide readily-deployable, high quality, high yield water treatment to disaster-affected communities at a low cost. Any proposed system shall extend recovery timelines with a cost and logistical advantage compared to the cost of delivering bottled or bulk potable water. The proposed system will be easily deployable and operational in a self-contained, self-generating powered platform that minimizes the need for a fuel supply and related logistical support. The proposed system will be capable of providing for continuous operation, 24/7, making potable water readily available at an approved site, when and where it is most needed, at a low cost with little or no pollution. Ancillary options, such as providing power to operate lights, recharge communications devices, operate computers, satellite communications modules and other equipment may also be included to improve the value proposition for the proposed system.

1.6 Operational and Support Concept

1.6.1 Concept of Operations

A proposed system may be deployed in response to a disaster in affected areas to treat water sources from a prearranged site where water treatment may be needed before the occurrence of an anticipated event. For instance, if it is likely a hurricane will make landfall in a particular area, it must be possible for the proposed system to be easily pre-positioned at a site within reasonable proximity of a high utility service area. A proposed system must be able to withstand commonly occurring weather conditions without additional hardening or protection. A system safety plan must be provided for reasonable precautions to protect a proposed system from weather disasters such as tornados, hurricanes, wild fires, severe winter weather, etc.

Emergency response teams making use of the system should be capable of identifying areas that may require water treatment based on local planning procedures, emergency response plans and suitability of water sources, including identification of specific deployment locations. Water assessment kits shall be provided with each unit, and additional kits shall be made available at a low price from the vendor for pre- and post-treatment water quality evaluations.

Operational roles in the field will be determined by local procedures and emergency response plans. A comprehensive and easy-to-understand training manual will be included with each unit describing the procedures to deploy and operate a system. In the event a more in-depth training session is required, a provider shall host tailored training sessions. A system provider will provide telephone, email and on-site assistance plans, as necessary.

A system will be self-contained and independently powered. Any proposed system will be capable of utilizing traditional power sources, such as the grid, when available, as a “back up” to the alternate power source. Power generated by the unit is used to pump and treat water and may be optionally used to power ancillary tools, lights and communication systems.

Because the systems may experience significant time in storage between events, they must be capable of being safely stored in a location without experiencing performance degradations that render the device ineffective. Configurations for storage shall not inhibit the rapid deployment and response to national demands for water treatment. System lifetimes and consumable refresh rates must conform to a low-cost model. Readying the systems for storage will also require minimal labor and preparation, and the processes for system configuration for storage and use will be fully covered in the provided training materials.

1.6.2 Support Concept

Any system will support easy installation and maintenance without the general need for specialized training. Maintenance requirements will be minimal.

Maintenance and operation roles in the field will be determined by personnel using local procedures and emergency response plans. A comprehensive operations manual will be provided with each unit describing when routine maintenance is required and the procedures required for maintaining treatment system performance. In the event a more in-depth training session is requested, the vendor will make such training sessions available. Any supplier will provide on-site assistance plans as well as telephone and email troubleshooting assistance.

Any system consumables will be available in the commercial market place for up to five years after original system purchase. The systems provider must demonstrate a clear capability for making parts available.

2. Threat

Contaminated water poses a significant health risk to exposed individuals. Water can become contaminated at the source, during treatment or during distribution to the point of use. Improperly treated water can contain both chemical and biological contaminants that can lead to chronic health effects, damage to internal organs, nervous and immune system disorders, birth defects, and even death.

Water infrastructure represents a potential terrorist target. Strategically, the development of a system response to affected areas may require a high yield (approximately 30,000 gallons from freshwater sources per day) of treated water is critical to necessary preparation for providing potable water to communities of approximately 10,000 people.

Additionally, water sources are often contaminated during a natural disaster. Hurricane events along the U.S. Gulf Coast, including Hurricane Katrina (2005) and Hurricane Gustav (2008), regularly impact water resources adversely, leaving communities without access to sanitary water. Other natural disasters have caused similar devastation to communities by contaminating water supplies including the Indian Ocean Tsunami (2004) and the earthquake in Sichuan, China (2008).

3. Existing System Shortfalls

The current methods of providing potable water in the wake of a disaster can be both costly and logistically complex. Current methods of distributing potable water to communities include trucking in bottled water or hauled water. The shortfalls in these approaches can include the high cost and logistical considerations of buying and transporting fuel and buying and transporting bottled water, as well as disposal costs of used bottles.

These traditional approaches require roads and bridges to be passable in order to transport potable water, and also require an ongoing monetary outlay to support logistic operations. A proposed system shall utilize technology to significantly reduce logistical considerations inherent in the provision of potable water where clean water is unavailable and also offer significant cost savings.

For example, hurricane, tornado, earthquake and other disaster response plans have typically provided for bottled water response to affected communities with potential difficulties, including:

- sourcing water vendors,
- costly contracts to purchase bottled water and transportation services,

- fluctuating cost of fuel, making budget planning difficult,
- unreliable roads and other infrastructure needed to deliver the bottled water,
- unreliable delivery dates presenting the possibility of no potable water to distribute, and
- costly disposal of discarded water bottles and the resulting increase of waste diverted to landfills and/or costs associated with the recycling of discarded bottles.

Alternatively powered treatment systems can present similar difficulties in terms of high cost, e.g., necessity for having a readily available and cheap source of fuel and an easy, cost effective means of regularly transporting the fuel to an affected site. These systems can also be quite large, posing additional difficulties for transportation and site location.

In summary, conventional methods of delivering potable water after a disaster rely on three uncontrollable factors:

1) the identification and ability of a source to supply bottled water, hauled water or generator fuel,
2) the availability of fuel to transport goods, and
3) an intact transportation infrastructure network to get the goods to an affected site.

These three points of potential failure in more typical approaches are present throughout the duration of a disaster response. Any proposed system shall eliminate these potential points of failure by presenting a stand-alone design allowing for flexible transport of the unit by air, land and/or water bringing high-yield water treatment to an affected site and using alternate power capabilities.

Current methods can lead to interrupted service when any one of these factors fails at anytime during the short and medium term of disaster response, leaving communities without life-saving water for undefined periods of time. Current methods rely on functional transportation networks to move bottled or bulk water or fuel to the site. Both transport and purchase of these goods (i.e. the bottled waters) is often costly. Costs associated with the disposal of bottled water containers is another potential shortcoming of this type of approach.

Capabilities needed to address this gap include utilization of a stand-alone on site water treatment system that does not require external fuel sources alone. It is also important that the technology be initially transportable to the site using a variety of transportation methods in order to mitigate impassable roads and bridges. This ensures that potable water is being delivered to affected communities without interruption of service when power or fuel are not readily available.

4. Capabilities Required

4.1 Operational Technical Parameters (T: Threshold/ O: Objective)

4.1.1 Each unit shall weigh no more than 8,000 pounds (T) and no more than 5,000 pounds (O) with compatibility of transport by with 4K (pounds) or greater all-terrain forklift.

4.1.2 Stowed or packaged for transport, the units shall be no more than 900 cubic feet (T), 100 cubic feet (O) with a maximum height of 7’ and a maximum width of 7’.

4.1.3 Standard 120V grid power connections shall allow for maintaining any required battery charge during indoor storage to support deployment readiness (T)/(O).

4.1.4 [Optional Requirement] The power system shall provide an alternative capability to run external equipment from 120VAC and 12 VDC plugs (T), 120VAC or 220VAC and 12 VDC plugs (O) using the internal power source.

4.1.5 [Optional Requirement] Each unit will have a total external power capacity of ≥ 3000 watts (T), ≥ 4,000 watts (O) when the entire system is fully operational.

4.1.6 The system design shall provide for a collapsible storage tank that stores excess potable water 15,000 gallons (T), 30,000 gallons (O), delivered with each unit.

4.2 Critical Technical Parameters

4.2.1 The treatment solution shall identify the methods of determining suitability for raw water sources within 48 hours (T)/ 24 hours (O) for all 50 US states, 8 territories and tribal regions.

4.2.2 The treatment solution shall provide potable water from raw surface water sources (T)/ from fresh, brackish (from 0.5 to 30 parts per thousand, ppt, salt), or saltwater sources (30-50 ppt) (O).

4.2.3 The system shall include definitive plans that are consistent with federal state and local regulations for the handling, processing, storing and/or disposing of hazardous residue produced by the system.

4.2.4 The system shall be configurable and loadable/unloadable for transportation to the site using one of the following transportation modes: truck (and trailer,) 20’ shipping container, boat, helicopter, commercial aircraft and/or a 4K or greater all terrain forklift within 1 hour (T) within 30 minutes (O).

4.2.5 Each unit shall be independently powered with minimum need for fueling, delivered with fuel to support the initial period of operation without refueling for: 2 days continuous operation without refueling (T)/7 days without refueling (O).

4.2.6 A system shall have the capacity to effectively pump and treat a minimum of ≥ 0.01 millions of gallons per day (mgd) (T), ≥ 0.03 mgd (O) from raw water sources.

4.2.7 Treatment process shall come with a 30 day chemical supply that will allow for uninterrupted treatment of water (T) or the treatment process shall process water without using chemicals to treat water (O).

4.2.8 Potable water resulting from a system shall comply with minimum standards set forth in the National Primary Drinking Water Regulations for drinking water quality set forth by the Environmental Protection Agency (EPA) in accordance with the Safe Drinking Water Act of 1974 as amended and the related National Primary Drinking Water Regulations (NPDWR) (T). Treated drinking water shall comply with the specific standards set forth by each of the 50 states, 8 territories and tribal regions (O).

4.2.9 All system components for processing and pumping water shall comply with NSF/ANSI Standard 61 and any treatment chemicals shall comply with NSF/ANSI Standard 60 (T)/(O).

4.2.10 The water treatment system shall have a configuration for storage for extended periods up to two years or more, allowing for storage configuration in less than 4 hours (T), 2 hours (O).

4.2.11 The proposed system storage configuration shall not impede deployment and employment response times. The system shall be configurable for storage for up to1 year (T) without maintenance. The system shall be configurable for storage for up to 2 years or more (O) without maintenance.

4.2.12 System consumables, including any membranes, shall remain functional for deployment for a period of 1 year (T). System consumables, including any membranes, shall remain functional for deployment for a period of 2 years or more (O).

4.3 System Performance.

4.3.1 Mission Scenarios

4.3.1.1 Proposed systems shall continue to work in environments where rain falls at the rate of one inch per hour for 4 hours (T), 8 hours (O); at temperatures greater than 100° F (T), 120° F(O); at temperatures less than 30° F (T), 0° F (O); and in the midst of dusty environments, 26.1 x 10^{-6} particles/m^3 (T)/(O).

4.3.1.2 Proposed systems shall be self-contained and easily transported to a required location using a 4K (pounds) or greater all terrain forklift (T), human portable (O).

4.3.2 System Performance Parameters

4.3.2.1 Each unit shall be powered independent of the electric grid (T)/(O).

4.3.2.2 The system shall pump and treat from at an effective minimum rate of ≥0.01 millions of gallons per day (mgd) (T), ≥ 0.03 mgd (O).

4.3.2.3 The system shall provide hosing to transfer water at the minimum effective treatment rate (4.3.2.2) for a distance of ≥100 ft. (T), ≥200 ft. (O) from a raw water source.

4.3.2.4 The system shall provide hosing to transfer water at the minimum effective treatment rate (4.3.2.2) for a distance of ≥100 ft. (T), ≥200 ft. (O) to deliver potable water to a distribution or storage destination.

4.3.3 Interoperability

4.3.3.1 Any proposed system shall work independently, without relying solely on any external input.

4.3.3.2 The system shall generate its own electricity to power water pumps (and other ancillary components), the water treatment process and optionally other equipment.

4.3.3.3 In order to provide the utmost flexibility to the end user, the system shall have a capability to be powered seamlessly using the electric grid through standard 120V plug(s) (T), 120 & 240V plugs when available.

4.3.3.4 The system shall be modularly designed such that key parts can be replaced in less than 60 minutes (T), 30 minutes (O).

4.3.3.5 System modularity shall allow for the operator to swap components out of non-functioning systems to create a functioning system in less than 4 hours (T), 2 hours (O).

4.3.3.6 Multiple systems functioning together shall be capable of producing up to 0.05 mgd (T) 0.075 mgd (O) from a raw water source.

4.3.3.7 The system shall allow connection to/from an un-damaged water distribution system to create a combined system that provides additional delivery pressure and/or volume. This aspect of the system should be clearly described so that water system officials can rapidly identify viable and safe modes for configuring multiple systems in less than 120 minutes (T), 60 minutes (O).

4.3.4 Human Interface Requirements

4.3.4.1 Operator safety is paramount. Safety features shall be explicitly covered in training and incorporated into the unit to prevent harm to operators or damage to the proposed equipment and other people, equipment or infrastructure in the vicinity of deployment.

4.3.4.2 The system shall clearly identifies the certification level required for federal, state, territory, or tribal operator appropriate to the treatment system shall be clearly identified for domestic deployment (T)/(O).

4.3.4.3 Training materials shall be available on-line, and may consist of manuals and/or training videos. Users shall be competent to operate the system with less than 2 hours of training (T), with less than 1 hour of training (O).

4.3.4.4 Once suitability of a raw water source is determined, a system shall be deployable by no more than two people in ≤ 60 minutes (T), ≤ 30 (O) minutes, after training has been completed.

4.3.4.5 The system shall interface with water processing infrastructure as applicable. Delivery pressure and interface options shall be identified and defined so that federal, state or local water processing staff can rapidly understand the capabilities that the system can provide and characteristics of any waste that will be produced as a result of processing raw water sources. Other operational requirements referring to deployment time do not include this time to interface the system with an existing water delivery system.

4.3.4.6 The system shall require only periodic visual confirmation from an operator to ensure the system is running optimally, checking system indicators and flow of potable water coming out of the treatment system. Regular monitoring of finished water quality shall be necessary to assure that the appropriate drinking water standards are met. State and local officials will specify routine monitoring requirements to meet regulatory requirements and any special monitoring required because of the emergency. Continuous monitoring of finished water quality is highly desirable, for example - automatically and regularly recording turbidity at intervals not exceeding every 15 minutes.

4.3.5 Logistics and Readiness

4.3.5.1 Safety features shall be built into a system to monitor drinking water production and ensure the highest quality water output.

4.3.5.2 During deployment, operators shall be alerted using a visual and audible indicator if any maintenance must be performed or any other consumables, e.g. filters, membranes, additives, must be changed or serviced.

4.3.5.3 The system shall have no less than a Mean Time Between Failure (MTBF) characteristic of 1460 hours (T), 2160 hours (O) with 94% Operational Availability (A_o).

5. System Support

5.1 Maintenance

5.1.1 Any proposed system shall require minimum preventative maintenance, less than 30 minutes per day, and a mean time to repair of less than 2 hours. The status of the equipment with respect to the need for preventative or restorative maintenance shall be visually and audibly indicated, to ensure continued production reliability for potable water.

5.1.2 As specified by the vendor, and as highlighted in required training materials, periodic visual checks of a system's self diagnostic indicators shall be conducted by operators or maintenance personnel to ensure the system is running optimally. The operator will check any gauges, LED light indicators, displays and flow of potable water coming out of the treatment system at a frequency specified by the manufacturer.

5.1.3 The system shall provide for quality testing of both raw source and treated water as specified using a vendor supplied kit and relevant methodology to ensure regulatory compliance.

5.1.4 System design shall ensure minimal training of personnel is required to ensure proper understanding of system self-diagnostic indicators.

5.1.5 The contractor shall submit a proposed preventative maintenance schedule for stored and operational units.

5.1.6 An operation manual and/or other training materials shall show the procedures required to maintain/change consumables and accomplish routine maintenance. Two copies of each manual shall be submitted in hard-copy and electronic form (e.g. pdf files).

5.2 Supply

5.2.1 Operation and maintenance manual(s) and other relevant training materials shall be provided to an end user with each system. These materials shall include deployment procedures, information on diagnostics, a troubleshooting guide and consumable replacement procedures.

5.2.2 Any supplier shall provide low-cost replacements for associated water treatment consumables.

5.2.3 Operations and maintenance manuals shall be made available on-line (T). Operations and maintenance manuals shall be made available with video training support (O).

5.2.4 The system developer shall develop a logistics support plan that outlines mean time between failure of parts and provides a recommended list of consumable and non-consumable spares required to maintain/sustain the system, and will make a maintenance kit available with any spare parts the unit may require within 90 days of continuous operation.

5.3 Support Equipment

5.3.1 Water testing and evaluation kits shall be provided as part of the system for examination of raw water source quality, system calibration, and determination of quality for treated water output from the system (T)/(O).

5.4 Training

5.4.1 A training manual shall be provided with each system describing when routine maintenance should be performed and procedures required to maintain a system.

5.4.2 In the event a more in-depth training session is required, a supplier shall host customizable training session(s).

5.4.3 On-site assistance plans, as well as telephone and email troubleshooting assistance shall be provided.

5.5 Transportation and Facilities

5.5.1 Any system shall be transportable by truck, trailer, air, shipping containers, boat, and helicopter suspended from installed lift points or by forklift using the skids built into the base of each system.

5.5.2 A system shall be installed at a minimum on level ground or on a trailer bed near a water source.

5.6 System Safety

5.6.1 The proposed system shall have a safety plan to provide for reasonable precautions that protect the system from weather disasters such as tornados, hurricanes, etc., during storage, transport, or use.

6. Force Structure

Emergency Response teams at the state, territory and/or tribal level are key customers for the delivery of key water resources in the face of an emergency incident. Domestic water processing infrastructure organizations are also primary customers in the determination of appropriate water sources and standards relating to water quality for the source and for the resulting drinking water.

If trained water processing professionals are available at the deployment site, it is highly likely that they will be involved directly in the request for and the implementation of local water treatment systems. However, individuals without specialized knowledge should be able to complete the provided system training and conduct operations and maintenance under the guidance of certified professionals.

It is conservatively estimated that the potential available market for such a system is greater than 18,000 units for use by local municipalities, public water systems, water treatment facilities and emergency management agencies.

7. Schedule

Activities that target the development of solutions that meet the requirements stated in this document are intended to result in commercial products. DHS and the potential partner will mutually agree upon a schedule for development that will become a part of the Cooperative Research And Development Agreement (CRADA).

8. System Affordability

Individual system price is not expected to exceed $100,000 at high volume production levels (T), ≤ $80,000 for a raw water treatment system (O).

Systems can also be made available to potential users on a lease or lease-to-buy payment scheme.