

2371 Koller Road
Sulphur, OK 73086

1920 Rankin Rd.
Houston, TX 77073

Tel +1 580 618 4000

FOUNDED 1981



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3306 Orange Grove Ave
N. Highlands. CA95660

Authorized suppliers to:



FEMA # 581287

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ROC Sciences
is a Division of
ROC Energy

House Committee on Natural Resources
2057 Rayburn HOB
Washington, DC 20515

Re: Contaminated Water and Mine Tailings

Dear Committee Members

After careful review of the water analytical results sent to us from Liberty Analytical Corporation regarding various tailings and from mining we propose the following scope of work and not-to-exceed budgets:

In reference to all mineral and metal components, we have extensive successful experience in the containment, removal, disposable and mitigation of these elements, always finishing on time and with no costs overrun.

Our proprietary water reclamation and mitigation/reclamation equipment is uniquely suited to capture and remove these contaminants. We use seven distinct methods of capture, denaturing and removal in each of our systems, including cyclonic separation, magnetic capture, chemical capture, atomic weight differential segregation and antimicrobial systems. Each of these seven components are necessary for the above planned remediation.

Our equipment has several attributes distinct in the industry. It is a high-flow purification system resulting in clean drinking water using our proprietary methods which are currently not known or suggested by others in the industry or literature. These methods and materials were developed in-house after years of field work, and are unavailable from others. Our system is sufficiently robust that it removes even low molecular weight particles and isotopes. This will ensure that all treated water will exceed or at a minimum meet the purity required by all applicable water standards.



Authorized Vendor to the above listed US government agencies in addition to state agencies

Normally, elements such as arsenic, iron, chromium, and zinc are to be expected in sampling, and we easily remove these particles. The beryllium found in the assay report is relatively unique but well within our scope of expertise (explained below). Since beryllium is only number 4 on the periodic table, it is logically a problem for the conventional other systems we have reviewed because it is easily oxidized by other elements. Some of these elements include the element Americium, number 95 on the periodic table. Oxidized or combined with other molecules such as Americium it will start to decay and release isotopes requiring us to handle them as radioactive materials. However, we can safely do so while also keeping airborne contaminants at safe levels.

Our system has a unique concentration and capture mechanism that has a second stage that minimizes the total mass (volume) of the contaminants which must be transported and disposed of in fills or radioactive land fills. Optimally we will reduce the total volume of captured beryllium and other isotopes including Americium in one square foot of our capture material and then concentrate it down into one square inch. This ability to minimize volume is unique to our material which we manufacture in-house by a means not found anywhere else. At this time we are completely unique, expect to be unique for many years and expect to help communities for many years.

As is known, when beryllium is oxidized with other elements it can cause berylliosis which can induce pneumonia and other respiratory illnesses. These dangerous compounds with even minimal exposure are harmful to people and animals. Several different forms of compounds with beryllium oxide can even prove fatal, so it is required for any service provider to have nuclear experience as do our personnel. We teach nuclear removal and safety to team supervisors and have 3 certified waste handling experts on staff, as well as a large team of consulting engineers.

After confirmation by our global experts, we are confident that ROC can isolate, capture and condense both beryllium and oxidized beryllium removing these and other related contaminants, and at the same time greatly reduce the costs of disposal because cost is generally related to volume (see discussion on volume following). At the same time, with proper management techniques and procedures, we can minimize the currently ongoing exposure both on site and in the surrounding areas.

After surveying the available maps of the Arizona Department of Resources, we propose the following solution which we have limited to what we believe are the total available funds:

- a) For the containerized and relatively portable machines built to produce clean water at high speed, ROC Sciences, (a Division of ROC Energy) will build, transport, install, startup, and operate six (6) purification machines we house in 40-foot containers for ease of transportation and security.
- b) We will also continuously (real time) monitor and operate these machines, verifying the resulting purity of cleaned (potable) water, and return that clean water down-stream of

the aquifer except for the water used in connection with cleaning the tailings. Real time sensors are expensive, but worth the safety when dealing with these contaminants.

- c) We manufacture these 6 machines each generating 12 million gal per day of treated clean water, running 24 hours a day, 7 days a week. There will be no “down time” as is a ever-present problem for other systems such as reverse osmosis units that are unsuited for this task.
- d) We will pump much of the clean water as positive backpressure to stop leaching. These 6 machines will process, 360 million gallons per month, which equals 4,320,000 gallons the first year, and 8,640,000 gal over the 2 year contract period. This is roughly 26,515 acre feet of clean water replacing and back-pressuring water which is currently leaching toward Phoenix. This amount is calculated to stop all leaching progress and clean the water that dose proceed.
- e) In order to remediate, once and for all, the tailings on site must also be cleaned. We will provide the second part of the contract, using part of the purified water to wash the tailings and then purify that water again, repeatedly subject to evaporation or loss.
- f) The cost of each 7-process machine, including transportation, installation and start-up to full capacity is \$3 million per machine, or \$18 million for all 6 machines.
- g) The cost of operating all 6 machines including real-time purity testing, and 24 hour operational maintenance, we have calculated to be \$60,000 per day including all labor and materials for 24/7 operations.
- h) The resulting total costs of all machines, labor and ongoing operations for two years is thus \$43,800,000 plus the \$18,000,000 for equipment which comes to a total cost \$61,800,000. However we have been informed that funds are limited to \$50 million so we will reduce the costs to work within that budget provided we are not required to pay Arizona sales tax on the extensive equipment we will be providing under that budget.
- i) All prices are firm prices with no costs overruns or hidden fees.

The subject tailings reportedly cause both airborne contamination and leaching into the watershed. ROC has developed and manufactures a super-polymer which is much stronger and more durable than current pit liners which will also be very effective in stopping the airborne contamination as the tailings are being processed. We propose:

- j) We do not think it feasible to remove the tailings to a land-fil site when they can be resolved much more efficiently and cheaply with less environmental impact.
- k) The ongoing contamination of water from tailings requires that a pit with liners be installed as close to the tailings as possible, and the tailings then be remediated and processed there in the pit.
- l) The pit will use the much more durable super-polymer together with a clay subfloor which will last much longer than current plastic-lined pits. We believe clay is available nearby.
- m) We will first make the holding pit with our super-polymer lining and clay subfloor.

- n) We will then use our preferred CAT front loaders, to move the tailings into the lined pit, processing them in part as moved to the pit, and continuing to process them in the pit as well, until all safety standards are met.
- o) During the move into the pit, newly cleaned water from our machines will both wash each loading area, and keep airborne dust to a minimum using generally proven spraying techniques. Our recycling of water system will easily continue for as long as is needed to bring the tailings into acceptable levels which do not pose a threat.
- p) The costs of this phase will be time and materials with a cap after calculations of total material and labor. A simple rule of thumb will provide an estimate of these costs. The price of fuel per gallon is roughly the price of a yard of material moved, plus equipment cost and manufacturing costs. Fortunately, the super-polymer is applied on site, and does not need to be rolled out.

When additional funding becomes available from the State and/or Federal government, with additional machines we can finish the entire water and tailings remediation within a two year period.

This two-part approach is unique as it remedies the problem from both above and below the tailings. Before we developed our contaminate removal process, there has been no real remedy. This project will also be a low-cost model for other contaminated waters and lands.

Accordingly, for roughly ½ cent per gallon, our proposal is unique, efficient and very cost effective. Compare this to the normal costs of water. Currently, for areas within and outside the city of Phoenix, water is serviced by meter charges, which include water charges, environmental charges, usage fees and other charges. Not surprisingly these combined charges are more than the cost of our water remediation and reclamation.

Furthermore, it is widely assumed that the average cost of water is expected to double nation-wide over the next five years, so our solution is even more cost effective as time progresses. Thus, we limit exposure, stop the leaching, remediate the tailings in an economic and environmental benefit both. In time, the tailings themselves can be used for local construction purposes.

Prior experience and Technology Review Follows: You have requested additional information on specific successful projects awarded and completed by ROC for governmental entities and our technologies. In addition to the entities listed on this letter there are a number of large noteworthy projects where ROC provided successful remediation including lands. These are just a few of the more unusual:

In Texas, Oklahoma and Arkansas, we have provided over 500 miles of cleanup services on creeks, streams and waterways with virtually every type of contaminants, waste products,

batteries, lead, chemicals and refuse including hazardous wastes. These services there were achieved with totally satisfactory outcomes and in budget.

We were the lead for the US Army Corps of Engineers watershed projects in North Carolina and Virginia where we provided cleanup and rebuilding of waterways after hurricane Isabel, the strongest, deadliest, costliest and most intense Atlantic hurricane in history until 2019. It provided immense amounts of waste and hazardous materials. Again, ROC provided totally satisfactory performance that gained us repeat contracts with governmental agencies. Subsequent contracts included cleanup and hazardous waste removal for FEMA, Florida DOT and US Army Corps of Engineers after hurricanes Charlie, Gene, Frances and Ivan.

We also provided FEMA, Army Corps of Engineers, and Louisiana DOT extensive cleanup for dams, waterways and levees after Katrina, and even provided the sole cleanup services of the Superdome from more than just storm damage. Large projects require good logistics and planning and we provide all of the engineering and design.

After the horrible Space Shuttle Columbia disaster, the EPA, FEMA, NASA and State of Texas contracted exclusively with us for hazardous recovery which included the US Forestry Services areas. Our reputation as a successful, no-problems, on-time and on-budget service provider gives us the first call for highly visible and sometimes notorious disaster remediation projects.

Another high-visibility crime scene and hazardous waste recovery project was the Oklahoma Federal Building (Alfred P. Murrah) cleanup and removal of contaminated water and recovery of human tissues under the collapsed building. If it requires special needs, the US Government can rely on us to be professional problem-solvers.

Cleanup and remediation product development originally started with the Oil Industry. By the date of the BP Deepwater Horizon spill, we were already an "extremely successful problem solving" provider. For example there were a large number of watercraft and skimming systems including buoys and booms which developed an almost permanent contamination due to the chemical changes made when highly pressured deep oil rises through seawater. The vessel owners began with 500 workers trying to clean the boats and buoys only to find out it was nearly impossible. As a well-known hazardous materials and expert services company, we were asked to develop a means to clean these watercraft without the hundreds of man-hours of manual scrubbing. We accomplished a new method by understanding oil, water, and the many different contaminants. Services for BP and the various States continued for over one year on various hard-case hazardous cleanups.

We have been selected by the State of California, FEMA and the local Water District to remediate a huge body of water and sediments at Twitchell Reservoir which is commencing this month. This is a cost of well over \$2 billion, over time. We were selected because the equipment we developed and manufactured is well suited for hard-to-clean ground sediments and

contaminated water. In addition, a Declaration of Emergency was issued, and we have immediately begun to reduce the water level and avoid a potential calamity as a result of the extensive rains in California.

We have also developed unique expertise in remediation of water contaminated by extremely difficult to remove chemicals. Some compounds become more difficult with the passage of time and other forces working on the mixture. A good example of this is frac-water which is used over and over, in oil wells, building up naturally occurring nuclear waste. Presented with these problems we have developed systems for the removal of nuclear waste and isotopes.

The oil industry has encountered or produced many types of waste which then make their way into the water and soil. We have cleaned to “drinking water” every sample of extremely dirty and contaminated water brought to us or encountered by us. This water is basically black with contamination and comes from the machine clear.

New clean water standards will apply in July 2023. We have already been proven to be effective to these standards by the largest water processing company in the US. We provided a pilot unit which takes the most contaminated water we have ever found, and turns it into drinking water. None of our systems, approaches or products are provided by others. However, while we do have a unique product line, we have the self-imposed duty to help our country so we do not price our equipment and services based it being unique, but rather on what it costs us to make it with a reasonable profit.

Success in the Oil Industry is not easy, and our company has been providing cleanup services to every major oil company. This provides additional verification of our high standards and successes. We have worked extensively and for many years for BP (both spill and operations), Shell Oil, Exxon Mobil, Valero, Chevron (Standard) Phillips Petroleum (Phillips 66), and Motiva all of which have varied needs for their refineries and surrounding lands. All of these companies were and are appreciative of our services.

In Africa, we have been selected to provide drinking water from rivers contaminated with years of human waste and pollution such that the “forever chemicals” they routinely drink have shortened their life expectancy by almost 8 years. The WHO and United Nations have selected us a marketplace provider due to our ability to clean water to drinking water standards.

When collecting water to clean it, there is water “hiding and gathering of contaminants” which often has affinities for certain surfaces. With down-hole contamination in watersheds and subsurface water, special intakes were and are required to capture that “hiding” water, otherwise only lesser contaminated water is processed. To meet this challenge, our ROC engineers developed the ultra-high pressure “pit boss” intake system thereby dislodging contaminants pulling in more contaminated water for cleaning. Without decades of knowledge and experimentation in the oil field, our systems including the drinking water system would never

*To Committee of Congress
Re: Arizona Mines and Tailings
January 30, 2023
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have been developed. Being in multiple disciplines of chemistry, engineering, and oil field service has allowed us to be innovative.

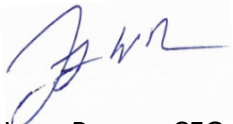
For each project, we use chemical knowledge and mechanical engineering with our specialized materials and pit boss to provide specifically designed hazardous material removal, effective beyond what we know is otherwise available. In short, there is no other company like ROC and we are dedicated to using our technologies to serve others.

By the date of the BP Deepwater Horizon spill, we were already an “extremely successful problem solving” provider and were tasked for innovative service. For example there were a large number of watercraft and skimming systems including buoys and booms which developed an almost permanent contamination due to the chemical changes made when highly pressured deep oil rises through seawater. The vessel owners reported 500 workers tried to clean by hand only to find out it was nearly impossible. We were asked to develop a means to clean these watercraft without hand cleaning and accomplished a new method because of our understanding oil, water, and dislodging contaminants. ROC services were continued for BP and the various impacted States for over one year, focusing us on hard-case hazardous cleanup problems.

We have worked for years to earn our reputation as inventive and high-performance providers. As you can read from the long list of prior reclamation, and hazardous materials removal from water, including all of the above US Government and State agencies as well as servicing lands with contaminants from rig pollution, we are well qualified for this task.

Thank you for your immediate consideration of this proposal. We can begin immediately. Additional questions will be promptly answered. Feel free to both email and telephone us.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'J. Ramer', is positioned above the typed name.

Jerry Ramer, CEO
ROC Applied Sciences
Div. of ROC Energy