SAMPLE
GAP Proposal (Fictional)

GAP Proposal

"Fresh Water on Demand"

Dr. Alice Jones College

of Engineering Florida

State University

November 7, 2008

Fresh Water on Demand

THE PROBLEM

It has been said by many that water will be the new oil. As the population of the world continues to grow the demand for fresh clean water will grow as well. This demand will come at a time when the supply of quality fresh water will be under increased decline due to many factors. The first will be from the increase in usage for irrigation needed for agriculture. The second factor that will affect supply will be from the effects of climate change. As the earth continues to warm the amount of fresh water at the earth's surface will continue to shrink. The third and potentially largest factor on fresh water supply continues to be the increase in the pollution level being introduced into the supply. Over the past hundred years the world's supply of unpolluted surface fresh water has been reduced by more than 50%. All in all, the supply picture for usable fresh water in the future is not a pretty one.

Many have predicted that the lack of available water will lead to famine, social and political unrest and even to possible war. So it is clear that any scientific breakthroughs that will increase freshwater availability will be embraced by society.

POTENTIAL SOLUTION

In our lab we have developed and now patented (FSU Patent Application # 17809235) a synthetic fiber call *Nylon-X that* has some very interesting and unique characteristics. Its fibers are extremely dense and can be used to filter out most if not all microscopic particles from a liquid. The fibers also have the ability to conduct an electrical charge. This can be used to attract or deflect particles that also have electrical charges associated with them. During our work on the amino acid solutions we did an experiment where we applied an electrical charge to a small patch of Nylon-X and used it as a filter. We then pumped an amino acid solution under a small amount of pressure through it. The results were quite remarkable as the purity, which resulted, was extremely high. We then tested the Nylon-X filter with salt water and found the resulting liquid to be pure freshwater. We feel that with the decreased availability of fresh water, our Nylon-X could help to provide us with more fresh water given its ability to purify water.

Novel Technology

Our lab at Florida State has been doing research in the filtration of liquids. Mainly our work has been directed at being able to remove impurities in different chemical compounds that exist in a liquid state thus making those compounds more effective. We have developed many different methods of filtration including using electromagnetic fields, the use of new manmade synthetic fibers and the use of temperature and pressure. In our most recent work we have been using a combination of these forces to try and increase the purity level of amino acids that exist in a saline solution for the bioengineering field.

As part of our process we routinely clean the entire filtration system with pure water, effectively putting water in place of the solution (in this case the amino acid solution) and run it through the process. We expect the final product in this cleaning exercise to be pure fresh water. One of our research assistants was performing this cleaning procedure when he noticed he had mistakenly substituted a saline solution (essentially seawater) for the pure

water that is required for the cleaning process. Just for research sake he looked to see what the resulting liquid solution would be. To our complete surprise we discovered that it was pure water! Our system was able to take seawater and only using our filter, a very small electric charge and a small amount of pressure we were able to make pure water. We were very excited about these results and the possible commercialization opportunities that might exist for products using this technology.

THE MARKET

FSU's technology has the potential to become a major factor in the world-wide water desalination market. Potable water is a scare commodity in many developing countries. Increasing population and environmental pollution is making clean water scare in developed nations as well. An inexpensive, compact device such as that being developed in our lab could gain a significant share of this billion dollar market.

The report, *Study: Water Desalination Worldwide for Sea Water and Brackish Water 2006-2010-2015 found* that 'The market for water desalination has witnessed a significant upturn during the last years. Driven by the increasing world population and the diminishing freshwater sources, a result of global warming, desertation and environment destruction, many countries in the world have constructed or are constructing water desalination plants for water supply. Meanwhile the technological innovations have been largely raising the energy efficiency of the desalination process and reducing the running costs, which are always the key concern for the large-scale water desalination. Especially, the innovations in energy utilization, such as solar energy and terrestrial heat, the advances of nanotechnology and molecular technologies have been elevating the outcome efficiency so largely that the desalination is really becoming a realistic solution for the water shortage in many parts of the world. The market volume has been soaring from $ 2.5 bn in 2002 to $ 3.8 bn in 2005 with a growth rate over 15% per annum. These figures are only plant and equipment but not the whole value chain. The market figures for the whole market, you will find in the study. It is predicted that this fast development is going to last and even accelerate for at least the next ten years. The market worldwide is to reach nearly $ 30 bn up to 2015. Dramatic increase is expected in Asia mainly China, in new technologies and small systems applications.

Divided by regions, the Middle East still takes over 50% of the market share, followed by Asia-Pacific, where economic boom, urbanization, population growth and environment deterioration make the municipalities and industrials eager to search for new water sources. These two regions are going to remain the leading forces for the global markets. America and Europe share about 10% of the market respectively. The construction there is mainly for the purpose of reducing the use of groundwater or adding alternative water sources."[1] The market for on-demand fresh water in small quantities will continue to grow as well. This growth will come from several areas. Recreational use will include the camping and boating industry which today utilizes chemical water purification as the chief method for making potable water out of non-potable water. A second major market will be the ability to provide an inexpensive and mobile water purification method for drinking and cooking water in the

[1] http://www.hkc22.com/waterdesal ination.htm l

third-world countries that don't currently have access to clean water sources provided in mass.

POTENTIAL COMMERCIALIZATION PARTNERS

IDE Technologies, Ltd is a joint venture between Israel Chemicals Limited and Delek Group Ltd. IDE has a $100 million contract to build a desalination plant in Australia, with construction to begin this year.

In 2005, the company, along with Veolia Environment and Dankner-Ellem, built the world's largest desalination plant in Ashkelon, Israel, capable of delivering up to 6% of Israel's water needs. In 2006, less than a year after initial production, it won Desalination Plant of the Year at the Global Water Awards.[2]

Additionally, General Electric Co. (GE) has expressed interest in this technology. As part of its WaterExplorer Project, GE is committed to improving the world's drinking water. We have provided GE management with our research materials and received positive feedback. We anticipate that GE

Furthermore, Coleman Company, LLC and the American Red Cross have expressed interest in using this technology. All of these companies have submitted letters of support for this technology.

PROPOSED USE OF GAP FUNDING

We propose to construct a working prototype of a one gallon "fresh water on demand" device utilizing the "Nylon X" technology described above. This effort will take approximately one year to complete. We have constructed an implementation plan attached to this document that details the proposed funding requirements to complete this development. We have broken the implementation plan into four phases. Each phase contains a verifiable objective. This objective is basically a critical point in each phase that if we don't successfully reach, the rest of the project cannot be achieved. Once we have successfully completed the entire prototype effort we will be at point where we can go forward to seek a commercial partner who can help us bring this technology into the market as a viable product.

[2] http://www.greenchipstocks.com/articles/desalination-companies-stocks/ l95

Fresh Water on Demand

Professional Biography

Dr. Alice Jones College

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Dr. Alice Jones is currently an associate professor in the College of Engineering at the Florida State University. Dr. Jones earned her doctoral degree in 1999 from the University of Texas at Austin in the Materials Science and Engineering Department. She came to FSU in 2003 from the College of Engineering at the Georgia Institute of Technology where she worked as a post-doc with Dr. Herman Smith. Dr. Smith is a world renowned expert in filtration systems and has many patents to his credit. Her postdoctoral work focused on materials science and the development of different kinds of porous membranes. During her time at Georgia Tech Dr. Jones conducted research into a new filtration device using a variation of a nylon fiber system. When Dr. Jones arrived at FSU she continued her work on the nylon product and was awarded a patent in 2005 for Nylon X. Dr. Jones currently runs her lab on the FSU campus and has multiple contracts with clients such as the Department of Defense, The Florida Fish and Wildlife Agency, The Nature Conservancy and several for profit companies doing research in the liquid purification area.

Dr. Jones has several patents to her credit dealing with filtration systems and has been published in many of the journals that deal with the subject. Below are a few of the publications Dr. Jones has published in her career:

I. Jones,A, Xu Y, Wong-Staal F. Identification and purification of cellular proteins that specifically interact with the RNA constitutive transport elements from retrovirus D. Virology 1997 228:333-339.
2. Jones,A, Gaietta GM, Fischer WH, Ellisman MH, Wong-Staal F. A cellular cofactor for the constitutive transport element of type D retrovirus. Science 1997 276:1412-1415.
3. Reddy TR, Jones, A, Li X, Wong-Staal F. Functional interaction of the HTLV-1 transactivator Tax with activating transcription factor-4 (ATF4). Oncogene 1997 14:2785-2792.
4. Li J,* Jones,A,* Mullen TM, Westberg C, Reddy TR, Rose DW, Wong-Staal F. A role for RNA helicase A in post-transcriptional regulation of HIV type I.Proc Natl Acad Sci USA 1999 96:709-714.
5. Jones,A, McDonald D, Middlesworth T, Hope TJ, Wong-Staal F. The carboxyl terminus of RNA helicase A contains a bidirectional nuclear transport domain. Mol Cell Biol 1999 19:3540-3450.
6. Reddy TR, Xu W, Mau JK, Goodwin CD, Suhasini M, Jones,A, Frimpong K, Rose DW, Wong• Staal F. Inhibition of HIV replication by dominant negative mutants of Sam68, a functional homolog of HIV-I Rev. Nature Med 1999 5:635--042.
7. Jones,A, Kuhen KL, Wong-Staal F. Lentivirus replication and regulation. Annu Rev Genet 1999 33:133-170.
8. Westberg C, Yang JP, Jones,A, Reddy TR, Wong-Staal F. A novel shuttle protein binds to RNA helicase A and activates the retroviral constitutive transpm1element. J Biol Chem 2000 275:21396-21401.
9. Jones,A, Wong-Staal F. Specific interaction between RNA helicase A and Tap, two cellular proteins that bind to the constitutive transport element of type D retrovirus. J Biol Chem 2000 275:32694-32700.
I0. Reddy TR,* Jones,A,* Xu W, Wong-Staal F. Sam68, RNA helicase A and Tap cooperate in the post-transcriptional regulation of human immunodeficiency virus and type D retroviral mRNA. Oncogene 2000 19:3570-3575.
11. Yang JP, Jones,A, Reddy TR, Wong-Staal F. Mapping the functional domains of HAP95, a protein that binds RNA helicase A and activates the constitutive transport element of type D retroviruses. J Biol Chem 2001 276:30694-30600.
12. Kuwabara T, Warashina M, Sano M, Jones,A, Wong-Staal F, Munekata E, Taira K. Recognition of engineered tRNAs with an extended 3' end by Exportin-t (Xpo-t) and transport of tRNA• attached ribozymes to the cytoplasm in somatic cells. Biomacromolecules 2001 2:1229-1242.

Fresh Water on Demand

Pictures and Diagrams of Potential Product

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Florida State University

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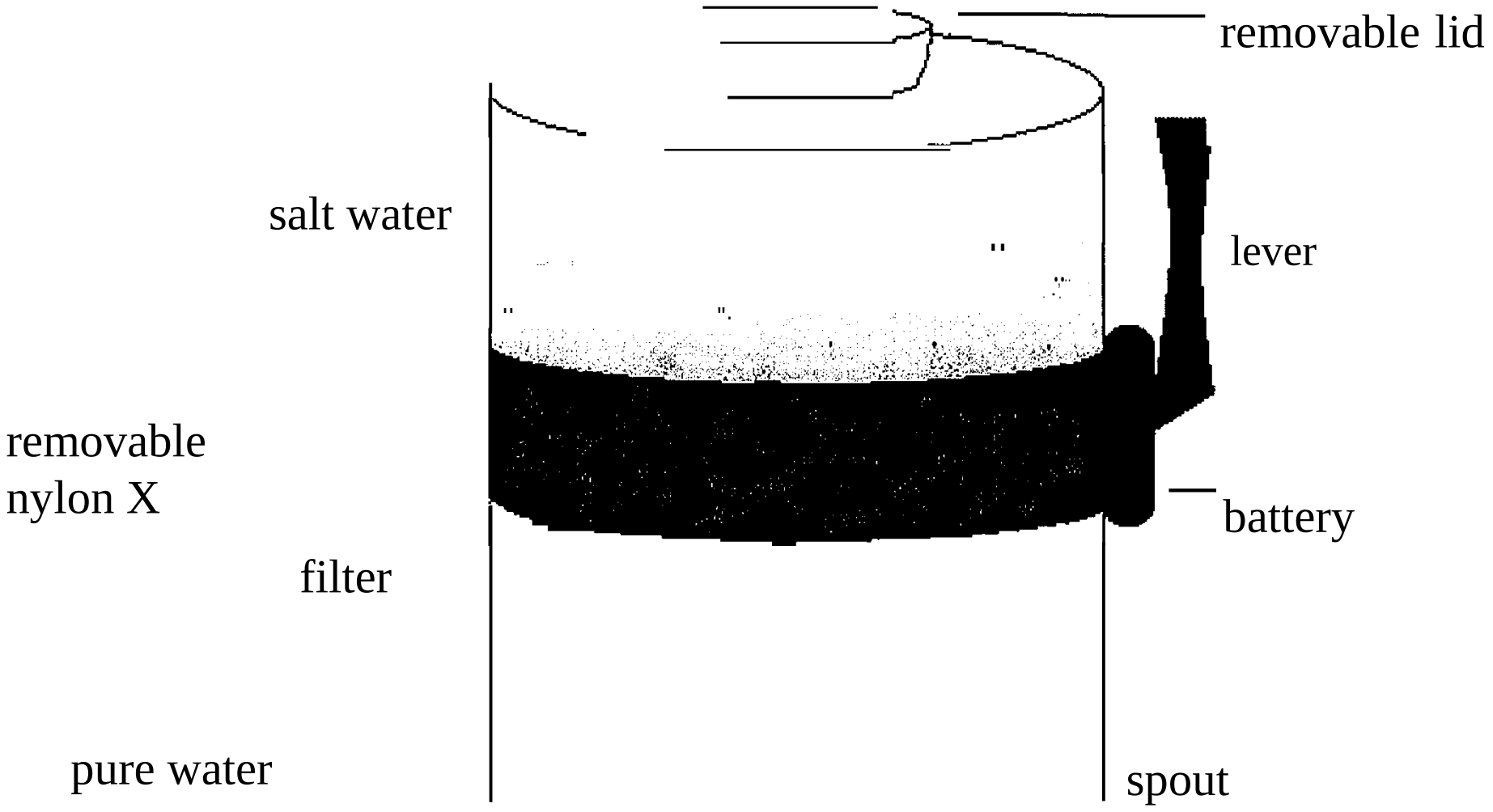
removable lid
salt water
lever
removable
nylon X
battery
filter
pure water
spout

Fresh Water on Demand

Cost and Activities Plan

Dr. Alice Jones College

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Phased Implementation Plan

Phase 1

Timetable: January 1 - March 30
Objective: To design and build a cylinder that can handle a pressure load equal to 4 times atmospheric pressure. This cylinder would hold I gallon of saltwater as well.
Required funding for Phase 1: $11,750
Failure point: Cylinder unable to maintain 4 atmospheres of pressure

If successful, proceed to Phase 2.

Phase 2

Timetable: April 1 - June 30
Objective: To design and build a removable Nylon X filter that will be used in the cylinder built in Phase 1. The filter must be able to successfully filter I gallon of saltwater into freshwater.
Required funding for phase 2: $14,750
Failure point: The filter clogs or fails under 4 atmospheres of pressure.

If successful, proceed to Phase 3.

Phase 3

Timetable: July 1 - September 30
Objective: To design and implement a small power supply that will attach to the Nylon X filter built in phase 2. This power supply will need to be battery driven and able to last over 30 gallons of purification.
Required funding for Phase 3: $11,750
Failure point: The power connection or duration does not meet basic needs.

If successful, proceed to Phase 4.

Phase 4

Timetable: October 1 - December 31
Objective: Final field-testing of completed prototype. The unit will be subjected to different elements (heat, humidity etc.) to ensure its successful use in these elements.
Required funding for phase 4: $11,750

If successful, move to find construction partner.

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Supporting Letters of Interest

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The Outdoor Company - (Mythical)

March 15, 2007

Alice Jones, Ph.D.
Director, High-Performance Materials Institute (HPMI)
1115 West Call Street
Tallahassee, FL 32306

Dr. Jones,

This is our letter of support for your GAP Proposal to the Florida State University Research Foundation.

The Coleman Company, LLC is firmly committed to supporting your efforts in creating a new water purification device. We believe that your efforts in developing a new filter made out of Nylon-x will prove to be invaluable to our outdoor customers. Coleman is very interested in the prototype you are developing and its progress.

Coleman Company, LLC has almost 100 years' experience with producing and supplying their customers with outdoor products. These products are designed to enhance people's outdoor experiences, as well as give them some of the conveniences of home. We feel that this technology will allow our customers the surety that the water they will be using is clean and doesn't contain any impurities.

Based on the opportunities this new product will provide for our company, we are willing to enter into an agreement with the Florida State University Research Foundation once the prototype has been proven.

We look forward to being of service to you in your endeavors to commercialize this product.

Sincerely,
Daniel Coleman
Vice President of Product Development

(Fictional)

March 15, 2007

Alice Jones, Ph.D.
Director, High-Performance Materials Institute (HPMI)
1115 West Call Street
Tallahassee, FL 32306

Dr. Jones,

This is a letter showing that GE is very interested in the product you are developing using the revolutionary filter made out of Nylon-X.

GE is currently working on helping to solve the water scarcity problem with our WaterExplorer project. We are currently establishing efforts for homes and businesses to practice more conservative water usage, as well as helping to install desalination plants around the world so that we can use the oceans to our advantage. Furthermore, we have developed technologies that will help turn wastewater into a renewable resource. We feel that the filter made with Nylon-x will help us to further these efforts in solving the water scarcity problems of the world.

We are committed to furthering water purification techniques, thus we are interested in your technology. We want to fully show our support of your work with this letter because we feel that your progress will prove to be an asset to our company.

Based on the success of this technology, we would be willing to enter an agreement with the Florida State University Research Foundation. We look forward to working with you, Dr. Jones, in the future.

Sincerely,
Jeff R. Garwood
President and CEO of GE Water & Process Technologies

American Green Cross (fictional)

March 15, 2007

Alice Jones, Ph.D.
Director, High-Performance Materials Institute (HPMI)
1115 West Call Street
Tallahassee, FL 32306

Dr. Jones,

This letter is to show our support for Dr. Jones' work in developing a water purification device using a filter made out of Nylon-X.

The Red Cross is completely in support of Dr. Jones efforts in developing a handheld device for water purification. We would find this immensely useful for our disaster relief personnel because clean water is difficult to come by in a third world country, let alone after a natural disaster. Moreover, we would also be able to supply them to the people in third world countries who so desperately need them. This technology would help us to aid much of the world with its clean water problems.

The Red Cross has over l00 years of experience as the nation's premier emergency response organization. As part of a worldwide movement that offers neutral humanitarian care to the victims of war, the American Red Cross distinguishes itself by also aiding victims of devastating natural disasters. Over the years, the organization has expanded its services, always with the aim of preventing and relieving suffering.

Based on the success of this technology we feel that it will help us in our endeavors, and we would be willing to enter into an agreement with the Florida State University Research Foundation.

Sincerely,

Betsy Ross
President
American Green Cross

Dr. Alice Jones,

I enjoyed meeting you and discussing your research at the International Water Technology Conference last year.

IDE has a continuing interest in the Nylon-X materials under development in your lab. The possibility of furthering our understanding of water desalination and purification is important.

It does appear that there is the possibility of producing an improved method of procuring potable water through this study. This is a process that is of the highest interest to IDE.

The prospect of using the fundamental understanding that this program will develop together with the development of a cost-effective product, which you indicate is now a possibility represents an important step forward in the difficult business of providing clean water.

Please keep us informed of your progress. I look forward to hearing that you have been successful in obtaining additional support and hope to further our collaboration in the future.

IDE Management (Fictional)