ACTIVITIES WITH ARGENTINA

SPRING 1999

A U.S. Department of Energy Cooperative Program with the National Atomic Energy Commission of the Argentine Republic
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INTRODUCTION

During the 1980s, the U.S. began to come to terms with the environmental legacy and by-products resulting from the Cold War and arms race. Among the many dangers posed by past practices were leaking or deteriorating containment vessels that were allowing the seepage of radioactive or chemical wastes into the ground and water, as well as the escape and transport of airborne contaminants. These and related issues demanded attention and illustrated the need to redirect resources from weapons production to environmental restoration and waste management.

In 1989, the U.S. Department of Energy (DOE) responded to these concerns by establishing the Office of Environmental Management (EM) and delegated to this office the responsibility of cleaning up the U.S. nuclear weapons complex. Now in its eighth year, EM's mission has three central facets: 1) to assess, remediate, and monitor contaminated sites and facilities; 2) to store, treat, and dispose of waste from past and current operations; and 3) to develop and implement innovative technologies for environmental cleanup.

EM faces a challenging job. A 1997 DOE report entitled, Linking Legacies, stated that DOE manages 36 million cubic meters of waste comprised of seven fundamental waste categories: high-level, low-level, transuranic, mixed low-level, hazardous, by-product material, and "other" waste. In addition, EM has oversight of over 5,100 contaminated buildings and facilities awaiting decontamination, decommissioning, and dismantling. The difficulty of this challenge requires the identification of technologies and scientific expertise from a variety of sources including industry, academia, national laboratories, and the international community.

To this end, EM has established domestic and international cooperative technology development programs, including one with the Republic of Argentina. Cooperating with Argentine scientific institutes and industries meets U.S. cleanup objectives by: 1) identifying and accessing Argentine EM-related technologies, thereby leveraging investments and providing cost-savings; 2) improving access to technical information, scientific expertise, and technologies applicable to EM needs; and 3) fostering the development of innovative environmental technologies by increasing U.S. private sector opportunities in Argentina in EM-related areas.
Overview

World markets for environmental technologies are growing dramatically and will continue to do so in the years ahead. These technologies offer the U.S. an exciting opportunity to achieve its economic, environmental, and energy goals simultaneously. A clean environment means a higher quality of life, and technological advancement means economic growth and better jobs for American workers. While taxpayer dollars are spent primarily to clean up sites, they must also assist in strengthening the national economy, particularly the environmental industry. A stronger domestic environmental services and products industry will better serve current U.S. needs such as enhancing domestic technology development, deployment, and application.

According to Congress’ former Office of Technology Assessment, a stronger environmental industry will also improve U.S. competitiveness in international markets, “...including a number of rapidly industrializing countries in Asia and Latin America poised for rapid expansion.” Studies by the Organization for Economic Cooperation and Development and the U.S. Agency for International Development (US AID) have estimated that the current annual global environmental market ranges from $200 to $300 billion. Additionally, the studies have projected high-market growth rates in many developing nations. These figures, tied with EM’s applied research, suggest a tremendous opportunity for EM-related industries that can offer successfully demonstrated and commercially available environmental technologies.
Environmental Market Potential in Argentina

According to the Department of State 1995 report *Big Emerging Markets: Argentina*, the Argentine market for U.S. environmental technologies and services is difficult to analyze quantitatively because of its relative immaturity. It is estimated that the U.S. currently holds only 15% of the Argentine environmental technologies market. The market for pollution control equipment in Argentina was estimated to be worth $175 million in 1995. Argentina plans to invest $2.8 billion over the next decade on water, sewer systems, products, and technological assistance.

Argentina’s diversified industrial and agricultural base provides a ready market for a wide array of environmental technology goods and services. Also significant are recent and anticipated moves toward trade liberalization, and a growing environmental awareness which is catalyzing a demand for environmental technology goods and services.

In November 1990, the World Bank established the Global Environmental Facility as an experimental program to provide environmental cleanup funds for emerging markets. The World Bank and Inter-American Development Bank are providing approximately $700 million in project financing for Argentina’s environmental sector from 1995-2000. These funds are to be directed primarily toward strengthening Argentina’s environmental management and protection institutions.
Nuclear Aspects

The growing importance of environmental protection in Argentina has been accompanied by changing priorities in its nuclear industry. At present, the nation has two nuclear power plants in operation: the 380 megawatt plant at Atucha and the 640 megawatt plant at Embalse. A third 720 megawatt nuclear power plant in Atucha is under construction and a fourth is being studied. Privatization efforts over the past four years have helped restructure the country's nuclear industry in part by establishing a financing system, similar to the U.S. Nuclear Waste Policy Act of 1982, to fund waste management activities. Privatization and heightened attention given to environmental issues, resulting from the use of nuclear power have conferred benefits to the public and private sectors in both Argentina and the U.S., and bode well for future collaboration on EM projects.
EM seeks out and leverages foreign technology, data, and resources in keeping with EM’s mandate to protect public health and the environment through the safe and cost effective remediation of the Department of Energy’s nuclear weapons sites. EM works closely with foreign governments, industry, and universities to obtain innovative environmental technologies, scientific and engineering expertise, and operations experience that will support EM’s objectives. Where appropriate, these international resources are used to manage the more urgent risks at our sites, secure a safe workplace, help build consensus on critical issues, and strengthen our science and technology program.

The Office of Science and Technology (OST) International Technology Systems Applications is responsible for the identification, evaluation, acquisition, and demonstration of international technologies that can accelerate the DOE cleanup operations. Their goal is to pursue international collaborations among government organizations, educational institutions, and private industry to identify technologies, which can address domestic cleanup needs. Through international agreements, OST engages in cooperative exchanges of information, technology, and individuals.

OST conducts an aggressive innovative technology development program for deployment in DOE environmental clean-up activities. Since its inception in 1989, EM estimates that it has realized cost-savings to taxpayers of approximately $115 million through implementation of innovative technologies. (EM Progress and Plans, November 1996, pg. 1).
EM works with its counterpart in the Argentine government, the National Atomic Energy Commission of the Argentine Republic (CNEA).

Benefits of Cooperation

This cooperative program with CNEA meets DOE domestic cleanup objectives by:

- identifying and assessing Argentine EM-related technologies, thereby leveraging investments and providing cost-savings
- improving access to technical information, scientific expertise, and technologies applicable to EM needs
- fostering the development of innovative environmental technologies by increasing U.S. private sector opportunities in Argentina in EM-related areas

The National Atomic Energy Commission of the Argentine Republic and the DOE/CNEA Implementing Arrangement

Established in 1950, CNEA's original mission was to develop nuclear power to meet Argentina's future energy needs. Over the past several decades the organization has evolved and today acts as a hub for its country's nuclear enterprises. Among its roles, CNEA advises the President of Argentina on nuclear waste management, technology transfer, and other marketing efforts by the Argentine nuclear industry. It also serves as the coordinating entity which integrates the public and private aspects of the nuclear sector, including nuclear power generation, waste management, isotope and heavy water production, and nuclear medicine.

Activities with Argentina are conducted under the auspices of the “Implementing Arrangement between the Department of Energy of the United States of America and the National Atomic Energy Commission of the Argentine Republic for Technical Exchange and Cooperation in the Area of Radioactive and Mixed Waste Management” which was signed on May 29, 1996. The bilateral agreement has a ten-year life span, with annual meetings scheduled between the participants to decide on specific projects.
The Joint Coordinating Committee for Radioactive and Mixed Waste Management

The Joint Coordinating Committee for Radioactive and Mixed Waste Management (JCCRM) was established as the managing body for the Implementing Arrangement, and is responsible for selecting specific joint project activities. Under the JCCRM, a variety of activities are authorized including technical workshops, technology development, technology deployment, and scientist exchanges. These activities are in direct support of EM’s Focus Areas and Crosscutting Programs which include the technical areas of: 1) deactivation and decommissioning (D&D), 2) contaminant transport and site characterization, 3) high-level waste tank remediation, 4) separations, 5) mixed waste, 6) plutonium stabilization, and 7) subsurface contamination.

At the first JCCRM meeting, held in May 1996, participants defined three areas of cooperation; remediation of uranium mill tailings, D&D, and research and development of low- and high-level waste. This list was expanded during an August 1996 workshop for four specific technical areas of cooperation: characterization and retrieval (of spent resins), separation methods (e.g., crystalline silicotitinate), D&D, and vitrification process.

The Hemispheric Center for Environmental Technology (HCET) and the DOE/Florida International University (FIU) Cooperative Agreement

HCET was established in 1995 by DOE and FIU to research, develop, and demonstrate innovative environmental technologies and to establish alliances that support their implementation. Its mission is to develop and market technologies to solve environmental problems common to the U.S., the Caribbean, and Latin America. To achieve this goal, the Center performs research and development, technology transfer, and forms partnerships with industries and governments throughout the Americas. Under the auspices of the JCCRM, HCET facilitates DOE/EM’s activities between the U.S. and Argentina.
Operating Procedures for the Activities of the JCCRM

Under the auspices of the Implementing Arrangement, DOE/CNEA has developed procedures that establish the guidelines for managing the cooperative program. These procedures consist of three sections: 1) Procedures for Proposal Development, 2) Procedures for the Management of DOE/CNEA Projects, and 3) Procedures for Resolving Action Items from a JCCRM Record of Meeting.

**Procedures for Proposal Development**

These procedures outline the process for placing a call for proposals, directing proposal development, and responding to a call for proposals. This is done through the following activities: 1) exchange of assessments, 2) project definition, 3) selection of project participants, 4) identification of technical capabilities, 5) call for proposals, 6) proposal submittal, 7) proposal evaluation, and 8) project selection and approval.

**Procedures for the Management of DOE/CNEA Projects**

These procedures define DOE’s process of conducting the DOE/CNEA projects within the DOE complex through the following activities: 1) project establishment, 2) tracking of cost and scheduling variance, 3) reporting requirements, and 4) communication.

**Procedures for Resolving Action Items from a JCCRM Record of Meeting**

These procedures define DOE’s process of assigning responsibility for, tracking the progress of, and documenting the completion of action items contained in the Record of Meetings: 1) record of meeting preparation, 2) assignments of points-of-contact for action items, 3) concurrence requirements, 4) assignment of due dates for actions, 5) reporting requirements, 6) action tracking, 7) action completion, and 8) closure of a record of meeting.
First Annual JCCRM Meeting

At the first JCCRM meeting, held May 30-31, 1996, in Miami, Florida, participants defined the following three areas of cooperation: uranium mill tailings remediation, D&D, and research and development of low- and high-level waste. Technical presentations were made by both delegations. CNEA presented a review of the nuclear activities in Argentina and of its facilities, as well as described the objectives of its Radioactive Waste Management program. This included a description of their research and development programs, types of waste generated, technologies being applied for waste treatment and conditioning, the existing and projected facilities for final disposal, and an overview of the Argentina Uranium Mill Tailings program. The DOE delegation also provided an overview of their corresponding programs and description of their Focus Areas.

To support these agreed areas of cooperation, it was decided that the following four activities should be performed: Preliminary evaluation of possible activities on D&D applied to the Argentina Alpha laboratory; characterization and immobilization by vitrification of spent ion exchange resins; characterization and separation methods of cesium-137 (Cs-137) from Mixed-Low Level Waste (MLW) of molybdenum-99 (Mo-99) production; and a scientific exchange in the area of uranium mill tailings. It was also determined that both countries would begin to exchange technical information within these cooperative areas.

JCCRM D&D Technical Exchange: August 1996

A JCCRM D&D Technical Exchange was held in August 1996 in conjunction with Spectrum '96. Among the objectives of this international meeting on nuclear and hazardous waste management were to increase domestic and international industry understanding of cleanup opportunities; to achieve high-quality exchanges in the areas of technology, operating experiences, and new management tools which reduce the associated cost and risk of hazardous waste management.
During the JCCRM D&D Technical Exchange it was determined that the programmatic strategy of the D&D cooperation would be to focus on large-scale technology demonstrations. This would allow for the program to focus on technology development as directed to the solutions of real problems, which would enhance the final acceptance of developed technologies.

**JCCRM Solidification/Vitrification Technical Exchange: November 1996**

A JCCRM Solidification/Vitrification Technical Exchange was held in Buenos Aires in November 1996 in conjunction with the international conference on “Nuclear Power Competitiveness in the Next Two Decades.” The purpose of this International Conference was to analyze the different elements that can have an influence on the cost of generating nuclear electricity. Presentations were made on a number of issues including: safety and economic aspects of nuclear energy, new designs of small nuclear power plants, nuclear power plant life extension, as well as the numerous areas of radioactive waste management.

At the JCCRM Solidification/Vitrification Technical Exchange a number of issues were discussed including the separation of Cs-137 and Strontium-90 from medium level wastes of Mo-99, and the option of the immobilization by vitrification of spent ion exchange resins. The differences in the two countries’ waste programs were examined. The viability of the various technological solutions may differ between the two countries, taking into account their economy of scale, programmatic strategy, and final disposal options would alter the selection of preferred disposal processes. A set of action items to be fulfilled during the following year Fiscal Year (FY) 1997 was agreed upon.

**Second Annual JCCRM Meeting: December 1997**

The Second Annual JCCRM Meeting was held in December 1997 in Miami, Florida, coinciding with X-Change '97. The conference covered operational approaches, new technologies, and other innovations for increasing the performance while reducing the costs of D&D
activities on buildings and equipment at nuclear sites and other locations that handle hazardous and radioactive wastes. Managers in government and industry discussed their specific spending plans, highlighting projects where operational decisions and new technologies can yield significant improvements in cost and performance.

The purpose of the JCCRM meeting was to discuss the projects conducted during the previous year and to determine the scope of future activities. Program Managers and Principal Investigators provided presentations on the past years activities, discussing project results, obstacles and hurdles, and their recommendations for future activities. Upon the agreement of future program direction, both parties signed a Record of Meeting, and collaborations were established in the following areas: D&D, Crystalline Silicatinate (CST), and Resin Vitrification.

**JCCRM Technical Exchange: September 1998**

A JCCRM Technical Exchange was held in Denver, Colorado in conjunction with Spectrum '98 in September 1998. This was the first conference in the Spectrum series to include D&D activities and their privatization. Spectrum '98 was dedicated to the accomplishments, progress, and results in nuclear and hazardous waste management and remediation.

At the JCCRM Technical Exchange discussions were held in the cooperative areas of D&D, CST, and Resin Vitrification. This exchange brought together the Principal Investigators working on their respective projects to present and discuss project data and results. Project tests plans were reviewed and evaluated, reaffirming the schedule of future activities.
Background

Uranium mill tailings are sand-like materials left over from the separation of uranium from its mined ore. More than 99% of the ore becomes tailings. The U.S. has been dealing with this issue for several years, as have many other nations. To discuss this subject participants from Argentina, Brazil, Canada, South Africa, Australia, Germany, and the U.S. held a technical discussion and facility tour in Colorado from June 6-14, 1997. The focus of the meeting was DOE's Uranium Mill Tailings Remedial Action (UMTRA) project, which is near completion, and how UMTRA knowledge could be applied to CNEA sites.

UMTRA is the world’s largest materials management project ever undertaken to reduce or eliminate risk to the public from exposure to potentially hazardous and radioactive materials. This project, comprised of both surface clean-up and groundwater compliance phases, details the responsibilities for encapsulating and isolating almost one-fourth of all the uranium mill tailings generated across the entire U.S. (more than forty-four million cubic yards). The UMTRA project manages the cleanup of 24 former uranium ore processing sites contaminated with tailings and other waste from uranium milling operations. In addition to the processing sites,
remediation has also been completed at more than 5,000 "vicinity properties," in which tailings had been used off-site for construction or landscaping purposes.

Argentina faces similar mill tailings problems as the U.S., however on a much smaller scale. Mining of uranium ore deposits began there in the 1950s, at sites that were often adjacent to populated areas. As such, windblown (airborne) and groundwater contamination have been issues of concern. Argentina has seven mill sites of which only one is still operational. CNEA is currently dealing with the issue of how to treat and where to store these mill wastes.

Two Argentine sites considered for final disposal are the Malargue and Cordoba Facilities. It has been noted that the Malargue Facility has several similarities to the DOE site in Gunnison, Colorado, which has been remediated under the UMTRA program. Consequently, CNEA officials have voiced interest in further investigation of the clean-up proceedings at Gunnison. As in the U.S., Argentina has considered in-site or off-site disposal options. Site characterization, planning, chemical make-up of tailings, the pH of tailings and the decision to neutralize (or not) tailings during disposal, long-term care, and custody of disposal cells are all topics of interest to the Argentine scientific community.

Activities

In June of FY1997, a CNEA representative participated in a DOE-sponsored site tour of DOE's uranium mill tailings sites in Colorado and Utah. As a result of this exchange, CNEA is re-evaluating their current methodology of remediating Argentine uranium mill tailings.
Spent Nuclear Fuel

Background

Both the U.S. and CNEA are also interested in the characterization and immobilization of spent nuclear fuel (SNF) returning from research reactors. During the 1980s, CNEA investigated the possibility of vitrification of SNF using glass compositions. From the early studies, it was determined that many of the glasses evaluated were satisfactory in comparison to the Environmental Assessment glass (the U.S. standard for High Level Waste [HLW]).

Activities

More recently, CNEA has begun reviewing cold press and sintering technology to produce a glassy ceramic waste form. The U.S. will continue to follow the development of these CNEA activities in hopes of applying lessons learned to the management of SNF in this country.
CURRENT PROJECTS

A number of projects have already begun or are being planned under the JCCRM.

Solidification/Vitrification

One of the issues of interest to both DOE and CNEA is the solidification of waste materials for storage and ultimate disposal. A Solidification Workshop was held in Buenos Aires, Argentina in November 1996. A number of issues were discussed including two waste streams of Mo-99 and spent resin that CNEA will be remediating. The Mo-99 and Spent Ion Exchange (IX) Resins projects listed below are a result of this meeting.

Mo-99/CST

Background

In the U.S. and Argentina at least 60,000 diagnostic and therapeutic medical procedures each day and nearly 100 million laboratory tests each year, require the use of medical radio-isotopes such as Mo-99. Mo-99 is the precursor, or “parent,” of Technetium-99m, which is used in greater than 80% of nuclear medicine applications. The U.S. has not produced Mo-99 since 1989, rather it purchases it from Canada. However, there is interest within the U.S. to once again produce its own supply of Mo-99.

Argentina produces Mo-99 and ships it (Mo-99/Technetium-99m generators) by air to over 400 hospitals, primarily in South America. Because Mo-99 decays rapidly (half-life of 67 hours), the supply must be continually replenished. CNEA is expanding its production capacity for Mo-99 and other isotopes. By the end of 1998, Mo-99 production will jump from 120 Ci/wk to over 1700 Ci/wk. The waste generation rate will increase, but the curie content of the waste will increase significantly (at least 10 times). Because of U.S. nonproliferation policies, CNEA will be converting their production targets to a low enriched uranium-silica fuel type. The agency is currently working on separation processes for this fuel, but still has several technical issues to overcome.
A primary factor in the economic viability of Mo-99 is the life cycle cost for disposal of production waste. This waste is generated through dissolution and separation processes of the present uranium-aluminum fuel. The process is performed in hot cells and generates 3.5 L/wk of intermediate-level waste (ILW), and 10 L/wk of low-level waste. With the increase of production, the cost of disposal will rise significantly. The ability to reduce the ILW stream through elimination of the cesium element will reduce the cost of disposal by an order of magnitude.

The waste can be grouted, but the salt content and high pH limit waste loading, which increases the total volume. At the present rate, this may be acceptable, however, CNEA is concerned over the future waste generation. As a result, the Argentines are looking at two methods of dealing with the problem with the support of U.S. scientists, who hope to apply lessons learned to their own Mo-99 waste streams:

I. Separating cesium and strontium from the Mo-99 waste: A variety of commercially available separation sorbents (e.g., resorcinol formaldehyde and CST) have been evaluated. The Pacific Northwest National Laboratory performed calculations using data from the Mo-99 waste to determine how well CST can capture and remove cesium and strontium. Initial results are promising.

II. Improved grout formulations: Argentina has generally concentrated on Portland Type V as well as the use of blast furnace slag and additives in the cementitious formulations related with the immobilization of MLW generated in the Mo-99 production.

Activities

CNEA is currently investigating treatment and disposal for organic ion exchange resins stored at their operation nuclear power reactors. They would like to reduce the hazard of the waste form and the cost of disposal. By reducing the cesium (Cs) and strontium (Sr) concentration, the bulk of the waste stream could be disposed of as low-level waste, thereby significantly reducing the disposal cost. The resulting waste, concentrated in Cs and Sr, could be disposed of as medium-level waste in a safer configuration.
In an effort to improve the efficiency of the Cs removal process and the storage and disposal characteristics of the separated Cs, DOE has proposed the use of the inorganic Cs selective ion exchange material CST. During FY1997, Pacific Northwest National Laboratory's researchers evaluated CNEA's Mo-99 waste streams, which were treated with CST, using a computer model. An analysis of the data indicated that CST could provide the decontamination factors needed for low-level waste classification.

During FY1998, DOE and CNEA delegates continued to work together to examine the feasibility of a CST application for the removal of Cs from the active waste produced during the production of Mo-99. DOE has conducted literature searches and computer modeling supporting the feasibility of this application. A report documenting the results was provided to CNEA.

In FY99, tests and procedures for a cold run have been jointly developed, the results of which are being examined to determine feasibility of establishment of tests with actual radioactive material. These tests would be jointly conducted at the waste management facilities in Argentina. FY2080 activities will be planned at the next JCCRM meeting scheduled for Summer 1999.

### Spent Ion Exchange Resins

**Background**

Another area of joint interest to the U.S. and Argentina is the immobilization of spent ion exchange resins. As U.S. sites move closer to clean-up, resins used to absorb more difficult contaminants like high-activity radionuclides will also require disposal. The U.S. hopes to learn from the experiences of Argentina. CNEA has among its functions the study of the conditioning of the spent resins generated in the nuclear power plants. At present,

*The Spent Ion Exchange Resin Team:*
(left to right) Steve Cox, Stir Melter, Inc.; Jack Zamecnik, WSRC (seated); Mario Sterba, CNEA; Diego Russo, CNEA; Steve Hoeffner, Clemson University.
approximately 42 m³ of spent resins are stored at Atucha I and 120 m³ at Embalse. At Atucha I, the resin is used to decontaminate the heavy water systems. In contrast, the Embalse operator passes all process aqueous streams through resins, which results in the larger volume and generation rate.

The resin at Atucha I was originally stored in two tanks, but was moved to a cistern a few years ago; the resin at Embalse is in tanks. The resins have been in interim storage for about thirty years and it is not known whether any degradation has occurred. Consequently, CNEA has expressed concern that any sample they might obtain is unlikely to be representative. This situation is analogous to that faced by many DOE sites where aging waste is currently stored in underground tanks.

Based on previous work, CNEA can immobilize the spent resins using a formulation containing Portland Type V cement and blast furnace slag. However, the spent resin loading must be limited to about 10-15% wt, requiring large amounts of cement. Consequently, CNEA is interested in vitrification of the resins. During the 1980s, CNEA investigated the possibility of vitrification of the High Level Waste (HLW) that should be generated in the reprocessing. At the
end of 1979, Argentina designed and built a Reprocessing Demonstration Plant, in order to
demonstrate the feasibility of reprocessing the spent fuel generated from nuclear power
plants, with the aim to manufacture mixed oxide fuel. From the early studies it was deter-
mined that some glasses evaluated were satisfactory in comparison to the Environmental
Assessment glass (the U.S. standard for HLW). At the same time, CNEA began reviewing
the cold press and sintering technology to produce a glassy ceramic waste form.

One possible solution is the demonstration of a Transportable Vitrification System such as
that funded by the Mixed Waste Focus Area. Should this technology be used, DOE will
profit from the experiences of demonstrating the unit in field conditions.

Activities

In an effort to determine whether such resins can be vitrified, several activities are being
conducted, beginning with the performance of a detailed characterization of the virgin
resins by CNEA. The Savannah River Technology Center is performing bench-scale stud-
ies on the resins, including loading samples of the resins with non-radioactive cesium and
irradiating them to doses expected over 10 years of storage. Results of these tests were used
to determine optimum vitrification parameters. One surrogate spent resin was vitrified to
test these parameters using a melter at the Clemson University Vitrification Center. The
resulting information will be used by the U.S. and Argentina to make decisions regarding
the potential vitrification of spent ion exchange resins.

In FY1992, a joint program between DOE and CNEA was initiated for the immobilization
of spent ion exchange resins. Vitrification presented a plausible immobilization option
because of the significant volume reductions possible, and because of the enhanced
performance of glass waste forms. Due to Savannah River Technology Center’s expe-
rience with vitrification of spent ion exchange resins, immobilization studies were
successfully performed on both the bench and melter-scale. However, during further
vitrification testing conducted in FY1991 with ion exchange resins, enhancements to
the treatment process were discovered.
In FY1999, two melter-scale studies with Argentine-supplied resin material will be performed at Clemson University using a prototypical melter system configuration. This will confirm the feasibility of the treatment process and provide off-gas data necessary to determine the hazardous air pollutants of concern. These demonstrations will also allow the CNEA representatives an opportunity to participate in the vitrification demonstration and to evaluate and review U.S. vitrification equipment for their specific applications.

The first demonstration is scheduled to be conducted February 22-26, 1999. Two CNEA scientists will accompany DOE personnel to Clemson University to participate in melter tests. In conjunction with this trip, the CNEA officials will visit Savannah River Technology Center to learn more about their vitrification facilities including the Shielded Cells Melter and Glass Testing Laboratories. A second demonstration will occur at Clemson University using Embalse resin during the Summer of 1999.

Upon the completion of these tests, a test report will be developed summarizing the results of this cooperative project. This report will assist the JCCRM in determining the future direction of the program for FY2000.

D&D

Background

Another challenge facing the U.S. and Argentina is D&D since both countries have facilities reaching the end of their useful lives. Argentina's Alpha Facility began operations in 1973 as a glove box facility for the safe handling of a few hundred grams (350 grams) of plutonium (Pu). Located at the Constituyentes Atomic on the outskirts of Buenos Aires, the facility has performed research on a variety of topics, most notably on the use of mixed oxide fuel for nuclear reactors.

Recently, a decision was made to move the laboratory to a new location, preferably one that is farther away from a populated area. Such a move would require D&D plans to be drawn up for the existing facility, and the possible use of the Ezeiza Atomic Center as a site to continue the research on the nuclear fuel cycle. The Argentine House of Representatives has given approval for the idea, however the Senate has not yet voted.
Activities

As agreed at the Solidification Workshop, a visit by an Argentine scientist to observe the demonstration of relevant D&D technologies in the U.S. was conducted early in 1997. The CNEA representative visited Argonne National Laboratory to hold discussions on D&D, spent fuel post irradiation examinations, and medical isotope production. He also toured the research reactor and various D&D areas. Upon his return to Argentina, CNEA provided a request for additional collaboration with the U.S. in the areas of D&D, spent nuclear fuel, and medical isotope production.

In December of FY1998, the D&D Focus Area obtained an agreement with Los Alamos National Laboratories (LANL) for the use of their facility for a large-scale demonstration and deployment project. LANL had been selected as the site for the D&D of 313 Pu gloveboxes. The D&D Focus Area obtained an agreement with LANL to demonstrate mature and new technologies for the D&D of these Pu gloveboxes. The demonstration project will be accomplished by an Integrating Contractor Team (ICT).

It was agreed that CNEA participate as a member of an ICT, which will have quarterly meetings and monthly teleconferences in the intervening months. The ICT is currently reviewing and selecting D&D technologies that match the previously identified needs. It is expected to take approximately six months to organize the first demonstrations of new technologies at LANL. Technologies will be demonstrated during the Summer of 1999 and 2000.

The U.S. and Argentina have discussed the possibility of demonstrating U.S. technologies in the D&D of the Alpha Facility during this time. This would be cost-effective for the Argentines and provide the U.S. with much-needed data on technology performance. CNEA is currently planning the D&D of two Pu gloveboxes. The ICT is currently examining the possibility for technology demonstrations and deployment in Argentina. These plans will be further developed and discussed at the next JCCRM meeting, which will determine FY2000 activities.
FUTURE PLANS

Scientist Exchanges

The four scientist exchanges for FY99 are: 1) CNEA participation in the large-scale demonstration for the D&D of Pu gloveboxes at LANL, 2) CNEA participation in two resin vitrification testings scheduled to take place at Clemson University, 3) DOE participation in the resin testing and melter evaluation at Bariloche Laboratories, and 4) DOE participation in the consultation for the setup and testing of CST at the Ezezia site.

Third Annual JCCRM Meeting: Summer 1999

The next JCCRM meeting will take place in the Summer of 1999 in Buenos Aires, Argentina. The purpose of this meeting is to discuss the projects conducted under the JCCRM in the previous year, and to determine the scope of future activities.

Possible Future Collaborations:  

D&D: Electrochemical technologies  
Separations: Testing ‘hot’ waste at CNEA facilities  
Spent Resin: Installation of melter into ‘hot’ cell  
Other: Groundwater contamination technologies
INTERNATIONAL PROGRAM INFORMATION:

Activities with Argentina is produced once a year by the International Program staff.
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