

***The DOE Office of Environmental Management International Collaboration Program
Overview: Interactions, Agreements, and Future Direction***

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Abstract

As the lead U.S. agency for the environmental cleanup, the Department of Energy (DOE) Office of Environmental Management (EM) carries out international activities in support of U.S. policies and objectives regarding accelerated risk reduction and remediation of the environmental legacy of the nation's nuclear weapons program and government-sponsored nuclear energy research. To achieve this, EM pursues collaborations with foreign government organizations, educational institutions, and private industry to assist in identifying technologies and promote international collaborations that leverage resources and link international experience and expertise. An initiative of the International Program is to link international experience and expertise to the technical needs of the overall EM mission and to foster further collaboration with international partners to promote those needs.

Through the International Program, the Office of Engineering and Technology currently works with the Khlopin Radium Institute (KRI), Electrotechnical University “LETI” and SIA Radon Institute in Russia, the International Radioecology Laboratory (IRL) in Ukraine, the Nuclear Engineering and Technology Institute (NETEC) in South Korea and the Immobilization Science Laboratory (ISL) at the University of Sheffield in the U.K.

In the future, the International Program expects to expand collaboration with all of EM's Program offices to further assist in linking international experience and expertise to address EM's technical needs and to continue to foster partnerships with other countries that can leverage technology solutions that have the potential for changing the dynamic of DOE's environmental and waste management cleanup missions and support the major priorities of the Department of Energy, including investing in science and completing the clean-up of the environmental legacy.

For example, dialog has been initiated with representatives from the Nuclear Decommissioning Authority (NDA) in the United Kingdom. A Statement of Intent was signed between DOE-EM and the NDA to work cooperatively on areas of mutual interest. Under this umbrella, discussions are held with NDA representatives to identify potential areas for collaboration. Information and technical exchanges are identified as near-term actions to help meet the objectives of the Statement of Intent. Current areas of focus include: Hot Isostatic Pressing; IX Resin Performance, Selection and Disposition; Glass Chemistry; Tank Corrosion Monitoring; Structural Integrity Issues; Fuel Drying; D&D in Confined Spaces and Decommissioning Hierarchy Issue; and Staff Training; and Competition, Procurement and Supply Chain. There has also been interest from Japan, China, EURATOM to do similar dialogs to share lessons learned on environmental management.

The EM International Program is currently leveraging cross cutting Departmental program activities (i.e. Nuclear Energy, Science) and other U.S. (NNSA, DHS, DOS, etc) and foreign institutions (IAEA, OECD/NEA) to assist in identifying transformational solutions that have the potential for changing the dynamics of DOE's environmental and waste management cleanup missions.

This paper will provide an overview of the current international program and how it plans to leverage existing, and when necessary, new international partnerships to support the overall EM cleanup mission. In addition it will examine the future vision of the international program to promote the EM mission through a focus on transformational solutions, science, and technology development.

Engagement with International Partners

International Agreements are the official mechanism to share and exchange scientific and technical information in the area of environmental management and provide a means of more effectively achieving our national goals. The EM International Program envisions establishing formal relationships with several countries that are essential in addressing many large-scale contemporary problems that are beyond the ability and resources of the U.S. or any individual country. EM has engaged with various countries to obtain and exchange information on the global status of progress in high-level waste management. Examples of current activities being pursued include activities with the United Kingdom, France, Russia, and Korea.

The United Kingdom

EM collaborates with the United Kingdom's Nuclear Decommissioning Authority (NDA) on issues relating to environmental management. A Statement of Intent (SOI) signed by the Assistant Secretary for Environmental Management and the NDA on March 2007 is the framework for this cooperation. Under the terms of the SOI between EM and NDA, periodic Steering Committee meetings are held to assess current progress of activities under the agreement. Recently, in October 14, 2009, the Fifth Standing Committee Meeting was held in Liverpool, England. The meeting allowed the opportunity to share information on human capital practices, business and contracting strategies, engineering and technology issues, and safety and security concerns. A sixth meeting is planned in the United States on the margins of the Waste Management 2010 Conference in Phoenix, Arizona.

In addition, through an International Agreement on energy research and development, NuVision Engineering (NVE), an engineering company based in the U.K., has been providing technology and engineering solutions to reduce cost, accelerate schedule and improve worker safety across the DOE Complex for approximately 12 years. NVE has identified demonstrated and implemented innovative approaches and technologies to address some of DOE's most difficult challenges in tank waste retrieval, tank closure, remote handling, D&D and groundwater sampling at a number of DOE sites including Oak Ridge, Los Alamos, Idaho Falls, Mound, Savannah River, Fernald and Hanford.

France

DOE has a long history of cooperation with CEA, the French Atomic Energy Agency. The issue of nuclear research and development (R&D) cooperation with France should be noted as they are one of the most active participants in DOE-wide nuclear cooperation programs (i.e., GIF, GNEP) and an important partner in laboratory-to-laboratory nuclear R&D cooperation. In the area of nuclear energy cooperation, France is a charter member of GIF and currently chairs the forum. France also hosted the GNEP Ministerial meeting on October 1, 2008, in Paris. EM is in the process of engaging with the French CEA and has planned visit to France in the Spring 09 to discuss policy and technological issues pertaining to environmental management and waste processing.

Russia

Russia has welcomed the US initiated Global Nuclear Energy Partnership (GNEP), and the December 15, 2006, report of the U.S.-Russia Civil Nuclear Energy Working Group contains an ambitious Action Plan for collaboration in areas related to GNEP. This working group held its first workshop in Obninsk, Russia, March 13-14, 2007, and reached initial agreement on collaborations in technical areas including separations, fuel fabrication, fast reactors, and exportable reactors for developing countries.

Russia is rapidly expanding its domestic nuclear program as well as its international marketing of fuel cycle services. The landmark signing of the U.S.-Russia Agreement for Cooperation on May 5, 2008, may provide more avenues for GNEP cooperation with Russia, as well as the renewal of the Memorandum of Understanding between the Department of Energy and the Russia Academy of Sciences on Cooperation in Science and Technology can expand EM's collaborative work scope with Russia.

The DOE-EM has collaborated with several Russian institutions over the past 15 years on waste management challenges of mutual concern. The Russian institutions have included the Khlopin Radium Institute (KRI) in St. Petersburg, the Institute for Silicate Chemistry in St. Petersburg, the Electrotechnical University "LETI" in St. Petersburg, the SIA Radon Institute in Moscow, and the Bochvar Institute in Moscow. Currently, EM is cooperating with KRI to explore glass chemistry improvements to increase throughput in U.S. vitrification facilities. EM is also working cooperatively with SIA Radon and the Electrotechnical University "LETI" to explore advanced glass melter concepts (namely the Cold Crucible Induction Melter (CCIM)) to improve the operating efficiency of U.S. vitrification facilities.

Korea

The Republic of Korea (ROK) has the sixth largest nuclear power program in the world. The ROK is actively engaged in the development of advanced reactor and fuel cycle technology, nuclear safety, and radioactive waste management. U.S. cooperation with the ROK has been extensive in advanced fuel cycle technology, including the DUPIC process and elements of pyroprocessing at the Advanced Spent Fuel Conditioning and Processing Facility (ACPF) (cooperative research involving separation of fissile material may only be conducted in the United States). The ROK is a charter member of the Generation IV International Forum (GIF) and was the first partner of the United States in bilateral technical cooperation offered through the International Nuclear Energy Research Initiative (I-NERI). ROK research and development focuses primarily on improving indigenous nuclear power technology by developing advanced reactors and fuels and solving the country's spent fuel and waste management problems.

The Department's primary mechanism for bilateral cooperation is the PI lead U.S.-Korea Energy Consultation. The State Department JSCNEC's on Nuclear Energy Cooperation coordinates our extensive nuclear energy interactions with Korea. EM is seeking to leverage these meetings and increase their participation in future JSCNEC. Korea hosted the September 2008 meeting in which EM participated and presented, and there are plans underway to increase the role of EM in this bilateral initiative. By EM engaging Korea in the JSCNEC it will have the opportunity to discuss areas of cooperation under six working groups: policy issues; nuclear R&D; nuclear safety; safeguards, export control and security issues; emergency preparedness; and, nuclear fuel issues. The JSCNEC between the U.S. and Korea is held annually.

The Office of Environmental Management can take advantage of the Korean JSCNEC's by leveraging expertise and experience from international environmental remediation organizations, like Korea's Hydro and Nuclear Power Co, Ltd (KHNP) and the Korea Atomic Energy Research Institute (KAERI) and by sharing information on research and development related to disposal of low and intermediate level radioactive waste and other related areas both countries stand to realize significant benefits.

A research program was conducted by KHNP's Nuclear Energy and Technology Institute (NETEC) under the direction of DOE-EM to evaluate the feasibility of using the CCIM technology to vitrify SRS waste types. The initial and baseline demonstrations with simulant showed that waste loading of 50% (versus about 38% in the current DWPF Melter) could be vitrified using the CCIM technology, which can run at higher glass temperatures (1250°C and higher) than the current DWPF Melter (1150°C). Higher waste loadings would result in less canisters being filled and faster waste throughput at the DWPF.

Low and intermediate level radioactive wastes (LILW) are generated from commercial nuclear power plants as a result of routine operations. The LILW must be dispositioned in a manner to meet safety and environmental regulations. In South Korea, vitrification of LILW is being viewed as a means to effectively treat and stabilize LILW to produce a glass product for long term disposition of the LILW. The Ulchin Vitrification Facility

(UVF) at the Ulchin Nuclear Power Plant site was constructed to treat the LILW generated from the Ulchin Power Plant. Construction of the UVF was completed and cold commissioning activities were completed in 2008. The plant is currently undergoing final licensing; radioactive testing and “hot” commissioning will follow.

The design, construction and commissioning activities conducted by KHNP and NETEC can provide valuable insight into design concepts for installation of a CCIM (specifically into an existing facility) and strategies for maintenance and operation of the CCIM in a remote facility. The sharing of lessons learned from installation and commissioning of vitrification facilities could be beneficial to both U.S. and Korean organizations. A collaborative effort is being pursued.

Establishment of New Collaborative International Agreements

With EM management consultation and approval the EM International Program will seek to formalize, where needed, these cooperative relationships by establishing formal international agreement and at the same time continue to identify new collaborative partnerships. By establishing these types of agreements EM will ensure it works with like minded countries that embrace a similar mission completion philosophy based on cleanup and reducing risk. The first such formal agreement should be with the United Kingdom. The UK is one of EM’s biggest and most important international partners. There is current collaboration taking place under the SOI. With the formation of the UK Department of Energy and Climate Change (DECC), EM has the opportunity to solidify this bilateral relationship at a government level and establish a mechanism in which to establish future work and an ability to grow the areas of cooperation under one overarching umbrella agreement.

Future Direction of the EM International Program

By working with other US agencies involved in formulating nuclear related policies, the International Program can solidify its role at both a policy and at a technology level. EM’s mission of collaborating with foreign government organizations, educational institutions, and private industry to identify technologies that can address the site cleanup needs of the U.S. Department of Energy can be further enhanced by continually engaging with other program offices within and outside the Department. EM plans to increase coordination with Departmental offices engaged in missions that interface with EM’s cleanup activities in order to leverage existing international programs. The results will be one of both getting more for the money and not duplicating efforts.

EM will also seek to expand its role with multilateral international organizations, like the International Atomic Energy Agency (IAEA), and the Nuclear Energy Agency (NEA). This will include possible high-level participation in existing joint undertakings involving scientific and technical information exchange on decommissioning projects and fuel cycle facilities and in IAEA/NEA sponsored workshops, seminars, and committees. By leveraging international expertise and experience EM can continue to produce tangible results in the cleanup efforts. EM International Program will work with management to seek existing international cooperative agreements and where none exist, establish new agreements that assist in developing effective international waste management strategies and formalize cooperative undertakings with international partner countries (i.e. UK,

France, Russia, Japan, and Korea). EM will also seek to identify and participate in international workshops and conferences which allow the opportunity to highlight the EM Program to an international audience.

Engage with DOE Program Offices

The EM International Program will also seek to engage with the Office of Science (SC), Office of Radioactive Waste (RW), National Nuclear Security Administration (NNSA), Office of Policy and International (PI) Affairs, and Office of Nuclear Energy (NE) on international programs that support and enhance the EM International Program goals and objectives. To follow are examples of how the EM International Program can engage with other DOE program offices.

PI

PI has primary responsibility for the Department of Energy's international energy activities including international emergency management, national security, and international cooperation in science and technology. PI's role is to deliver unbiased advice to the Department of Energy's leadership on existing and prospective energy-related policies, based on integrated and well-founded data and analysis.

Through its Energy Policy Dialogue discussions, PI works closely with DOE program Assistant Secretaries and other DOE Secretarial officers to maintain a knowledge of the activities, issues, and policies of the Department, other Federal departments and agencies (including the National Security Council, Office of Management and Budget, and other White House offices), members of Congress and Congressional Committees, and energy producers and consumers. By engaging in the Energy Policy Dialogue discussions and being an active participant EM can contribute to the optimization of the national environmental management system. Additionally, in its leadership role, the U.S. will continue to assist other countries to adopt high-level waste management and disposal practices that enhance international security, safety, and environmental management.

The EM International Program will seek to work closely with PI as it moves forward in establishing international agreements to ensure environmental management is a key area of collaboration so that when the time comes that EM is interested in cooperating with international scientist and experts that mechanism for cooperating and/or sharing information is already in place. In addition, the International Program can be assured to keep abreast of the latest policy issues affecting bilateral consultations in environmental management and radioactive waste management.

NE

The Office of Nuclear Energy (NE) mission is to promote nuclear power as a resource capable of meeting the Nation's energy, environmental and national security needs. There are two programs relevant to EM's mission, currently the Global Nuclear Energy Partnership (GNEP) and the Generation IV International Forum (GIF). GNEP was established to promote cooperation among States that share the common vision of the need to expand nuclear energy production worldwide in a safe and secure manner. It aims

to accelerate development and deployment of advanced fuel cycle technologies to encourage clean development and prosperity worldwide, improve the environment, and reduce the risk of nuclear proliferation. To date the partnership consists of twenty-five partners, three permanent international nongovernment observers and a number of observer countries. The partners are: Armenia, Australia, Bulgaria, Canada, China, Estonia, France, Ghana, Hungary, Italy, Japan, Jordan Kazakhstan, Republic of Korea, Lithuania, Morocco, Oman, Poland, Romania, the Russian Federation, Senegal, Slovenia, Ukraine, United Kingdom and the United States. The three permanent international nongovernment observers are: the International Atomic Agency, the Generation IV International Forum and EURATOM.

GNEP has two working groups. Of special interest to EM is the Infrastructure Development Working Group (IDWG). One of the subgroups of the IDWG is the Waste Management Group whose goal is to address radioactive waste management issues. EM has the unique opportunity to help identify specific activities in the area of radioactive waste management. Some proposed activities are human capital development, exchanging information on calculations and costing methodology, identifying and addressing research and development gaps and providing lessons learned. The partners have suggested that each country identify an expert to participate in the subgroup. Through the International Program EM can have an important role in the establishment of a GNEP sub-Working Group to explore possible strategies for the long term management of radioactive wastes arising at nuclear power stations and from associated fuel cycle activities.

The mission of GIF is to develop the next generation nuclear energy systems to meet the world's future energy needs. This unique international effort allows unprecedented coordination among the national research organizations of the various countries in the GIF, which include Canada, China, Euratom, France, Japan, Republic of Korea, Republic of South Africa, Russia, Switzerland, the United Kingdom, and the United States [Argentina and Brazil are inactive] Senior representatives from GIF member countries participate in a range of committees that coordinate the research activities required to develop up to six next generation nuclear energy systems. EM can leverage these research and development activities to assist in identifying technologies that can aid in our domestic clean-up efforts.

NNSA and RW

The National Nuclear Security Administration (NNSA) holds high-level meetings and discussions on non-proliferation issues that have the potential to influence the overall EM mission. NNSA holds meetings with countries that EM may be interested in working with or expanding collaborations. Just recently, NNSA held discussions with Russia, India, and China. Even if some of these countries are not actively engaged with EM, there are collaborative opportunities that can be attained with research centers and institutions (for example with Russia's Rosatom). The Office of Radioactive Waste (RW) has a history of working with international organizations, like the International

Atomic Energy Agency (IAEA) and the Organization for Economic Cooperation and Development/Nuclear Energy Agency (OECD/NEA). EM could leverage these activities to study mutual waste management challenges that can promote exchange of institutional and technical knowledge that can contribute to the reduction of technical and programmatic risks of the EM program.

Coordinate with US agencies

In recent years, the State Department activities on technical cooperation under the Joint Standing Committee on Nuclear Energy Cooperation (JSCNEC) have increased. The JSCNEC meeting includes a review of several joint projects between the United States and foreign nuclear research institutions. At these annual meetings the Department of Energy has been responsible for coordinating between the Department of State (DOS), U.S. national laboratories, program offices, and other DOE participants and private entities, collecting updates on ongoing projects and identifying any new areas of collaboration. DOE's Office of Nuclear Energy, Radioactive Waste, and Non-Proliferation also participate in DOS's organized JSCNEC meetings held annually.

The JSCNEC's provide an important chance for the EM International Program to continue to broaden its understanding of environmental remediation efforts in the international context. The meetings will also enable senior EM personnel to share information and to gain lessons learned from environmental programs that are highly developed and assist in expanding the EM International Program. Japan, Korea, and Argentina all use the JSCNEC as the formal bilateral cooperation channel between them and the United States where nuclear policy consultations, exchange of technical information, joint R&D activities, etc., transpire.

Other examples where the EM International Program can engage and coordinate with other U.S. agencies is with the U.S. Department of Commerce (DOC) trade delegations and the Nuclear Regulatory Commission (NRC) Committee Sessions on Environmental Management. Both of these forums can help to meet EM and the Department of Energy's goals in advancing scientific understanding, enhancing environmental protection, and improving global security.

Engage with Multinational Forums/Agencies

Another important objective of the EM International Program will be to leverage the use of international opportunities that promote U.S. leadership and benefit the mission of the U.S. on environmental management. This will be accomplished by enlisting international support and cooperation in the identification and resolution of common institutional and technical issues through participation in international organizations. Some examples of forums that the EM International program can engage with include the International Atomic Energy Agency (IAEA) and the Organization for Economic Cooperation and Development/Nuclear Energy Agency (OECD/NEA).

IAEA

The IAEA is the world's center of cooperation in the nuclear field. It was set up as the world's "Atoms for Peace" organization in 1957 within the United Nations family. The

Agency works with its Member States and multiple partners worldwide to promote safe, secure and peaceful nuclear technologies. The IAEA has 15 technical areas, of interest to EM is the area related to disposition of radioactive waste. The Radioactive Waste and Spent Fuel Management group has the responsibility for development of safety standards related to both the predisposal management of radioactive waste and its disposal. It also has the responsibility to assist Member States in the use and application of these standards. Standards are developed to reflect the needs of member states. Needs are identified by three mechanisms (1) outcome of international conferences, (2) input from the safety standards development committees and (3) from direct contact with Member States.

Of special interest to EM is the outcome of the second Review Meeting of Contracting Parties to the Joint Convention which identified a number of the issues that still needed to be addressed: (1) processing of legacy waste, (2) the safety implications of longer storage of radioactive waste at the site of origin versus at a final disposal facility, (3) the need for improved characterization and quality assurance of waste and (4) the assessment and demonstration of safety of waste management activities and facilities. In addition the Convention identified the need to establishing a coherent policy for the disposal of all types of radioactive waste. One area where EM can clearly benefit from more interaction with the IAEA is by participating in the new Network of Centers of Excellence for Decommissioning which were established after the General Conference in September 2007. The purpose of these centers is to create a network to share both knowledge and experience among Member States.

OECD/NEA

Another multinational agency EM can increase engagement with is the Nuclear Energy Agency (NEA). The NEA is a specialized agency within the Organization for Economic Co-operation and Development (OECD), an intergovernmental organization of industrialized countries, based in Paris, France. The mission of the NEA is to assist its Member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for the safe, environmentally friendly and economical use of nuclear energy for peaceful purposes. NEA is currently the only forum for the major nuclear power stakeholders to discuss nuclear policy. To achieve its goals, NEA works as a forum for sharing information, experience, and promoting international cooperation. NEA considers itself “a center of excellence” which helps member countries pool and maintain their technical expertise and serves as a vehicle for facilitating policy analysis and developing consensus based on the Agency’s technical work.

NEA consists of 28 countries in Europe, North America, and the Asia-Pacific regions. Together they account for approximately 85 percent of the world’s installed nuclear capacity. Nuclear power provides almost a quarter of the electricity produced in NEA member countries. NEA works closely with the International Atomic Energy Agency (IAEA) and the European Commission in Brussels.

The NEA has 9 working groups; of interest to EM is the working group related to radioactive waste management. Similar to IAEA, its goal is to assist member countries in the management of radioactive waste and materials, focusing on the development of strategies for the safe, sustainable and broadly acceptable management of all types of radioactive waste, in particular long-lived waste and spent fuel. Their main objectives are: (1) shared and broad-based understanding on radioactive waste management, (2) facilitate the development of waste management strategies at the national and international levels, (3) assist in elaborating common regulatory approaches and (4) promote the exchange of scientific and technical knowledge. Recently, EM was invited to actively engage in the NEA's Radioactive Waste Management Committee and its sub-groups. The NEA uses these Committees and ad hoc working groups to accomplish its goals. EM participation in these committees and working groups is beneficial to the Department.

The EM International Program can play an important role in ensuring that the EM organization as a whole understands the leveraging potential that exist with these multinational agencies and forums, and can be work with management, as appropriate, to engage with such international bodies in order to promote international collaboration and understanding in environmental management. By doing this, EM can have a role in reaffirming the common understanding of radioactive waste goals and objectives as laid out in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention), which the US is a signatory, while at the same time having a role in promoting international political commitments in the implementation of radioactive waste management solutions and national programmes.

Conclusions

The DOE-EM International Program can be a supportive mechanism for DOE-EM as it identifies solutions to accelerate cleanup and reduce technological risk. Previous task activities have provided information to support DOE-EM's environmental cleanup decision-making and to provide data to support accelerated cleanup objectives. Future collaborative partnerships will be identified with current collaborative partners as well as other international experts to support efforts to address technology needs identified in the current Office of Technology Innovation and Development program planning. Moreover, efforts will be made to integrate the international collaborative program with other DOE offices and other governmental agencies to leverage activities being conducted in these offices and agencies to best address the needs of DOE and the nation. By coordinating with Departmental and Federal entities the EM International Program can ensure harmonization of international experience into domestic program activities and decision-making.

EM's International Program will focus on continuing to leverage and when necessary, identifying international opportunities that can assist in reducing the cost and schedule of the cleanup mission; enhancing understanding of the processes related to environmental management; and accelerating and increasing innovative technology applications. This will be accomplished by enlisting international support and cooperation through participation in international organizations and developing and maintaining appropriate

frameworks for bilateral and multilateral cooperation. Most importantly, EM's International Program will direct the implementation of international agreements which involve the whole of EM and also be able to monitor and support international advances in technology that reduce cost and optimize the efficiency of the nation's responsibility to cleanup sites and will be responsible for obtaining and exchanging information on the global status of progress and policies in waste management. Additionally, in its leadership role, the EM program can have the opportunity to assist other countries to adopt safe waste management and disposal practices that enhance international security, safety, and environmental integrity.

The EM International Program will work with its program offices in identifying, evaluating, and demonstrating international technologies that can accelerate DOE cleanup operations. The goal of the International Program will be to pursue collaborations among foreign government organizations, educational institutions, and private industry to identify technologies that can address the environmental remediation needs of DOE and contributes to the reduction of technical and programmatic risks of the EM program. Through international agreements, the International Program will engage in cooperative exchanges of information, technology, and data on technology development and demonstrations with national laboratory, university, and industry at an international level while at the same time developing science and engineering talent for DOE.

Most importantly, the Office of Environmental Management's International Program will seek out and leverage 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 DOE's nuclear weapons sites. These international resources will be used to manage the more urgent risks at DOE sites, secure a safe workplace, help build consensus on critical issues, and strengthen DOE's science and technology program. Due to the size and complexities of DOE's environmental legacy, DOE/EM will need to address these environmental problems for the next several decades. The scope of this task will require DOE/EM to identify and investigate promising technologies developed internationally in addition to those developed domestically. EM recognizes the importance of this and for this reason issues a report annually to summarize the activities of the EM International Program. This report also outlines areas of future interest to be pursued. The Annual Report is presented in summary fashion but specifically identifies reports, presentation and papers published over the past year that are associated with international program tasks. By continuing to identify promising technologies developed abroad and collaborating with scientists from around the world, DOE/EM can solidify its remediation mission more effectively, efficiently, and with less environmental and human health risks.