United States International Trade Commission

Remediation and Nature and Landscape Protection Services:

An Examination of U.S. and Foreign Markets

Investigation No. 332-454
USITC Publication 3727
October 2004

U.S. International Trade Commission

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Address all communications to
Secretary to the Commission
United States International Trade Commission
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U.S. International Trade Commission

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This report was prepared principally by the Office of Industries

Project Team

Jennifer Baumert, *Project Leader*
jennifer.baumert@usitc.gov
Lisa Ferens, *Deputy Project Leader*
lisa.ferens@usitc.gov

Michael Ferrantino, *Economist*

Staff assigned:
Laura Bloodgood, William Chadwick, Amanda Horan, Dennis Luther, and Ben Randol

Peg MacKnight, *Office of Operations*

With special assistance from:
Lynette Gabourel and Cynthia Payne

Primary Reviewers
Judith Dean and David Ingersoll

under the direction of
Richard Brown, *Chief*
Services and Investment Division

ABSTRACT

Remediation and nature and landscape protection services are segments of the environmental services sector. Remediation services entail the cleanup of soil and water environments after contamination has occurred, while nature and landscape protection services involve the prevention or mitigation of future soil and water contamination as well as the protection of soil and water ecosystems. The environmental services sector as a whole has received special emphasis in the World Trade Organization (WTO), as the reduction or elimination of barriers affecting trade in such services has been identified in the Doha Ministerial Declaration as one of the principal goals of the present negotiating round. Moreover, environmental issues have become increasingly tied to international trade and investment, such that the environmental impact of trade agreements is more likely to be evaluated and considered as a critical component of the policy under consideration. This report provides an overview of U.S. and foreign markets for remediation and nature and landscape protection services; examines trade and investment in remediation and nature and landscape protection services markets, including barriers affecting such trade and investment; and discusses existing regulatory practices. Information is presented on both developed- and developing-country markets.

The largest markets for remediation services are in developed economies, with the United States ranking as the world's largest such market. There does not appear to be a well-defined market for nature and landscape protection services among the markets selected for analysis (Australia, Canada, China, the Czech Republic, the European Union, Japan, Malaysia, Mexico, Poland, the United States, and developing countries considered as a group), as a wide variety of laws and regulations pertain to the market, and there are few firms that specialize in the industry. However, the prevalence of biodiversity-related regulations in these markets as well as widespread membership in multilateral conventions on nature and landscape protection issues demonstrate global awareness of such concerns.

The extent of cross-border trade and investment in remediation and nature and landscape protection services markets is small compared with some other segments of the environmental services industry, but is expected to grow in the long term, as the markets for these services mature outside of the United States. Few of the countries selected for discussion in this report have explicit restrictions on trade in remediation and nature and landscape protection services. However, regulations and practices that pertain to all sectors, or to related sectors such as engineering and environmental consulting, can potentially affect trade in the remediation and nature and landscape protection services industries.

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EXECUTIVE SUMMARY

Introduction

On July 1, 2003, the U.S. International Trade Commission (Commission or USITC) received a letter from the United States Trade Representative (USTR) requesting that the Commission conduct two investigations under section 332(g) of the Tariff Act of 1930 on discrete segments of the environmental services industry, with the second of these reports focusing on remediation and nature and landscape protection services (appendix A). The environmental services sector has received special emphasis in the World Trade Organization (WTO), as the reduction or elimination of barriers affecting trade in such services has been identified in the Doha Ministerial Declaration as one of the principal goals of the present negotiating round. The USTR has indicated that information on environmental services markets would be useful in conducting WTO negotiations on environmental services, the environmental review of this element of the current WTO negotiations, and future negotiations and reviews.

The Remediation and Nature and Landscape Protection Services Market

Remediation services entail the cleanup of soil and water environments after contamination has occurred, while nature and landscape protection services involve the prevention or mitigation of future soil and water contamination. In 2001, the year for which the most recent global data are available, remediation services accounted for 10.5 percent of the $279 billion worldwide environmental services market. The primary force behind the establishment of remediation services markets worldwide has been the passage of legislation which requires cleanup of polluted sites and which assigns liability for the associated costs. Most of the developed-country markets discussed in this report have enacted legislation to regulate remediation of soil, groundwater, and surface water. The majority of developing countries have not enacted such legislation as environmental laws in those countries have tended to focus on more immediate problems, particularly sewage treatment and air pollution. In many countries, following the model laid down by the landmark U.S. laws, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as the Superfund law) and the Resource Conservation and Recovery Act (RCRA), applicable legislation follows the "polluter pays" principle, under which the polluter retains financial liability for the remediation of environmental damage. Without such legislation, polluters have little incentive to embark on expensive remediation projects.

The United States is the world's largest market for both remediation and nature and landscape protection services, due largely to the fact that it was the first country to pass comprehensive legislation directed at environmental remediation. Industry observers characterize the U.S. remediation market as mature, competitive, highly regulated, and increasingly driven by economic incentives such as brownfields

redevelopment (private sector redevelopment of contaminated sites), rather than regulatory requirements. Other large remediation markets include Western Europe and Japan. Japan's market is still in its early stages of development, with the country's first national remediation law passed only in 2003. Foreign markets are expected to grow as remediation legislation becomes more common. In developing countries, the existing market for remediation services derives primarily from the developing-country affiliates of multinational corporations based in the United States and Europe, which reportedly prefer to maintain the level of environmental standards that they observe at home.

The markets for nature and landscape protection services are harder to characterize, as a wide variety of laws and regulations pertain to such activities, and there are few firms which specialize in the industry, making data compilation difficult. All of the countries selected for analysis (Australia, Canada, China, the Czech Republic, the European Union, Japan, Malaysia, Mexico, Poland, the United States, and developing countries considered as a group) in this study have passed legislation in this area, generally focused on biodiversity concerns such as protecting endangered species. In developing countries, the markets for nature and landscape protection services are largely driven by financial assistance from high-income countries and multilateral assistance organizations.

Trade and Investment

Trade in remediation and nature and landscape protection services is small compared with trade in other environmental services industries. Trade is expected to grow in the long term, however, as more countries pass legislation establishing liability standards in these areas, and enforce those laws. Both the United States and Europe are net exporters of remediation services. In Japan, where the environmental remediation market is just beginning to respond to new regulations, very little trade in remediation services takes place. Most of the remaining highlighted countries, along with most developing countries, are likely net importers of remediation services although it is not clear whether trade accounts for a substantial portion of the market. Industry observers expect the environmental consulting segment of the remediation industry to be the principal beneficiary of increased trade in the future. Most agree that it is not cost-effective to export actual remediation services to most other countries because work requires specialized equipment that is difficult to transport across borders, and most technology is widely available. However, industry representatives believe that the skills of U.S. firms in areas such as site assessment and overall project planning are highly competitive in foreign markets, and over the coming years these are likely to represent growth opportunities for U.S. companies in the field. Very little is known regarding trade in nature and landscape protection services, and it is not possible to draw conclusions from available data.

Thirty-seven countries have scheduled commitments under the General Agreement on Trade in Services (GATS) on nature and landscape protection services, including 10 developing countries and five of the countries whose markets are highlighted in this report (Canada, China, the European Union, Japan, and the United States). As discussed in Appendix D, remediation services are not clearly addressed by the WTO Services Sectoral Classification Guide, so it is not possible to address GATS commitments related to this industry. Few of the countries addressed in the study

maintain specific barriers to the foreign provision of remediation or nature and landscape protection services, but other measures with broader application throughout the economy may exist which hinder such trade, including foreign equity limitations on all business enterprises, or licensing restrictions on architects or engineers, who may be engaged in providing such services. However, according to industry representatives, the limited level of trade in the remediation and nature and landscape protection industries reflects the commercial difficulty of making a profit from the provision of such services, rather than the influence of barriers to trade.

ACRONYMS

ADB	Asian Development Bank
APEC	Asia-Pacific Economic Cooperation
BOD	Biochemical oxygen demand
Brownfields Act	Small Business Liability Relief and Brownfields Revitalization Act
CBD	Rio Convention on Biological Diversity
CCME	Canadian Council of Ministers of the Environment
CEC	The North American Commission for Environmental Cooperation
CEE	Central and Eastern European
CEPES	Center for Environmental Policy, Economics and Science
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLARINET	Contaminated Land Rehabilitation Network for Environmental Technologies
CPC	Central Product Classification
CWA	Clean Water Act
D&O	Directors and officers
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
EBI	Environmental Business International
EC	European Communities
ECOS	Environmental Council of the States
EEA	The European Environmental Agency
EIAs	Environmental Impact Assessments
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EU	European Union
EUROSTAT	Statistical Office of the European Communities

FIC	Foreign Investment Committee
FNM	Mexican National Railways
GAO	U.S. General Accounting Office
GATS	General Agreement on Trade in Services
GEF	Global Environmental Facility
IADB	Inter-American Development Bank
IMF	International Monetary Fund
IPPC	Integrated Pollution Prevention and Control
ISA	Industry Sector Analysis
ITA	International Trade Administration
LIFE	Financial Instrument for the Environment
M&A	Mergers and acquisitions
MGPs	Manufactured-gas plants
MOFA	Ministry of Foreign Affairs
NACEC	North American Commission for Environmental Cooperation
NACEPT	National Advisory Council for Environmental Policy and Technology
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NALGEP	National Association of Local Government Environmental Professionals
NEP and WM	The National Fund for Environmental Protection and Water Management
NEPA	National Environmental Policy Act
NGOs	Non-governmental organizations
NLP	Nature and landscape protection
NOAA	National Oceanic and Atmospheric Administration
NPF	National Property Fund
NPL	National Priorities List
ODA	Overseas development assistance
OECD	Organization for Economic Cooperation and Development
PBTs	Persistent bioaccumulative toxins
PCBs	Polychlorinated biphenyls

PLL	Pollution legal liability
POPs	Persistent organic pollutants
PROFEPA	Mexican Environmental Protection Agency
PRP	Principal responsible parties
RCRA	Resource Conservation and Recovery Act
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
SCP	*Société Civile Professionnel*
SEF	State Environmental Fund of the Czech Republic
SEL	*Société d'Exercice Libéral*
SEMARNAT	Secretariat of Environment and Natural Resources
SIC	U.S. Standard Industrial Classification
SYSCO	Sydney Steel Corporation
TSCA	Toxic Substances Control Act
UNCTAD	United Nations' Conference on Trade and Development
UNEP	United Nations' Environment Program
USAID	The United States Agency for International Development
USDOC	United States Department of Commerce
USDOS	United States Department of State
USFCS	U.S. & Foreign Commercial Service
USITC	United States International Trade Commission
UST	Underground storage tanks
USTR	United States Trade Representative
WTO	World Trade Organization
WWF	World Wildlife Fund

CHAPTER 1
INTRODUCTION

Purpose

On July 1, 2003, the U.S. International Trade Commission (Commission or USITC) received a letter from the United States Trade Representative (USTR) requesting that the Commission conduct two investigations under section 332(g) of the Tariff Act of 1930 on discrete segments of the environmental services industry.[1] The USTR requested that the second of these reports, which is this report, focus on remediation and nature and landscape protection (NLP) services. This report provides an overview of U.S. and foreign markets for remediation and NLP services; examines trade and investment in relevant markets, including barriers, if any; and where possible, discusses existing regulatory practices.[2] As requested, information is presented on both developed- and developing-country markets.

The global market for remediation services is large and has seen steady growth in recent years, with revenues increasing from $25.7 billion in 1996 to $29.9 billion in 2002 (figure 1-1).[3] Growth in this market is expected to continue due to increased environmental awareness, public pressure, and emerging legislation. Demand for remediation services is also spurred by urban revitalization and industry relocation, both of which may require the testing and remediation of contaminated sites prior to redevelopment. Potential buyers often conduct environmental testing at potentially contaminated sites to protect themselves from future liability.

The remediation and NLP services industries, together with the entire environmental services sector, have received special emphasis in the World Trade Organization (WTO), as the reduction or elimination of barriers affecting trade in environmental services has been identified in the Doha Ministerial Declaration[4] as one of the principal goals of the present negotiating round. Industry representatives believe that as trade in the environmental service sector grows, exporters, importers, and the environment itself may benefit from increased competition that generally reduces

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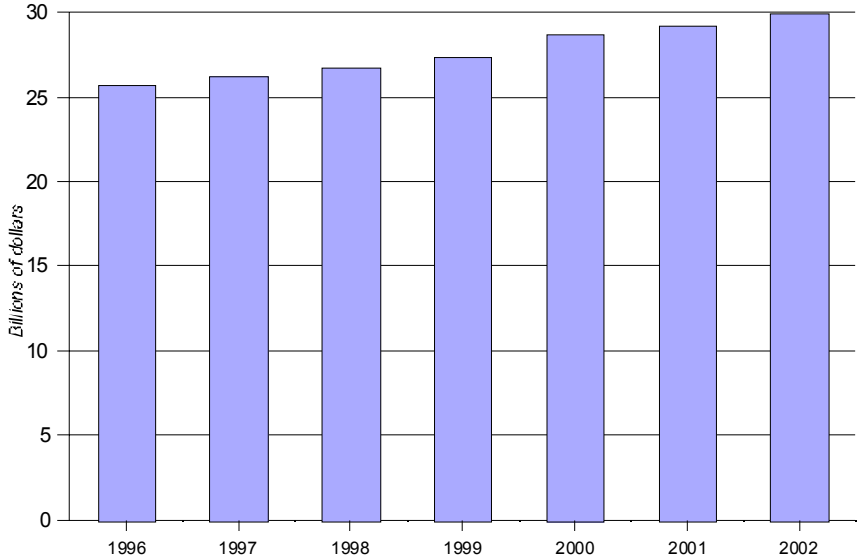
[1] See appendix A.

[2] Such regulatory practices may include national and subnational environmental regulations, as well as multinational conventions or agreements on environmental issues that may have an effect on the remediation and NLP services markets.

[3] These figures are reported by Environmental Business International (EBI) under the category, Remediation and Industrial Services. This category reflects the cleanup of contaminated sites, buildings, soil, groundwater, and operating facilities. Such data are consistent with the activities defined as remediation services for the purposes of this report, though they do not capture activities defined as landscape and nature protection services. A fuller discussion of this report's use of EBI and other data is found under the heading Methodological Approach, which concludes this chapter. EBI, email received by Commission staff, Aug. 6, 2004.

[4] World Trade Organization (WTO), *Ministerial Declaration: Adopted on 14 November 2001*, WT/MIN(01)/DEC/1, Nov. 20, 2001.

Figure 1-1
The global market for remediation services, 1996-2002



[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns.

Source: Environmental Business International, *The Global Market*, attachment to an e-mail message, received Aug. 6, 2004.

costs, increases service quality, improves efficiency, and/or introduces services that were previously unavailable.[5] Environmental issues also have become increasingly tied to international trade and investment activities, such that the potential environmental impact of a trade agreement is increasingly likely to be evaluated and considered as a critical element of the agreement under consideration. For instance, the United States is required by the Trade Act of 2002 to perform environmental reviews of major trade agreements.[6] The environmental review process involves the public, including environmental groups, in the development of trade agreements; informs trade negotiators of the possible environmental implications of such agreements; and identifies opportunities for environmental cooperation between the United States and its trading partners.

[5] Industry representative, interview by USITC staff, California, May 11, 2004.

[6] The Trade Act of 2002, signed by the President on August 6, 2002, provides that the President shall conduct environmental reviews of certain trade agreements consistent with Executive Order 13121, Environmental Review of Trade Agreements (64 FR 63,169, Nov. 18, 1999) and its implementing guidelines (65 FR 79,442, Dec. 19, 2000) and report on such reviews to the Committee on Ways and Means of the House of Representatives and the Committee on Finance of the Senate. Environmental reviews must be prepared for (i) comprehensive multilateral trade rounds, (ii) bilateral or plurilateral free trade agreements, and (iii) major new trade liberalization agreements in natural resource sectors. The Order and guidelines are available at Internet address *http://www/ustr.gov/environment/environmental.shtml*.

Scope

Remediation services entail the cleanup of soil and water environments after contamination has occurred, while NLP services involve the prevention or mitigation of future soil and water contamination. For the purpose of this study, remediation and NLP services are specifically defined to include the remediation and cleanup of land sites, bodies of water, industrial sites, mine sites, and contaminated buildings; the assessment, mitigation, abatement, and cleanup of disasters affecting the environment;[7] the protection of land and water environments, including the protection of animal and plant species and habitats; and reclamation;[8] monitoring; and other services incidental to remediation and NLP. This definition was established through consultations between the USTR and the Commission, as called for in USTR's request letter. Other researchers may arrive at different, but equally valid, definitions of remediation and NLP services.

One of the strengths of the definition utilized in this investigation is that it is based on two major industrial classification systems. The World Trade Organization's (WTO) *Services Sectoral Classification List*[9] (also known as the W/120) divides environmental services into four sub groups, most of which are identified by corresponding Central Product Classification[10] (CPC) codes: sewage services, CPC 9401; refuse disposal services, CPC 9402; sanitation and similar services, CPC 9403; and other environmental services,[11] which is often presumed to include, *inter alia,* NLP services. The W/120 is used by most signatories to the General Agreement on Trade in Services (GATS) as a basis for their schedules of specific commitments.[12] However, some WTO members contend that the W/120 does not reflect current

[7] Examples include spills of oil or other toxic substances.

[8] Land reclamation is defined as the process of returning disturbed land to some new use or function, where this involves addressing problems such as contamination, soil degradation, or unstable ground.

[9] WTO, MTN.GNS/W/120, July 10, 1991.

[10] The provisional CPC specifically includes nature and landscape protection services in class 9406, although the services classified in prov. CPC 9406 do not necessarily correspond to the definition of the nature and landscape protection services segment being used for the purposes of this study. However, the provisional CPC includes no specific reference to remediation services. United Nations, Statics Division - detailed structure and explanatory notes, found at *http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=3&Lg=1&Co=94900,* retrieved Feb. 19, 2004.

[11] The OECD and the Statistical Office of the European Communities (Eurostat) have developed a system that classifies industrial activities under three broad headings: pollution management, cleaner technologies and products, and resource management. The United States, the EU, Canada, and Japan reportedly consider this system to be more consistent with the current structure of the industry than the W/120. OECD/Eurostat, *Environmental Goods and Services Industry Manual for the Collection and Analysis of Data,* 1999.

[12] The terms and conditions under which WTO signatories accord market access and national treatment to foreign firms is provided within national schedules of specific commitments.

market conditions[13] and should be replaced or updated. As a result of these concerns, the European Union has proposed a revised classification system, which several members have incorporated in their offers for the current WTO negotiating round.[14] This new classification scheme includes two categories which specifically cover the services discussed in this report: remediation and cleanup of soil and water, and protection of biodiversity and landscape.[15]

The North American Industry Classification System (NAICS),[16] which serves as the basis for official U.S. industry data, categorizes the remediation industry within Sector 5629 (remediation and other waste management services). The specific segment of this sector that most closely corresponds to the activities discussed in this study--remediation services 562910--includes remediation and cleanup of contaminated buildings, mine sites, soil, and ground water; abatement of toxic materials such as asbestos and lead; and the integrated reclamation of mines.[17] The NAICS has no discrete sector that closely corresponds to the NLP services industry.

Methodological Approach

To gather information for this report, the Commission conducted in-person and telephone interviews with industry representatives, government officials, and academics, and consulted a range of secondary sources in a search for both quantitative and qualitative information. Secondary sources included industry journals and websites, U.S. and foreign government publications, and other publications and websites such as those available from the World Bank, the WTO, and the Organization for Economic Cooperation and Development (OECD). In recognition of the pronounced variation among remediation service providers, an attempt was made to collect information from diverse parties. During the course of this investigation, the Commission conducted interviews with representatives of 19 remediation service providers in several locations, including Belgium, China, the Czech Republic, France, Japan, Malaysia, and Mexico,[18] as well as the United States. The Commission endeavored to interview representatives of large, multinational

[13] In submissions to the WTO, several members expressed the view that the W/120 is outdated and incomplete in the manner that it addresses environmental services. Specifically, members noted that it does not emphasize pollution prevention, sustainable resource management, facilities development, or services provided directly to industry. For a more detailed discussion regarding these environmental services submissions, see appendix D.

[14] For more information on the current round of WTO services negotiating round, and on the offers submitted as part of that round, see appendix D.

[15] World Trade Organization (WTO), "Communication from the European Communities and their Member States, GATS 2000: Environmental Services," S/CSS/W/76, May 4, 2001.

[16] The North American Industry Classification System (NAICS), developed jointly by the United States, Canada, and Mexico, has replaced the U.S. Standard Industrial Classification (SIC) system. U.S. Census Bureau, *North American Industry Classification System (NAICS),* found at *http://www.census.gov/epcd/www/naics.html,* retrieved Feb. 19, 2004.

[17] U.S. Census Bureau, *2002 NAICS Codes and Titles,* found at *http://www.census.gov/epcd/naics02/naicod02.htm,* retrieved July 27, 2004.

[18] Specific travel destinations were chosen based on a number of criteria, including market size and development, export potential, and the USTR's request for information on both developed- and developing-country markets.

firms as well as those of small firms. Eight large and eleven small firms were interviewed. U.S. firms and their foreign subsidiaries represent the majority of firms interviewed (15), although information was also obtained from a small number of foreign firms (4).

The Commission reviewed and incorporated quantitative data from many sources, but has relied on data developed by Environmental Business International (EBI) to provide an estimate of the overall size of the global remediation services market, as well as a foundation for comparable country-by-country estimates. EBI data are supplemented by quantitative data collected from country and international sources. The types of quantitative data reviewed in preparing this report had different strengths and weaknesses. Country-specific data, for instance, often contained a variety of facts that yielded good insights on the dynamics of specific markets, but usually did not provide for meaningful cross-country comparisons. Data developed by EBI provided for meaningful cross-country comparisons, but did not yield as many country specific insights as other information.

EBI data on U.S. revenues and exports in the remediation services industry segment are largely based on industry surveys and reports from publicly traded companies. EBI data on U.S. imports are largely based on secondary information (such as financial reports) from top foreign environmental companies, which EBI confirms with U.S. customers.[19] Data on foreign market revenues are generated using data from secondary sources, which are adjusted so as to conform to the definitions and methods used to generate U.S. data.[20]

According to EBI, its survey response rates vary by firm size. Typically, EBI experiences 100-percent response rates among U.S. firms with revenues exceeding $100 million, 50-percent response rates among U.S. firms with revenues falling between $10 million and $100 million, and 3- to 4-percent response rates among the hundreds of U.S. firms with revenues below $10 million.[21] EBI reports that although the surveys received from companies with revenues exceeding $10 million may vary slightly from year to year, it generally receives responses from the 30 to 40 firms that account for one-half of the U.S. remediation services market.[22] Estimates for many of the smaller companies are based on company profiles that EBI maintains and patterns discerned from the group of surveys returned by respondents in the same revenue group. In all, EBI indicates that it captures about 60 to 70 percent of U.S. remediation service revenues.[23] EBI indicates that improvements made to its survey methods over the years do not alter previous perceptions of industry trends.[24]

EBI data appear in many other publications produced by entities such as the U.S. Environmental Protection Agency, the U.S. Department of Commerce, the Asia-Pacific Economic Cooperation (APEC) forum, the OECD, the United Nations' Environment Program (UNEP), and the United Nations' Conference on Trade and

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[19] EBI, e-mail response to questions posed by USITC staff, received Aug. 5, 1998.

[20] From EBI, EBI Market and Industry Research Methods, p. 25, found at *http://www.ebiusa.com/*, retrieved Aug. 4, 2004.

[21] EBI, *EBI Market and Industry Research Methods*, 1997, p. 17.

[22] EBI, telephone interview with USITC staff, Aug. 11, 2004.

[23] EBI, *EBI Market and Industry Research Methods*, 1997, p. 17.

[24] EBI, telephone interview with USITC staff, Aug. 11, 2004.

Development (UNCTAD).[25] EBI data capture many of the activities defined as remediation services for the purposes of this report, though there are recognized difficulties associated with drawing clear distinctions between remediation and NLP services on the one hand, and closely related services such as engineering and construction on the other, given the reliance on secondary sources. EBI data also capture both private and government consumption of remediation services, the latter reflecting, inter alia, the cleanup of military facilities and radioactive substances. Because USTR requested this report to inform services negotiations, data that differentiated between private consumption and public consumption would have been preferable. Government consumption falls outside the parameters of WTO services negotiations by virtue of national security exclusions stipulated in Article XIV (bis) of the GATS.

Organization

This report presents an overview of the global market for remediation and NLP services, organized by region. Chapter 2 provides an overview of the global remediation market. Chapters 3 through 6 examine remediation and NLP services markets in the United States, Canada and Mexico, Europe, and Asia and the Pacific. These chapters follow a similar format, which includes a market overview, an examination of the trade and investment environment, and a discussion of future prospects. Chapter 7 presents a broad overview of developing-country markets for remediation and NLP services, and discusses development-bank funding for NLP projects. The report concludes with a summary of current trends within the global market for remediation and NLP services, including a discussion of trade and investment trends.

[25] For example, see Organization for Economic Cooperation and Development (OECD), Environmental Goods and Services: The Benefits of Further Global Trade Liberalization (Paris: OECD, 2001); Jolita Butkeviciene, United Nations Environment Programme (UNEP) and United Nations Conference on Trade and Development (UNCTAD), UNEP/UNCTAD, *GATS Negotiations and Issues for Consideration in this Area of Environmental Services from a Development Perspective*, May 16, 2002; Asia-Pacific Economic Cooperation (APEC), *Survey of Environmental Markets in APEC*, (Singapore: APEC Secretariat, 2001); Loch McCabe and Susan Muller, Center for Environmental Policy, Economics and Science (CEPES),Facilitating the Flow of Capital to the Pollution Prevention Industry, report sponsored by the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Commerce (USDOC), *Environmental Market in Japan*, found at *http://web.ita.doc.gov/ete/*, retrieved Aug. 4, 2004.

CHAPTER 2
REMEDIATION AND NATURE AND LANDSCAPE PROTECTION SERVICES: SECTOR OVERVIEW

Introduction

This chapter provides an overview of the remediation and nature and landscape protection (NLP) services sector. The first part of the chapter describes the structure and characteristics of the market for such services. It discusses global consumption, the variety of firms supplying the market, the nature of international trade in remediation and NLP services, and the factors that influence demand for these services. The second part describes the various activities included in remediation, such as water remediation; soil and site remediation; remediation of brownfields, buildings and structures; and the methods and technologies used to provide nature and landscape protection.

Market Structure

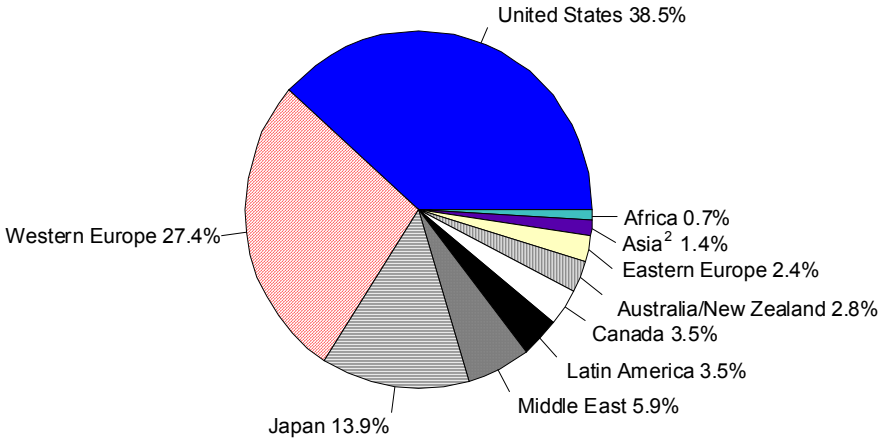
Global Consumption

In 2001, remediation services accounted for an estimated 10.5 percent of the $279-billion worldwide environmental services market.[1] The United States is the world's largest market for these services, accounting for $11.1 billion, or 39 percent, of global consumption in 2000 (see figure 2-1). Other key markets for such services included Western Europe and Japan, which respectively accounted for 27 percent and 14 percent of the global market for remediation services in 2000.[2] Although the largest European markets for remediation services are found in Western Europe, remediation markets in Eastern European countries could grow rapidly as a result of past environmental damage and rising environmental standards stemming from the

[1] Estimated worldwide remediation and environmental services revenue are available only through 2001; country-specific data are available only through 2000. EBI, data provided via e-mail correspondence with USITC staff, received July 31, 2003.

[2] Environmental Business International (EBI), *The Global Environmental Market by Region, 2000*, data provided via e-mail correspondence with USITC staff, received July 31, 2003.

Figure 2-1
Remediation services:[1] Global market, 2000



Total revenues = $28.7 billion

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.
[2] Does not include Australia, Japan, or New Zealand.

Source: EBI, *The Global Environmental Market by Region, 2000*, attachment to an e-mail message, received July 31, 2003.

recent accessions to the European Union.[3] Interest in site redevelopment is also expected to spur the remediation market in Europe, as well as in the United States.[4]

Suppliers of Services

It is misleading to think of a "remediation services sector" consisting of firms that produce more or less identical services in competition with each other. Firms that provide remediation services vary markedly in terms of size and degree of specialization. At one extreme, large construction and civil engineering firms may perform remediation activities as one component of a larger project, such as a brownfield redevelopment. At the other extreme, a local construction firm with a single piece of equipment may perform one distinct task, such as removing an underground storage tank from an abandoned gasoline station. At an intermediate level, project management firms may act as subcontractors for larger firms and/or mediate the relationship between a local supplier and a government purchaser of

[3] Air and water pollution abatement services may take precedence over remediation and NLP services. Industry representative, interview by USITC staff, California, May 13, 2004.
[4] As urban development expands and as buildable sites become more scarce, an increasing number of current and former contaminated sites will be in closer proximity to residential and commercial zones, and thus will have to comply with urban, residential environmental standards. Industry representative, interview by USITC staff, Delaware, May 11, 2004.

services.[5] Relationships between large and small firms providing remediation services are complex. In some cases firms may compete with each other for projects. In other cases the same firms may cooperate on projects through contracting and subcontracting relationships. Frequently, firms participate in projects as consultants or project managers as opposed to direct provision of services such as water or soil cleanup.

One source reports that in 2001, approximately 53 percent of U.S. demand for remediation services was served by 15 firms with $100 million or more in remediation revenues apiece, 26 percent by 59 firms with between $20-$100 million in remediation revenues apiece, and 21 percent by nearly 600 smaller firms.[6] There is a significant overlap between firms providing remediation and NLP activities and firms providing other environmental services, such as water and wastewater treatment and solid and hazardous waste disposal, as well as non-environmental services such as construction, civil engineering, real estate, and insurance services.

One consequence of the above considerations is that few firms may see themselves as beneficiaries of policies designed to liberalize "environmental remediation and NLP services," as they are defined in this study. This observation pertains to both national deregulation and trade agreements. However, policies to deregulate or liberalize more traditional sectors related to remediation, such as civil engineering or insurance, may in fact assist the ability of U.S. services firms to offer such services in foreign markets.

Some evidence of the degree to which large firms perform remediation services as part of a diversified portfolio of service activities can be found by analyzing the data compiled by Environmental Business International (EBI). Of the top 50 environmental companies worldwide, 13 are also among the top 50 providers of remediation services in the United States.[7] None of the 13 firms appearing on both lists is identified as having remediation as their primary activity. Elsewhere, the same source reports that for eight of the thirteen firms, gross revenues for remediation in the U.S. market accounted for less than 30 percent of total environmental revenues in 2001; for three other firms, remediation revenues appeared to be between 30-70 percent of total environmental revenues; while for the remaining two firms gross U.S. remediation revenues exceeded 70 percent of total environmental revenues. Moreover, total revenues for at least some of the firms in question likely included a substantial component of non-environmental goods and

[5] Industry representatives, interviews with USITC staff, Pennsylvania, May 11-12, 2004.

[6] EBI, *Environmental Business Journal*, vol. XV, No. 7/8, 2003, p. 3.

[7] EBI, *Environmental Business Journal*, vol. XV, No. 7/8, 2003, p. 3, and vol. XV, No. 11/12, 2003, p. 3. Other figures in this paragraph are USITC calculations. Of the 50 largest environmental firms worldwide, 22 are U.S. firms, including 9 of the top 20. Of the 50 largest suppliers of remediation services to the U.S. market, 49 are U.S. firms. The other is ARCADIS Geraghty and Miller, Inc., which is based in the Netherlands.

services. As a whole, these thirteen firms accounted for $4.6 billion, or 46.8 percent, of revenues in the site remediation segment of the U.S. market in 2001.[8]

Worldwide, French firms Veolia Environment and Suez[9] are two of the larger providers of environmental services, although like many other large multinational environmental firms, remediation represents a very small percentage of the firms' overall sales revenue. Other leading environmental services firms based in Europe that provide remediation and NLP services include Brezillon (a subsidiary of Bouygues, France), Sondalp (France), A.S.A. Abfall Service AG (Austria), Arcadis (Netherlands), REO-RWE AG (consortium based in Germany), and Marius Pedersen (Denmark). Based on U.S. market share data for 2003, leading U.S.-based remediation and NLP services firms included Shaw Environmental & Infrastructure, Inc., Bechtel Group Inc., Parsons, Fluor Daniel Inc., CH2M Hill, URS Corp. (formerly Dames & Moore), and Washington Group International.[10]

Nature of Trade and Trade Impediments

Remediation and NLP services are usually provided to foreign clients through affiliates located in or near the client's home or host market. Many remediation firms that establish offices in foreign countries initially develop strategic alliances with local partners or invest in local subsidiaries to demonstrate their long-term commitment. Local firms in developing-country remediation markets often seek partnerships with more established firms so as to acquire industry knowledge and experience. For example, to gain technical expertise and access to more extensive resources, Mexican firms often partner with U.S. firms to provide remediation services.[11] Additionally, U.S. firms often gain a foothold in foreign markets by following their U.S.-based clients overseas and then hiring local staff that have knowledge of, and contacts within, industry and government.[12]

Occasionally, providers of remediation and NLP services find that operating abroad or establishing a foreign office is not feasible. Circumstances that may limit foreign participation in certain markets include intellectual property infringement, non-transparent or discriminatory certification procedures administered by local accreditation entities, and corruption. Measures affecting related sectors – such as licensing requirements for architects or engineers – may act as barriers to the provision of remediation or NLP services in foreign markets. This is in addition to factors affecting demand for the services of foreign and domestic firms alike, such as weak enforcement of environmental regulations, limited remediation funding, and

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[8] Ibid.

[9] Large firms such as these often participate in the remediation market through considerably smaller subsidiaries.

[10] Shaw acquired Stone & Webster, Inc. and The IT Group in 2000 and 2002, respectively. "The Shaw Group Completes Acquisition of Assets of Stone & Webster," press release, July 17, 2000, found at *http://www.shawgrp.com/,* retrieved Sept. 27,2004; and "Shaw completes Acquisition of Assets of the IT Group, Inc.," press release, May 3, 2002, found at *http://www.shawgrp.com/*, retrieved Sept. 27, 2004.

[11] Industry representative, interview by USITC staff, Mexico City, Apr. 22, 2004.

[12] Some U.S. firms operating abroad report difficulty finding local workers with required skills and experience. Industry representative, interview by USITC staff, California, May 11, 2004.

underdeveloped insurance industries.[13] Other hindrances include unfamiliar local regulations and business rules.[14] When operating abroad, multinational firms reportedly must compete to a greater extent on price, rather than quality, because it is reportedly difficult to convince local clients that there is a difference between the services provided by competing firms. Industry sources indicate that this practice can reduce profits or render projects financially unattractive.[15] In addition, countries vary as to what level of residual contamination is acceptable after remediation services have been performed, which can complicate the estimation of project costs and, hence, appropriate bids.[16] The provision of cross-border services may also be limited by difficulties in transferring or acquiring the necessary equipment.[17] In cases where business opportunities exist, but a permanent office is not practical or economically feasible, firms often elect to enter the foreign market on a limited basis.[18] A common arrangement under these circumstances would be to send engineers overseas to direct the performance of local workers.[19]

U.S. environmental consulting firms that perform remediation services internationally reportedly are strongest in the assessment and management phases, which entail evaluating the extent of contamination problems and developing guidelines and treatment methods for addressing those problems.[20] An industry representative indicates that outside the United States, such consulting work is frequently performed by government agencies, so foreign firms have relatively less experience in this industry segment. With regard to the provision of actual remediation services, local firms are generally more experienced and competitive. Outside the United States, demand for NLP services can usually be met by local companies, so there are reportedly few opportunities for U.S. firms. [21]

Factors Influencing Demand

Degree of Economic Development

A substantial body of research has established that the demand for environmental goods and services is disproportionately greater in high-income countries than in middle- and low-income countries. Low-and-middle-income countries accounted for approximately 19 percent of global gross product in 2001 but no more than 11

[13] Industry representative, interview by USITC staff, California, May 11, 2004.
[14] Ibid.
[15] Industry representative, interview by USITC staff, Mexico City, Apr. 23, 2004.
[16] Ibid.
[17] Ibid.
[18] Short term assignments also serve to avoid longer-term issues such as residency visas. Industry representative, interview by USITC staff, California, May 11, 2004.
[19] Industry representative, interview by USITC staff, Delaware, May 12, 2004.
[20] Industry representative, interview by USITC staff, California, May 11, 2004.
[21] Ibid.

percent of demand for global environmental services.[22] Much of the existing demand for environmental services in middle- and low-income countries is concentrated in basic services such as water and wastewater treatment. Following the historical sequence observed in the United States, developing countries are more likely to devote resources first to environmental issues that have an immediate impact on public welfare, such as water and air quality, than to issues with a less immediate impact, such as site contamination. For example, in the United States basic regulations for prevention of water and air pollution, which were first established in 1948 and 1955 respectively, predated passage of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for remediation, which occurred in 1980.[23]

Regulation

As with other environmental services, the demand for remediation services is driven to a large extent by regulation. In the case of water and soil resources that may have been contaminated over time by multiple users, profit-based motivations for cleanup are likely to be weak in the absence of policies mandating ambient water or soil quality standards, or specifically requiring site cleanup. The most well-known of these policies is the U.S. Superfund program,[24] which has influenced the subsequent development of remediation policies in other countries according to industry representatives. In particular, it is perceived that regulatory specifications and standards, including technological standards originated by the U.S. Environmental Protection Agency, have been replicated in detail in the regulatory codes and practices of many countries. However, industry representatives indicate that other countries often do not modify EPA regulations for local circumstances, or have limited technical capacity to carry out testing or other specified activities, leading to weak enforcement.[25]

Regulation and enforcement at both the national and subnational levels can be important drivers of demand for remediation services. A 2003 survey of remediation executives and officials found that state enforcement activity and federal EPA enforcement activity were at the top of a list of nine potential market drivers, mentioned by 84 percent and 64 percent of respondents, respectively. Enforcement activity outranked such potential market drivers as economic growth rates, funding levels at the departments of Defense and Energy, cradle-to-grave liability concerns,

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[22] USITC calculations. The share of global GDP in low-, middle-, and high-income countries is derived from World Bank, *World Development Indicators*, found at *http://devdata.worldbank.org/dataonline/* on June 9, 2004. The share of global environmental purchases made in lower-income countries is calculated from EBI, *Environmental Business Journal*, vol. XV, No. 11/12, 2003, p. 2. EBI only provides discrete data for certain countries and world regions. Thus, for the purposes of this calculation, "high-income" includes the United States, Western Europe, Japan, Canada, and Australia/New Zealand while "low/middle income" includes the rest of the world.

[23] U.S. Environmental Protection Agency (EPA), *Introduction to Laws and Regulations*, found at *http://www.epa.gov/epahome/lawintro.htm*, retrieved Aug, 7, 2004.

[24] See chap. 3 on the United States.

[25] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

and brownfields initiative programs, which were mentioned by 51 percent, 44 percent, 42 percent, and 27 percent of respondents, respectively.[26]

Funding and Liability

The source of funding for remediation projects is an important consideration in the rate and volume of projects that are undertaken and completed. The main distinction between the policy emphasis of different countries is the relative emphasis placed on government funding and private funding. There is a widespread perception that requiring polluting parties to pay for the cost of cleanup (the so-called "polluter pays" principle) is fair and provides a deterrent to further contamination. Implementation of this principle involves identification of responsible parties, which can be expensive and time-consuming, particularly if it involves litigation. In many cases it may be impossible to identify the original polluters, creating an incentive for assigning legal responsibility to certain parties based on their ability to pay. It may also be the case that, even if the responsible party or parties can be identified, the actual cost of remediation greatly exceeds the resources available to those parties, so that implementing the "polluter pays" principle would not generate sufficient funds to remediate the contaminated sites.[27]

Private payers for remediation services face a substantial amount of uncertainty.[28] They have an interest both in determining a maximum level of costs and in ensuring that the final expenditure produces a certificate of regulatory compliance. In the early stages of a remediation project, costs may be uncertain to several orders of magnitude. The role of insurance companies,[29] accountants, and environmental consultants in helping firms to minimize and manage the financial and regulatory risk associated with remediation expenditures is thus extensive. Since it is desirable to fix costs as early as possible in the process, firms are often willing to pay substantially more than might be technologically necessary if the total level of remediation costs are guaranteed.[30] While there is an emerging market for environmental insurance for remediation problems, most firms tend to cover their own financial liabilities with regard to environmental contamination, as policies are typically expensive and have deductibles as high as 50 percent of total costs of remediation. There may also be uncertainty regarding which environmental remediation liabilities are covered by insurance policies, particularly when the issuance of the policy and the contamination

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[26] *Environmental Business Journal*, vol. XV, No. 7/8 (2003), p. 5.

[27] For further background see G. William Page, *Contaminated Sites and Environmental Cleanup: International Approaches to Prevention, Remediation, and Reuse* (San Diego: Academic Press, 1997), pp. 75-87.

[28] Industry representatives, interviews with USITC staff, Pennsylvania, May 11-12, and industry representative, telephone conference call with USITC staff, May 18, 2004.

[29] For a more detailed discussion of the market for environmental insurance, see Appendix C.

[30] In the *Environmental Business Journal* survey (cited above), 70 percent of respondents identified "liability protection" in general as an important business challenge. The same point arose frequently in the industry interviews conducted for this study.

of the site both occurred a number of years ago. Court decisions have from time to time modified the coverage of policies.[31]

Government funding of the remediation of sites that were operated by the private sector when contamination occurred is motivated by a different philosophy than the "polluter pays" principle. Government funding has the advantage that funding need not be contingent on the identification of responsible parties, or on the resources available to the responsible parties. Governments can be a significant source of funding for remediation projects. For example, in the United States, the Superfund appropriation exceeded $1 billion in every year during 1987-2003 (figure 2-2).[32] In those cases where the original polluter is an agency of government, a government commitment to remediation can provide a substantial source of funds. EBI, which provides comparable data on government and non-government spending in site remediaion, indicates that services sold to the Departments of Defense and Energy alone accounted for $2.89 billion dollars, or 46 percent, of the U.S. market for site remediation in 2002.[33] Remediation work for the Department of Energy, which was valued at $1.86 billion dollars in 2002, is reportedly the result of legacy contamination associated with weapons programs.[34]

Activities and Technology[35]

This section provides an overview of some of the more common methods and technologies used to remediate bodies of water, soil and sites, and brownfields, buildings, and other structures, and discusses those activities that may cause contamination at such locations. This section also includes a brief overview of those services provided to protect nature and landscape.

Water Remediation

Remediation of water environments typically involves the reduction of certain categories of pollutants arising, in most cases, from human activity. The goal of water remediation is to improve the quality of water in order to make it suitable for a particular use, such as swimming, fishing, or other recreational or non-recreational

[31] Industry representative, interview with USITC staff, Pennsylvania, May 11-12, 2004. See also Appendix C.

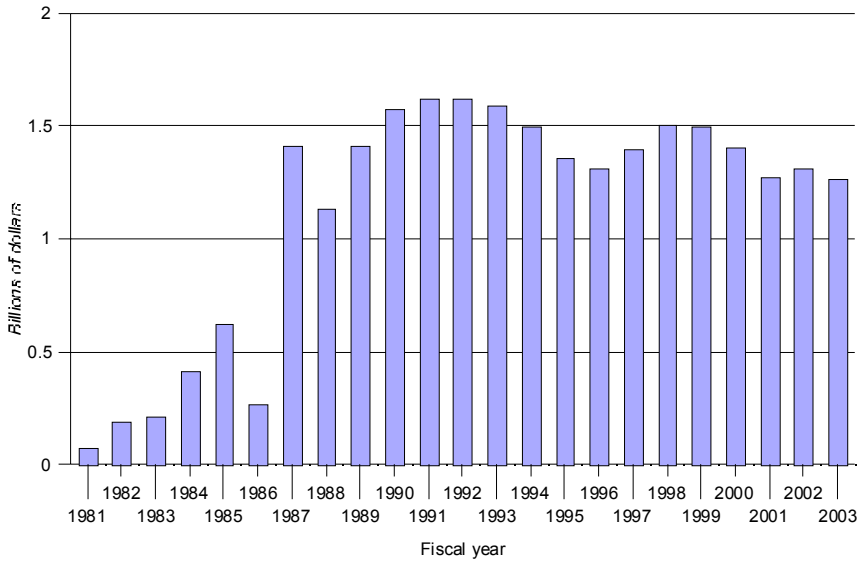
[32] EPA, Superfund Budget History, found at *http://www.epa.gov/superfund/action/process/budgethistory.htm*, retrieved Aug. 6, 2004.

[33] *Environmental Business Journal,* vol. XV, No. 9/10, 2003, p. 1.

[34] Industry representative, telephone interview by USITC staff, June 1, 2004.

[35] This section relies heavily on Jerry A. Nathanson, *Basic Environmental Technology: Water Supply, Waste Management, and Pollution Control*, 4th edition (Upper Saddle River, New Jersey and Columbus, Ohio: Prentice-Hall. 2003), Chapters 5 and 12.

Figure 2-2
Superfund appropriations, fiscal years, 1981-2003



Source: U.S. Environment Protection Agency (EPA), "Superfund Budget History," found at *http://www.epa.gov/*, retrieved, Aug. 6, 2004.

uses, or in order to avoid further water or soil contamination.[36] Water pollutants can include pathogenic (disease-causing) organisms, oxygen-demanding substances (which can cause eutrophication and algal blooms), plant nutrients, toxic organics, inorganic chemicals, sediment, radioactive substances, heat, and oil.[37] Such

[36] Standards for water quality in such bodies are thus distinct both from effluent standards which pertain to water quality of, e.g., treated sewage effluent emerging from sewage plants, and from drinking water standards which pertain to water quality of water emerging from a water treatment plant and piped to households. Drinking water standards are generally higher than surface water standards due to the different uses to which they are put. There is an interaction between the three types of water standards, however. High effluent standards may limit the amount of pollution that is released into bodies of water, reducing the need for remediation. High surface water quality in rivers, streams, lakes, and reservoirs, as well as successful remediation of surface waters, may facilitate treatment of raw water drawn from rivers and reservoirs by reducing the amount of contaminants to be removed by water treatment plants. However, the fact that many substances dissolve readily in water implies that "natural" water inevitably contains significant quantities of dissolved substances, which need not always be removed to make the water fit for a particular use. Nathanson, *Basic Environmental Technology*, ch. 5.

[37] Nathanson, *Basic Environmental Technology*, pp. 124-125.

pollutants can come from either *point sources* (e.g., a single factory or plant which releases effluent through a pipe)[38] or *dispersed* or *nonpoint sources* (e.g., runoff from farms, roads, and construction projects).[39]

Contamination of rivers and streams is typically due to effluent discharges and erosion. Although there are some remediation services associated with the cleanup of rivers and streams, such as those involved in the cleanup of oil spills and other environmental accidents, contamination in such bodies of water is mitigated through natural dilution and the management of pollutants prior to discharge. Lakes and groundwater do not benefit from natural dilution to nearly the same extent as rivers and streams. Management of water withdrawals from, and effluents into, lakes must take into account seasonal cycles which are characterized by thermal stratification in the summer, stagnation in the winter, and overturn (thermal mixing) in the spring and fall.

Groundwater pollution can come from a variety of sources, including leachate[40] from waste dumps and landfills and seepage from septic systems. Such pollution may be exacerbated by improper storage or accidents.[41] Contamination of coastal groundwater can take place when withdrawal of water from coastal wells causes intrusion of saline water from the ocean into the water table. Management of groundwater pollution may require testing to determine the location of permeable and impermeable strata of underground rock and the location of waste plumes from septic systems or other sources of contamination. Since the natural purification of groundwater takes place at a much slower rate than for rivers and streams, prevention of groundwater pollution tends to be cheaper and more effective than cleanup. There are a variety of *ex situ* technologies for remediating groundwater once it does become polluted. So-called "pump and treat" methods involve containing the area of contamination, extracting the water, treating it, and reintroducing it into the aquifer. There are also *in situ* remediation technologies which involve injection of steam or chemical agents into the aquifer.[42]

Accidental discharges of oil resulting from tanker spills or offshore well blowouts have harmful effects on ocean life and on recreational use of beach areas. During 1975-2000 there were 63 oil spills from tankers involving either the discharge of at least 25,000 metric tons of oil, indemnities of over $1 million, or both.[43] Of these,

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[38] For example, electrical power plants can be significant point sources of water-borne waste heat produced during electricity generation. This heat can interfere with populations of commercially important fish species. Sewage treatment plants are another point source of effluent.

[39] Non-point effluent can come from several sources, such as farmland runoff -- which can contain fertilizers, pesticides, and animal wastes -- and seepage from septic tanks. Urban runoff introduces motor oil, litter, de-icing salts, organics, and heavy metals, while construction site runoff is heavy in sediments such as eroded soil, silt, sand, and clay.

[40] Leachate is contaminated liquid by-product of solid waste that has percolated through the soil or some other medium.

[41] Sanitary landfills constructed to modern regulatory standards generally contain a liner to act as a barrier to groundwater contamination.

[42] Jay Lehr, Marve Hyman, Tyler E. Gass, and William J. Seevers, *Handbook of Complex Environmental Remediation Problems* (New York: McGraw-Hill, 2002), pp. 1.33 to 1.84.

[43] *OECD Environmental Data Compendium 2002: Risks* (Paris, OECD), Table 6.1.

five involved U.S.-flag tankers and seven affected U.S. waters or coasts.[44] While oil spills have occurred in a wide variety of locations, there has been a significant number of such spills on the Atlantic coast of Europe, from Scotland south to Portugal. As with other types of water pollution, prevention is easier than cleanup. For example, improvements in tanker construction and operation have caused the annual amount of oil spillage to decline markedly, from an average of 313,000 tons per year during 1970-1979 to 31,000 tons per year during 1995-2001.[45] However, the amount of oil spilt each year is volatile and influenced by individual large incidents. Technologies for containment and cleanup include physical barriers, mechanical collection of spilled oil, bioremediation (the use of bacteria to break down oil), and chemical dispersants such as detergents, although the use of such dispersants may have additional negative environmental effects.

Soil and Site Remediation

Much soil and groundwater contamination has its origin in the operation of industrial facilities prior to the establishment of modern regulations concerning hazardous wastes. Before the onset of modern regulations, methods of hazardous waste disposal included,[46] *inter alia*, industrial lagoons, unlined dumps, and waste piles.[47] The historical inventory of sites requiring cleanup is very large, and varies from location to location depending on the degree of industrial activity, the length of time that hazardous waste regulation has been in place, and the extent of previous cleanup. For example, in the United States, sites may range from relatively large sites that may have housed steel mills or other industrial plants to smaller sites that may have housed gas stations or dry cleaning establishments. There are a large number of contaminated sites arising from the activity of producing "town gas" (methane) for street lighting, domestic hot water heating, and cooking.[48] There are also a large number of sites that require remediation due to contamination from gasoline or other petrochemicals. Many of the sites requiring remediation in Eastern Europe and the former Soviet Union arise from more recent industrial or military activity. Contaminated sites arising from military operations account for a significant share of

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[44] The largest oil spills affecting U.S. waters, each of which involved about 35,000-40,000 metric tons of oil, are the *Corinthos/E.M. Queeney* (U.S./Liberian flag), January 31, 1975, off the coast of Delaware; the *Burmah Agate* (Liberian flag), November 1, 1979, off the coast of Texas; and the *Exxon Valdez* (U.S. flag), March 24, 1989, off the coast of Alaska. In other parts of the world, at least four tanker spills have exceeded 200,000 metric tons of oil.

[45] Calculated from data in International Tankers Oil Pollution Federation Ltd., *Accidental Tanker Oil Spill Statistics*, p. 3, found at *http://www.itopf.com/datapack2002.pdf,* retrieved on May 7, 2004.

[46] The present tense is employed here because much of the developing world is essentially still in a pre-regulatory state.

[47] As distinct from modern landfills which generally have an underground liner.

[48] An estimated 11,000 manufactured-gas plants (MGPs) were operating in the United States in 1921. They produced combustible gases from coal and oil, and were economically important from approximately 1850 to 1950. Their byproducts were recycled as chemical feedstock, fuels for heating production ovens, or disposed of as wastes, depending on economic considerations. By the early 1940s natural gas became more economical than MGP gas, leading to large-scale closure, abandonment or retrofit of MGP facilities. The EPA currently estimates that there are between 3,000 and 5,000 contaminated MGP sites. See Lehr et al., *Handbook of Complex Environmental Remediation Problems* (New York: McGraw-Hill, 2002), p.10.2.

the total inventory of land sites requiring remediation and have made a substantial contribution to the accumulated expertise of the firms in the industry. Pollutants at such sites include fuels and radioactive materials.

Prior to the cleanup of a contaminated land site, sampling and testing of contaminants at the site may be carried out though a variety of methods. Soil gases can be tested by inserting a portable photoionization detector into the ground with a steel sampling rod, or by burying a glass soil-gas sampling tube suspended from a retrieval wire. Small soil samples may be extracted for testing with scoops, hand augers, or other tools, while deeper samples (exceeding about 1.5 meters) are obtained by drilling. Groundwater can be sampled at depths up to 60 meters through the direct push method, which uses a truck-mounted hydraulic press with a slide hammer to insert a small bailer or sample vial into the ground. Once contamination at a groundwater site is determined to be significant, the level of contamination can be measured on an ongoing basis using a monitoring well. Monitoring wells contain a mesh screen at the bottom which admits groundwater and pollutants but not larger soil particles. Special procedures are used to sample the contents of abandoned drums or tanks, which pose a risk of sudden release of toxic vapors or liquids, fires, or explosions.

A variety of techniques are used in the remediation of land and soil.[49] Waste material, including contaminated soil, can be physically removed from the site and carried over distances to a hazardous waste landfill. This operation, which is sometimes referred to as "dig and dump," can often be accomplished with standard earth-moving equipment, including backhoes or dredging equipment for contaminated ponds and lagoons. Removal and transport of buried drums and tanks requires more specialized equipment. Soils can be temporarily removed and then returned to the same site after construction of a lined landfill to reduce leachate. Permanent surface or subsurface barriers such as steel walls may be employed if there is a solid, impermeable substrate of rock for them to rest on. Finally, *in situ* bioremediation employs the biological action of microorganisms to convert contaminants into harmless substances. In some cases, bioremediation involves the introduction of bacteria into the soil, while in others it involves enhancing the metabolic environment for indigenous bacteria by adding oxygen through soil aeration[50] or other nutrients such as nitrogen and phosphorus.

Remediation of Brownfields, Buildings, and Structures

Brownfields are unused or underutilized sites at which the presence, or perceived possibility, of low-level contamination may complicate redevelopment or reuse.[51] Brownfields are often in urban areas that were formerly economically active, and thus may occupy potentially valuable property. The initial stages of a brownfield remediation may involve both testing and historical research. While some information may be available on the uses of a particular site by former owners or tenants, complete information on releases (e.g. leakage of containers in an abandoned

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[49] Nathanson, *Basic Environmental Technology*, pp. 388-402.

[50] Air may be inserted into the ground either above the water table, a process known as *bioventing*, or below the water table (*air sparging*).

[51] EPA, EPA Brownfields Homepage, found at *http://www.epa.gov/swerosps/bf/index.html*, retrieved Aug. 8, 2004.

warehouse) is generally not available. Methods of soil and water remediation at brownfield sites vary according to the type and location of contamination.

In some cases, buildings and structures in current use may require remediation either of the structure or the adjoining property. One example of such remediation is asbestos removal in older buildings. Furthermore, large civil engineering projects to renovate infrastructure, such as roads, bridges, airports, water and sewage systems, and rail and mass transit systems, may uncover sites needing remediation. Such activities may then be incorporated into the overall project.

Nature and Landscape Protection

NLP services are only occasionally marketed on a stand-alone basis, and are more commonly bundled with other remediation, environmental, or real estate development services. Examples of NLP services may include the creation of a wetland as a method of secondary or tertiary water purification in a stream remediation project; the establishment of greenbelts, wetlands, or other open areas as part of a real estate development project, which can be done whether or not the land required remediation prior to development; erosion prevention activities,[52] such as those associated with construction projects; and services provided by private contractors to national or subnational parks, wildlife refuges, fisheries, or other public entities associated with nature and landscape protection in support of their mission.

[52] Erosion of soils and sediments in many cases can be prevented by the construction of barriers made of soil, mulch or hay, temporary grass cover, diversion channels, or artificial materials, such as fencing, around construction sites.

CHAPTER 3
UNITED STATES

Introduction

The U.S. market for remediation and nature and landscape protection services is the largest in the world. It is mostly mature, competitive, and highly regulated. Interest in brownfields redevelopment has largely surpassed Superfund projects as the primary stimulant of new demand in the U.S. remediation services market. In recent years, federal legislation and regulations affecting such services have largely refined and clarified provisions that have been in place for more than a decade. The United States is a net exporter of remediation and related services.

This chapter presents an overview of the U.S. market's size, key suppliers and consumers, and regulation and principal technologies; discusses the factors affecting demand for remediation and nature and landscape protection services; addresses the nature and extent of U.S. trade and investment in these services industries; and discusses the future outlook for the U.S. market for remediation and nature and landscape protection services.

Market Overview

In 2002, U.S. remediation services firms[1] generated revenues totaling $12.1 billion[2] and employed 112,000 workers (table 3-1), according to EBI. Using different methodologies, Farkas Berkowitz & Company estimated the U.S. market for remediation consulting and engineering services at $3.8 billion in 2002,[3] while the Bureau of the Census reported 55,618 employees in establishments of the

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report, though it does not include activities defined as nature and landscape protection services. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.

[2] EBI, data provided by e-mail correspondence with USITC staff, June 25, 2004.

[3] Farkas Berkowitz & Company, "Environmental and Infrastructure Markets Look Past 2003 For Turnaround," press release, May 7, 2003, found at *http://www.farkasberkowitz.com/*, retrieved Aug. 5, 2004.

Table 3-1
Selected characteristics of the U.S. remediation and nature and landscape protection services markets

Item	Characteristics
Market size (2002)	• Remediation, including cleanups at military installations and nuclear facilities: $12.1 billion;[1] 3,500 firms[2] (an additional $4.5 billion in remediation-related services was supplied by consulting and engineering firms).[3] • Nature and landscape protection: about $1.3 billion; approximately 650 to 750 firms[4] (an additional $1.0 billion in nature and landscape protection services was supplied by consulting and engineering firms).[3]
Employment (2002)	• Remediation: 112,000 employees[5]
Trade (2002)	• Remediation: $460 million (exports), $400 million (imports)[6]
Characteristics of remediation segment	• Private-sector firms are the principal providers of remediation services in the United States. The market is not highly concentrated, as the largest 15 firms account for about one-half of remediation services revenues, while about 85 percent of firms are considered small[7] and account for about 20 percent of revenues.[3]
Characteristics of nature and landscape protection segment	• Private-sector firms are the principal providers of nature and landscape protection services in the United States. The market is fragmented, and principally consists of firms generating less than $2 million annually in such services.[4]
Key market participants (and location of parent)	• Remediation: Shaw (U.S.), CH2M Hill (U.S.), URS Corp (U.S.), Parsons (U.S.), Bechtel (U.S.),[8] Fluor[8] (U.S.).[3] • Nature and landscape protection: Tetra Tech (U.S.), Battelle Memorial Institute (U.S.), Science Applications International Corporation (SAIC) (U.S.), Parsons (U.S.), CH2M Hill (U.S.), and AMEC (U.K.).[4]

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the cleanup of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1. EBI, data provided via e-mail correspondence with USITC staff, June 25, 2004.

[2] EBI, *Environmental Business Journal*, vol. 16, No. 5/6, 2003, p. 5.

[3] EBI, data found at *http://www.ebiusa.com/*, retrieved May 25, 2004.

[4] EBI, *Environmental Business Journal*, vol. 16, No. 1/2, 2003, p. 3.

[5] EBI, data found at *http://www.ebiusa.com/*, retrieved May 25, 2004. Discrete data on employment and trade in the NLP services industry are not available.

[6] EBI, data provided via e-mail correspondence with USITC staff, June 25, 2004. Discrete data on employment and trade in the NLP services industry are not available.

[7] EBI considers small firms to be those generating less than $20 million in annual revenues. EBI, data found at *http://www.ebiusa.com/*, retrieved May 25, 2004.

[8] These firms provide remediation services primarily or solely to government clients.

Table 3-1—*Continued*
Selected characteristics of the U.S. remediation and nature and landscape protection services markets

Item	Characteristics
Key legislation	• Remediation: Resource Conservation and Recovery Act (RCRA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended; Toxic Substances Control Act (TSCA).[7]
	• Nature and landscape protection: National Environmental Policy Act (NEPA); Endangered Species Act (ESA); Clean Water Act (CWA).[8]
Regulatory authorities	• U.S. Environmental Protection Agency (EPA); U.S. Army Corps of Engineers; U.S. Coast Guard; Departments of Agriculture, Commerce, Defense, Energy, Homeland Security, Housing and Urban Development, and Interior; and state and local government environmental agencies and departments of natural resources and development.[9]
GATS commitments	• U.S. commitments grant full market access and national treatment for the provision of remediation and nature and landscape protection services through cross-border supply (mode 1), consumption abroad (mode 2), and commercial presence (mode 3). However, these commitments only apply to a specified set of environmental activities.[10]

[7] RCRA (1976): 42 U.S.C. 321 et seq.; CERCLA (1980): 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (1986) and in 2002; TSCA (1976): 15 U.S.C. s/s 2601 et. seq.

[8] NEPA (1969): 42 U.S.C. 4321-4347; ESA (1973): 7 U.S.C. 136; 16 U.S.C. 460 et seq.; CWA (1977): 33 U.S.C. ss/1251 et seq.

[9] U.S. EPA states that it develops and enforces regulations to implement federal environmental laws, and conducts and sponsors research, environmental education, and programs to encourage pollution reduction and energy conservation, as indicated at the EPA website, *http://www.epa.gov/*. Information on activities related to regulation of the subject services by other Federal Government agencies and departments may be found at their respective websites. Information on state and local government agencies may be found at websites maintained by states, counties, and municipalities individually.

[10] General Agreement on Trade in Services (GATS), *United States: Schedule of Specific Commitments*, GATS/SC/90, Apr. 1994. Activities expressly included in the U.S. environmental services commitments, as stated in footnote 19, are implemention and institution of new or existing systems for environmental cleanup, remediation, prevention, and monitoring; on-site environmental investigation, evaluation, and monitoring; sample collection services; implementation of environmental quality control and pollution reduction services; maintenance and repair of environment-related systems and facilities not already covered by the U.S. commitments on maintenance and repair of equipment; training on-site or at the facility; and consulting related to these areas.

Table 3-1—*Continued*
Selected characteristics of the U.S. remediation and nature and landscape protection services markets

Item	Characteristics
Membership in multinational and bilateral conventions and agreements	• Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);[11] Convention on Wetlands (Ramsar Convention);[12] Convention on the Prevention of Marine Pollution (London Convention);[13] United Nations Convention to Combat Desertification;[14] Convention Concerning the Protection of the World Cultural and Natural Heritage;[15] Framework Convention on Climate Change;[16] North American Agreement on Environmental Cooperation (side agreement under NAFTA);[17] Memorandum of Understanding Establishing the Canada/Mexico/United States Trilateral Committee for Wildlife and Ecosystem Conservation and Management;[18] Boundary Waters Treaty of 1909 and various other bilateral agreements with Canada, such as the U.S./Canada Framework for Cooperation in the Protection and Recovery of Wild Species At Risk;[19] various bilateral agreements with Mexico, such as those regarding pollution of the marine environment by discharges of hydrocarbons and other hazardous substances;[20] conventions and agreements concerning the Arctic and Antarctic regions; environmental agreements with countries of the Western Hemisphere, China, India, Japan, the Russian Federation, South Africa, Taiwan, and Thailand; and agreements with other countries or regions with regard to particular mammals, fish, and wildlife.

[11] CITES is an international agreement that became effective in 1975. The United States is among 164 partner countries as of year-end 2003. Under the agreement, international trade in wildlife is monitored to ensure that principles of sustainable use and management of wild and captive animals and plants are practiced.

[12] The Ramsar Convention is an international treaty, signed in 1971, to which the United States is a party. The treaty provides a framework for action and international cooperation concerning conservation and prudent use of wetlands. For more information, see the Convention's website, found at *http://www.ramsar.org/*.

[13] The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, found at *http://www.londonconvention.org/main.htm*.

[14] The United Nations Convention to Combat Desertification, found at *http://www.unccd.int/convention/ratif/doeif.php*.

[15] For information, see the Convention website, found at *http://whc.unesco.org/*.

[16] For information, see the Framework Convention website, found at *http://unfccc.int*. Although the United States has ratified the Convention, it has not ratified the Kyoto Protocol linked to the Convention.

[17] Text of the environmental side agreement to the NAFTA may be found at the North American Commission for Environmental Cooperation (NACEC) website, *http://www.cec.org/pubs_info_resources/law_treat_agree/naaec/*. The NACEC implements the environmental side agreement of the NAFTA. Its council consists of the administrators of each country's federal environmental agency. For more information, see the NACEC website, found at *http://www.cec.org/who_we_are/*.

[18] The Memorandum of Understanding, signed in 1996, brought together wildlife and ecosystem conservation and management agencies of the three North American countries in order to cooperate in programs of mutual interest. For more information, see the trilateral committee's website, found at *http://www.trilat.org/*.

[19] The Framework, signed in 1997, pledges bilateral efforts toward conserving mutually shared wildlife and ecosystems in order to prevent species from extinction. For more information, see the text of the agreement, found at the U.S. Fish & Wildlife Service website, *http://endangered.fws.gov/canada/framewrk.htm*.

[20] EPA, "U.S./Mexico Border Agreements, Laws, Regulations, Policies, and Procedures Related to Chemical Accident Prevention, Preparedness, and Response," found at *http://yosemite.epa.gov/oswer/*, retrieved June 2, 2004.

remediation service industry as of the week of March 12, 2001.[4] During 1994-2001, remediation firms' revenues increased at a 4-percent average annual rate (figure 3-1).[5] Services related to remediation projects are also supplied by consulting and engineering firms. In 2002, revenues for remediation-related services performed by consulting and engineering firms totaled an additional $4.5 billion.[6] Remediation-related services are also supplied by analytical laboratories, whose revenues generated from remediation projects are not separately reported, but whose revenues from the entire environmental services market totaled $1.2 billion.

Approximately 3,500 private-sector firms[7] and relatively few public-sector entities supplied remediation services in 2002. Using a different methodology, the Bureau of the Census reported 2,186 establishments in the remediation services industry in 2001.[8] The largest remediation firms typically generate most of their revenues from public-sector clients, such as the U.S. Departments of Energy and Defense, or from federal and state environmental agencies that must absorb all or most remediation costs at certain severely contaminated sites where principal responsible parties (PRP) are unknown or unable to pay substantially toward cleanup costs. All four of the largest firms in terms of remediation services revenues – Shaw Environmental & Infrastructure, Bechtel, Parsons, and Fluor (all U.S.-owned) – generated remediation revenues of more than $500 million in 2001 and principally served public-sector customers.[9] However, two of the 10 largest firms – CH2M Hill and URS – each generated at least 55 percent of approximately $360 million in revenues earned through remediation projects from private-sector customers in 2001. Consolidation among large firms has been ongoing in recent years, enabling such firms to continue to serve the public sector and attract a greater number of private-sector clients. Nevertheless, about 85 percent of the remediation firms serving the U.S. market exists as small companies that generate revenues of under $20 million annually.[10]

Large remediation firms supply an array of services, with 23 of the largest 40 firms generating at least 55 percent of revenues earned through remediation projects from the provision of consulting services while most of the remaining large firms generate more of such revenues from construction than from consulting services. Large- and mid-sized firms state that they perform relatively few environmental assessments, except on behalf of established clients who request such services. Most remediation services firms tend to specialize in particular geographic areas or market niches, although large firms tend to serve multiple areas or niches.

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[4] U.S. Department of Commerce (USDOC), Bureau of the Census, 2001 *Country Business Patterns (NAICS)*, data for Industry 56291, Remediation Services, found at *http://censtats.census.gov/*, retrieved Aug. 3, 2004.

[5] EBI, data provided by e-mail correspondence with USITC staff, June 25, 2004.

[6] Ibid.

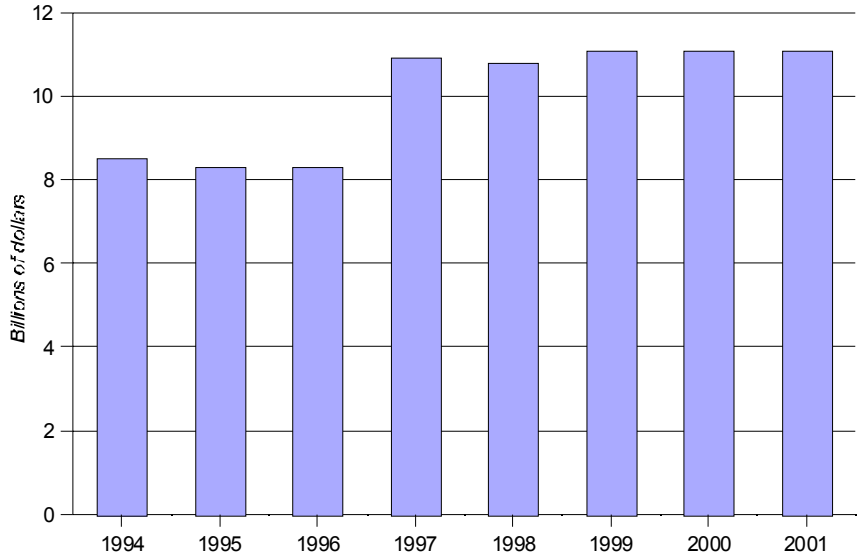
[7] EBI, *Environmental Business Journal*, vol. 16, No. 5/6, 2003, p. 5.

[8] USDOC, Bureau of the Census, 2001 *Country Business Patterns (NAICS)*, data for Industry 56291, Remediation Services, found at *http://censtats.census.gov/*, retrieved Aug. 3, 2004.

[9] EBI, data found at *http://www.ebiusa.com/*, retrieved May 25, 2004.

[10] Ibid.

Figure 3–1
The U.S. market for remediation services,[1] 1994-2001



[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.

Source: EBI, Environmental Business Journal, 8/95, p. 3, vol. XIV, No. 7/8, p. 3, and vol. XII, No. 9/10; U.S. Department of Commerce, Office of Technology Policy, The U.S. Environmental Industry, Sept. 1998, pp. 30-31; EBI, "The U.S. Environmental Industry," attachment to an email message; EBI, The Global Market by Region, 2000, attachment to an email message, recieved July 31, 2003; and EBI, An Examination of Trade in Environmentally Preferable Goods and Services in the NAFTA Region, Spring 2004.

The U.S. Departments of Energy (DOE) and Defense (DOD) were the two principal consumers of remediation services in 1997, but during 1998-2001, privately initiated remediation surpassed DOD work.[11] The Department of Energy remained the top consumer of remediation services during 1997-2001, accounting for 29 percent of remediation revenues in 2001. Remediation revenues from private work increased at an average annual rate of 15 percent during 1997-2001, significantly faster than the 1.3-percent growth rate posted by the overall U.S. site remediation market.[12, 13] Industry sources forecast parity in revenues from private projects and DOE work by 2006.[14]

[11] EBI, "U.S. Site Remediation Market 1997-2006," data found at *http://www.ebiusa/*, retrieved May 25, 2004.

[12] These data exclude remediation services performed in buildings, such as the removal of asbestos.

[13] EBI, "U.S. Site Remediation Market 1997-2006."

[14] Ibid.

The United States is likely the world's largest single-country market for nature and landscape protection services.[15] Approximately 650 to 750 firms generated $1.3 billion in revenues in 2001, with consulting and engineering firms generating an additional $1.0 billion in nature and landscape protection services revenues.[16] The U.S. industry is fragmented. Five of the six largest firms by revenues–Tetra Tech, Battelle Memorial Institute, Science Applications International, Parsons, and CH2M Hill–are U.S.-owned, while AMEC is British-owned.

Federal and state regulation and enforcement have historically been the primary drivers for the creation and growth of the U.S. remediation services market. Key federal legislation includes the Resource Conservation and Recovery Act of 1976 (RCRA)[17] and its amendments, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA),[18] as amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA) and in 2002 by the Small Business Liability Relief and Brownfields Revitalization Act (Brownfields Act),[19] and the Toxic Substances Control Act (TSCA) of 1976.[20]

Subtitles C and I of the RCRA have been important stimulants for the remediation market. Subtitle C of the RCRA established the framework for controls on hazardous waste from generation to disposal, known as cradle-to-grave.[21] The U.S. Environmental Protection Agency (EPA) estimates that 3,800, or 58 percent, of 6,500 treatment, storage, and disposal facilities for hazardous waste subject to the RCRA have begun, or need to begin, to implement corrective action to clean up hazardous releases.[22] At 1,714 such facilities needing the most prompt corrective action, specific short-term cleanup goals have been developed by EPA with

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[15] EBI refers to such services as natural resources management services, defined by EBI as services related to aquatic ecology, biodiversity, dams and power projects, ecological and habitat restoration, the natural resource components of environmental impact statements and environmental assessments, endangered species, fisheries, forestry, natural resource planning and mapping, lakes and rivers, marine ecology, mining restoration, mitigation banking, natural resource damage assessments, natural resource economics, wetlands, watershed management, water resources planning, and related services. EBI, *Environmental Business Journal*, vol. 16, No. 1/2, 2003, p. 1.

[16] EBI, *Environmental Business Journal*, vol. 16, No. 1/2, 2003, p. 3.

[17] 42 U.S.C. 321 et seq.

[18] 42 U.S.C. 9601 et seq.

[19] P.L. 107-118.

[20] 15 U.S.C. s/s 2601 et seq.

[21] U.S. Environmental Protection Agency (EPA), "Section I: Introduction to the Resource Conservation and Recovery Act," found at *http://www.epa.gov/epaoswer/general/orientat/rom1.pdf*, retrieved May 8, 2003.

[22] EPA, "Corrective Action: Background," found at *http://www.epa.gov/epaoswer/hazwaste/ca/background.htm*, retrieved May 18, 2004.

assistance by the states.[23] Subtitle I mandates stringent performance standards for underground storage tanks (USTs) containing hazardous substances and petroleum products, as well as improvements in detection and cleanup of leaks at USTs, in response to the discovery of widespread deterioration and leakage.[24] EPA regulations published in 1988 required owners to close, upgrade, or replace USTs by 1998. EPA estimates that about 683,000 USTs are active in the United States, while 1.6 million are closed.[25] More than 439,000 releases of hazardous or petroleum substances from USTs have been recorded as of September 30, 2003; of these releases, more than 303,000 cleanups have been completed, costing less than $5 million each and leaving a backlog of 136,000, of which about 100,000 cleanups have been initiated. EPA's goal of 18,000 completed cleanups annually is intended to reduce the backlog by about 50 percent by 2007.[26] Many firms providing UST remediation services have exited from this market segment, stating that the more stringent federal and state standards[27] for new storage tank construction and advancements in electronic monitoring of tank performance have made releases less prevalent and will likely result in reduced demand for related cleanup services.[28] Nevertheless, the backlog of old tanks and an unknown number believed to be undocumented, which could fall under the RCRA program, have prompted certain small firms to retain involvement in UST cleanups.[29] States play the dominant role in enforcing both Subtitles C and I

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[23] By 2005, the EPA's goal is to verify and document that 95 percent of the baseline facilities have reduced exposures to humans and that 70 percent of these facilities have mitigated the migration of contaminated ground water. As of May 2004, 74 percent of the baseline facilities had controlled the former, while 63 percent had contained the latter. States and EPA districts are compiling a new baseline list, intended for completion in 2004, to serve as the basis for more stringent clean up goals by the end of FY 2008. EPA, Office of Solid Waste and Emergency Response, *RCRA Corrective Action News*, Mar. 2004, p. 1, found at *http://www.epa.gov/epaoswer/hazwaste/ca/*, retrieved May 18, 2004.

[24] EPA cited a 1984 Congressional Research Service report indicating that an estimated 85 percent of those USTs that were buried prior to 1964 had been made of single-walled steel without corrosion protection. Thus, these USTs are likely leaking or in danger of leaking in the near future. EPA, *Underground Storage Tanks: Building On The Past To Protect The Future*, publication No. EPA 510-R-04-001, Mar. 2004, p. 15, found at *http://www.epa.gov/swerust1/pubs/20annrpt.pdf*, retrieved May 20, 2004.

[25] EPA, Office of Solid Waste and Emergency Response, memorandum from Cliff Rothenstein, Director, Office of Underground Storage Tanks, "FY 2003 Semi-Annual End-of-Year Activity Report," Nov. 25, 2003, found at *http://www.epa.gov/*, retrieved Apr. 29, 2004; and EPA, *Underground Storage Tanks: Building On The Past To Protect The Future.*

[26] EPA, *CleanupNews 2*, issue 15S, Feb. 2004, pp. 2-3, found at *http://www.epa.gov/compliance/resources/newsletters/cleanup/cleanupnews.html*, retrieved Apr. 9, 2004.

[27] Since 1990, EPA has approved UST clean-up implementation programs submitted by 33 states, the District of Columbia, and Puerto Rico. Virtually all remaining states implement distinct UST programs under cooperation agreements with EPA. EPA, *Underground Storage Tanks: Building On The Past To Protect The Future*, p. 11.

[28] Industry representatives, interviews by United States International Trade Commission (USITC) staff, Delaware and Pennsylvania, May 11, 2004.

[29] Industry representatives, interviews by USITC staff, Delaware, May 11, 2004.

of the RCRA, as the EPA authorizes most states to implement their own programs upon demonstration that state requirements are at least as stringent as EPA requirements.[30]

CERCLA authorizes federal responses to the release or threatened release of hazardous substances that actually or potentially endanger public health or the environment.[31] The principal responses include short-term, prompt removal actions in imminent life-threatening situations and long-term remedial actions to reduce serious contamination or potential contamination in situations that are not immediately life-threatening. CERCLA provides that parties deemed principally responsible for the contamination (PRPs) are the first to be held liable for cleanup costs.[32] The legislation also established a trust fund[33] to cover instances when cost recovery from PRPs was not possible. Amendments to Superfund legislation in 1986 increased the enforcement responsibility of the states.[34] Further the Brownfields Act, cleared major impediments to significant redevelopment of brownfields[35] by providing liability protection for prospective buyers of brownfield sites, owners with property adjacent to such sites, owners having no part in the contamination, and certain small business owners, and by expanding federal funding authority and assistance to the states to encourage cleanup and revitalization at brownfield sites.

Under CERCLA, about three-quarters of the 45,000 sites assessed since 1980 needed no remediation.[36] Approximately 7,000 short-term removal actions at more than 5,000 sites have occurred since 1980 in response to urgent public health risks, and during 1999-2003, about 290 short-term removal actions occurred each year, on average. Depending on the severity of contamination and the extent of cleanup required in the short term, long-term remediation may or may not be necessary following a removal action.

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[30] EPA, "Section I: Introduction to the Resource Conservation and Recovery Act."

[31] EPA, "CERCLA Overview," found at *http://www.epa.gov/superfund/action/law/cercla.htm*, retrieved May 8, 2003.

[32] About 70 percent of cleanups under CERCLA are funded principally by PRPs. EPA, *PRP Search Manual*, Sept. 2003, found at *http://www.epa.gov/compliance/resources/publications/cleanup/superfund/prpmanual/prp-man-chap1.pdf*, retrieved May 4, 2004.

[33] A $1.6-billion trust fund established under CERCLA for clean up of Superfund sites and financed by taxes and fees on the chemical and petroleum industries was expanded by legislation in 1986 to $8.5 billion, as the number, complexity, and longevity of sites requiring remediation had been initially underestimated. The federal Superfund taxes and environmental fees on profits above $2 million were imposed until 1995 and have not been renewed. Consequently, funds raised through such tax levies have been spent and – although the fund receives revenue from fines, penalties, interest, and cost recoveries – most federal Superfund expenditures are currently funded by general tax revenues. Superfund Subcommittee of the National Advisory Council for Environmental Policy and Technology (NACEPT), *Final Report* (draft), Apr. 12, 2004, ch. 2, pp. 8, 19.

[34] EPA, "SARA Overview," found at *http://www.epa.gov/superfund/action/law/sara.htm*, retrieved May 8, 2003.

[35] See Appendix E, Glossary, for a definition of brownfields.

[36] Superfund Subcommittee of the NACEPT, *Final Report* (draft), ch. 2, p. 13.

Atop the hierarchy of contaminated sites for which long-term remediation is required, 1,518 sites[37] have been placed on the President's National Priorities List (NPL),[38] which includes sites where known or threatened releases of contaminants meet or exceed a numerical threshold established by EPA.[39] Although over half of the sites were placed on the NPL prior to 1986, average annual additions (28) surpassed deletions (21) during 1993-2003. Since the first sites were added to the NPL in 1983, EPA has deleted 274 sites deemed "construction complete."[40] In 2003, controls were in place at 82 percent of those NPL sites requiring prevention of unacceptable human exposure to contaminants and at 65 percent of those sites requiring prevention of the spread of contamination in ground water.[41] However, limited funding poses a particular challenge to the Superfund program, especially in view of decreases in appropriations to Superfund, expressed in constant dollars, since 2000.[42] The 142 longest term, most complex, and most expensive sites on the NPL are known as mega sites, each of which is expected to cost more than $50 million to remediate. Seven such sites and one non-mega NPL site accounted for nearly half of the $224 million appropriated for Superfund remedial action projects in 2003.[43] The EPA inspector general reportedly stated that recent funding shortfalls have delayed removal actions, construction, cleanups, or investigations at 21 major sites.[44]

Industry sources describe Superfund cleanup as a stable to declining market, as federal funding priorities are perceived to have shifted from remediation to infrastructure security and contamination control processes, especially following the terrorist attacks on September 11, 2001.[45] However, Superfund cleanups could increase in light of EPA's determination in 2003 that the Toxic Substances Control Act does not prohibit the sale of real property contaminated after 1978 with polychlorinated biphenyls (PCBs).[46] The EPA stated that its reinterpretation of the Act removes an unnecessary barrier to economic redevelopment as well as an

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[37] Federal facilities comprise 177 of the NPL sites. Funding for remediation at federal NPL sites is the responsibility of federal entities other than EPA, principally the Departments of Energy and Defense.

[38] Only NPL sites are eligible for long-term remediation funding under Superfund.

[39] An additional 54 sites have been proposed and meet the threshold requirements for listing on the NPL, and listing is pending. Superfund Subcommittee of the NACEPT, *Final Report* (draft), ch. 2, p. 13.

[40] Construction is deemed complete when physical construction necessary to remediate a site is complete, immediate threats have been handled, and long-term threats are controlled and in the final cleanup stage. The completion of this final cleanup stage could still take many years. Superfund Subcommittee of the NACEPT, *Final Report* (draft), Glossary, p. 111.

[41] EPA, "Superfund Accomplishments Summary, Fiscal Year 2003," Nov. 3, 2003, found at *http://www.epa.gov/superfund/accomp/success/pdf/accomp03.pdf*, retrieved Apr. 29, 2004.

[42] U.S. General Accounting Office (GAO), *Superfund Program: Current Status and Future Fiscal Challenges*, GAO-03-850, July 2003, p. 12.

[43] Superfund Subcommittee of the NACEPT, *Final Report* (draft), ch. 2, p. 13.

[44] "Superfund Lacks Cash, EPA Says," Associated Press, Jan. 9, 2004, found at *http://cw.groupstone.com/*, retrieved Apr. 9, 2004.

[45] Industry representatives, interviews by USITC staff, California, Delaware, and Pennsylvania, May 11-13, 2004.

[46] EPA, "Interpretive Statement on Change in Ownership of Real Property Contaminated With PCBs," memorandum by Robert E. Fabricant and Susan B. Hazen, Aug. 14, 2003, found at *http://www.epa.gov/pcb/distincommerce.pdf*, retrieved July 28, 2004.

impediment to remediation of contaminated sites. PCBs are believed to contaminate more than 1,000 properties, including 500 NPL sites.[47]

States oversee investigations and cleanups at most sites not on the NPL, and they contribute a small share of the remediation expenses at NPL sites.[48] By year-end 2000, states reported remediation was complete at about 29,000 non-NPL sites, although the states' inventory of about 63,000 contaminated sites is considered stable or growing slightly, as additions have surpassed completions.[49] For most of the 1990s, state environmental budgets increased. However, decreases in state tax receipts compelled about three-quarters of the states to reduce environmental agency budgets by approximately 7 percent in 2002, the second consecutive year of mandatory reductions in most states.[50] Accordingly, many states reduced or delayed awarding environmental services contracts, including remediation contracts.

As pressures on federal and state government budgets have increased in recent years, voluntary redevelopment of brownfields has emerged as one of the few new factors stimulating the remediation services market.[51] Public-sector entities have begun to modify regulatory requirements and processes and to increase collaboration with the private sector in order to rejuvenate blighted brownfield areas which may, in turn, accelerate employment, increase tax revenues, and slow the depletion of undeveloped areas.[52] Industry sources indicate that the brownfields market is concentrated in the northeast and midwest, and along waterfronts in certain Southern and Western states.[53] Collaborative efforts are regarded as gradually diluting decades-old obstacles to redeveloping brownfields, especially insufficient cleanup funds and liability issues under the Superfund law.[54] There are an estimated 400,000 to 600,000 brownfield sites,[55] of which up to 100,000 are thought to have positive

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[47] Standard & Poor's, *Industry Surveys: Environmental & Waste Management*, Apr. 1, 2004, pp. 7, 8, found at *http://www.standardandpoors.com/*, retrieved Apr. 29, 2004.

[48] Environmental Law Institute, *An Analysis of State Superfund Programs: 50-State Study, 2001 Update*, Nov. 2002, p. 7, found at *http://www.elistore.org/reports.asp*, retrieved Apr. 30, 2004.

[49] Ibid., p. 8.

[50] Environmental Council of the States (ECOS), "Coping With the Budget Crunch," *ECOStates*, Winter 2002, pp. 17-19.

[51] EBI, *Environmental Business Journal*, vol. 13, No. 5/6, 2001 and vol. 17, No. 1/2, 2004, and industry representatives, interviews by USITC staff, California, Delaware, and Pennsylvania, May 11-13, 2004. Brownfield redevelopment is considered a small subset of real estate development, the growth of which is perceived to vary widely across regions and localities.

[52] U.S. Conference of Mayors, *Recycling America's Land: A National Report on Brownfields Redevelopment*, vol. 4, 2003, p. 16, found at *http://usmayors.org/*, retrieved Feb. 4, 2004.

[53] EBI, *Environmental Business Journal*, vol. 17, No. 1/2, 2004, p. 4.

[54] U.S. Conference of Mayors, *Recycling America's Land: A National Report on Brownfield Redevelopment*, vol. 4, 2003, found at *http://usmayors.org/*, retrieved Feb. 4, 2004.

[55] National Association of Local Government Environmental Professionals (NALGEP), *Brownfield Communities Network: Revitalizing America's Communities*, found at *http://www.nalgep.org/*, retrieved May 4, 2004. The EPA estimates that the number of brownfield sites exceeds 1 million.

income-producing value that surpasses associated environmental liabilities.[56] The proliferation of brownfield sites has prompted federal, state, and local government authorities to modify or adopt regulations in order to favor risk-based standards for cleanups, under which several stakeholders negotiate a new prospective use for a site that is committed for redevelopment in the near term. This prospective use then determines the extent to which remediation is required.[57]

Public and private sources provide numerous financial mechanisms, such as grants, loans, tax incentives, trust funds, liability relief, and risk management, to support brownfield redevelopment.[58] Coordinated Federal Government efforts to assist in enabling certain brownfield redevelopment have increased, especially following enactment of brownfield revitalization legislation in 2002.[59] For example, the National Oceanic and Atmospheric Administration (NOAA) leads a multi-agency effort to coordinate assistance to port cities engaged in restoration and revitalization programs, beginning with pilot programs in New Bedford MA, Tampa FL, and Bellingham WA.[60] Additional collaborative federal efforts focus on giving priority to brownfield grants, training, and technical assistance provided by various departments, and the U.S. Army Corps of Engineers' commitment to initiate new pilot projects in and around urban rivers.[61]

Industry sources state that advancements in, and experiences with, treatment technologies[62] have progressed to a point at which estimating remediation project costs has become realistic.[63] Several firms in the insurance and banking industry reportedly have created environmental departments or have contracted with remediation experts for advice in order to become adept at providing financial risk

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[56] EBI, *Environmental Business Journal*, vol. 17, No. 1/2, 2004, p. 4.

[57] Ibid., p. 2.

[58] A partial list of programs compiled by USITC staff over several years includes more than 20 such sources. For more information, see Peter B. Meyer and H. Wade Van Landingham, *Reclamation and Economic Regeneration of Brownfields*, 2000, E. P. Systems Group, Inc., report prepared for U.S. Economic Development Administration, found at *http://www.eda.gov/*, retrieved Aug 12, 2004.

[59] EPA, *Brownfields Federal Partnership Action Agenda*, November 2002, found at *http://www.epa.gov/brownfields/*, retrieved May 4, 2004.

[60] The program, known as the Portfields Initiative, was developed jointly between federal agencies and the International City/County Management Association, and announced in October 2003. EBI, *Environmental Business Journal*, vol. 17, No. 1/2, 2004, p. 6; and EPA, "Brownfields Federal Partnership Action Agenda," Nov. 2002, found at *http://www.epa.gov/brownfields/*, retrieved May 4, 2004.

[61] EPA and the Army Corps of Engineers share responsibility for federal wetlands preservation under several federal laws, and jurisdictional responsibilities for each agency are delineated under memoranda of understanding. EPA, "Brownfields Federal Partnership Action Agenda," Nov. 2002, found at *http://www.epa.gov/brownfields/*, retrieved May 4, 2004.

[62] For information about innovative treatment technologies, see the searchable on-line database entitled EPA Reach It, sponsored by EPA's Technology Innovation Office, at *http://www.epareachit.org/*. Additional information on treatment technologies may be accessed through the EPA-sponsored remediation databases website at *http://clu-in.org/databases*.

[63] Industry representatives, interviews by USITC staff, California and Pennsylvania, May 11-13, 2004.

management products.[64] Greater clarity in assessing costs has led redevelopers of brownfield projects to increase the incidence of guaranteed fixed-fee contracts, which are backed by assets of the remediation firm, as an alternative to contracts based on the amount of billable hours.[65] Although limited to date to a small number of instances, certain mid- to large-size remediation firms have become equity partners in brownfield projects, which appears to be another manifestation of improvements in remediation services firms' outlook toward liability management in the industry.[66] It is reported that improved management of financial risk also creates opportunities for larger, multidimensional environmental projects linking, for example, brownfield redevelopment on a waterfront with wastewater management in a watershed.[67]

Remediation projects often include requirements to rectify the detrimental effects of contamination on ecosystems, and thus fall under the legislative and regulatory parameters that principally drive nature and landscape protection services. Three major federal laws, as amended, frame the natural resources management market, and are complemented by additional federal laws and initiatives, as well as a significant number of state, tribal, and local measures. The National Environmental Policy Act of 1969 (NEPA),[68] as amended in 1975 and 1982, established a national policy for the environment applicable to all federal agencies, and to state and local governments insofar as federal funding is made available. The purpose of the Endangered Species Act of 1973 (ESA)[69] is to conserve the ecosystems upon which at-risk species depend and to conserve and restore listed species.[70] Under the ESA, financial and technical assistance is provided to non-federal landowners for the implementation of conservation actions, state government activities are supported, critical habitats are designated for protection, unlawful actions concerning listed species are defined, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is implemented, among other provisions.[71] The Clean Water Act of 1977 (CWA),[72] as amended, established the basis for regulating the discharge of pollutants into U.S. waterways, and authorized the EPA to institute pollution control

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[64] For more information regarding the environmental insurance industry, see appendix C.

[65] A specific deadline for completion of the work also may be included in a fixed-fee contract. EBI, *Environmental Business Journal*, vol. 17, No. 1/2, 2004, pp. 3, 12.

[66] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[67] Ibid., May 11-12, 2004, and EBI, *Environmental Business Journal*, vol. 17, No. 1/2, 2004, pp. 5-7.

[68] 42 U.S.C. 4321-4347. The NEPA provisions apply directly to activities of the Federal Government, requiring federal agencies to consider environmental impacts of proposed actions as well as reasonable alternatives to such actions. EPA reviews and maintains a database on environmental impact statements submitted by other federal agencies and assures that EPA's actions comply with NEPA requirements. EPA, "National Environmental Policy Act (NEPA)," found at *http://www.epa.gov/*, retrieved Mar. 4, 2004.

[69] 7 U.S.C. 136; 16 U.S.C. 460 et seq. The ESA is administered by the U.S. Fish and Wildlife Service concerning land and freshwater organisms and by the National Marine Fisheries Service as regards marine species.

[70] In August 2002, 1,818 species, of which 1,260 are native to the United States, were listed as endangered (in danger of extinction) or threatened (likely to become endangered). Information is also gathered on species that are not listed but are considered likely to attain endangered or threatened status if deterioration of their habitats continues.

[71] U.S. Fish and Wildlife Service, "ESA Basics," Oct. 2002, found at *http://endangered.fws.gov/*, retrieved Mar. 4, 2002.

[72] 33 U.S.C. 1251 et seq.

and water quality standards programs, and partnerships with states to fund water pollution programs.[73]

In 2002, at least 80 percent of the estimated 50,000 active nature and landscape protection services projects in the United States were reportedly small, averaging $5,000.[74] This portion of the U.S. market is described as having been stable for at least a decade. About 5,000 to 6,000 projects averaged $50,000, while less than 1,000 projects were believed to be valued at $500,000 or more. The regulation of discharges into surface water and ground water is considered by industry sources to be an especially important current and future driver of nature and landscape protection services.[75] Recent market interest observed by industry representatives suggests that projects based around water, which tend to be more costly and longer in duration than projects solely involving land, seem to be receiving significant attention.[76] Government and private entities have also stepped up activities related to threats by nonindigenous invasive species. This issue, together with habitat destruction, is currently considered one of the most important ecological threats in the United States.[77] Moreover, industry representatives indicate that large, multifaceted programs such as restoring the Florida Everglades and the Great Lakes are likely to require decades to complete, include many layers of engineering and construction projects, cost tens of billions of dollars, stimulate collaboration by private and public participants, and drive industry consolidation to maximize the availability of capital that firms will likely need to sustain involvement in such projects.[78]

Remediation services firms state that they usually provide nature and landscape protection services together with remediation services.[79] At some properties, certain areas are remediated while adjacent parcels require nature and landscape services primarily or exclusively; at others, both remediation and natural resources components such as revegetation are necessary in the same areas. These remediation firms tend to leave stand-alone nature and landscape protection services projects to the large number of small local and regional firms that are familiar with state laws and local ordinances, such as construction permit limitations that are intended to

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[73] EPA, "Clean Water Act," found at *http://www.epa.gov/region5/water/cwa.htm*, retrieved Mar. 4, 2004.

[74] EBI, *Environmental Business Journal*, vol. 16, No. 1/2, 2003, p. 1.

[75] Ibid., pp. 1-13.

[76] Industry representatives, interviews by USITC staff, Delaware and Pennsylvania, May 11-12, 2004; and EBI, *Environmental Business Journal*, vol. 16, No. 1/2, 2003, p. 1.

[77] EPA, *Nonindigenous Species - An Emerging Issue for the EPA, Volume 1: Region/ORD Nonindigenous Species Workshop Reports*, May 2001, found at *http://www.epa.gov/owow/invasive_species/workshop/nisvol1.pdf*, retrieved June 4, 2004.

[78] Industry representatives, interviews by USITC staff, California and Pennsylvania, May 11-13, 2004. For more information, see EPA's websites on the Great Lakes at *http://www.epa.gov/greatlakes* and the Florida Everglads at *http://www.epa.gov/region4/sesd/reports/epa904r00003.html*.

[79] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

preserve local wetlands.[80] Industry sources state that many small firms, each with fewer than five employees, have entered the market in recent years, only to exit after a few years as others take their place.[81]

Trade and Investment

Data on international trade and direct investment in remediation services are scarce. Official data on U.S. services trade and direct investment in remediation or depollution services are generally aggregated with data on other sectors, such as solid and hazardous waste services. In the aggregated data, international transactions taking place by means of foreign-based commercial presence are substantially larger than cross-border trade in private services.[82]

EBI's estimates for 2002, which include the value of cross-border trade and repatriated profits but not sales of overseas subsidiaries, report U.S. exports of remediation services of $460 million and imports of $400 million. This reflects the U.S. comparative advantage arising from technological leadership associated with a relatively long history of regulation. According to this source, exports of remediation services account for approximately 4 percent of total U.S. market revenues, which totaled $12.1 billion in 2002. By comparison U.S. exports accounted for 14 percent of market revenue in environmental consulting and engineering services, 7 percent in environmental analytical services, 2 percent in hazardous waste management, 0.5 percent in water treatment works, and 0.4 percent in solid waste management.[83]

In 2001, U.S. remediation services export markets were widely dispersed, as markets outside the Western Hemisphere accounted for 80 percent of exports; Canada, 4 percent; Mexico, 6 percent; and the remainder of Latin America, 7 percent.[84]

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[80] Local ordinances may provide for the exercise of broader or stricter authority to preserve local wetlands as compared to the authority granted under state laws, except as related to events such as discharges of contaminants and issues of navigability, health, and safety reserved to federal and state government responsibility. Business and Legal Reports, Inc., "Wetlands," Feb. 3, 2003, found at *http://enviro2.blr.com/*, retrieved Apr. 27, 2004.

[81] Industry representatives, interviews by USITC staff, California and Pennsylvania, May 11-13, 2004.

[82] USITC, *Solid and Hazardous Waste Services: An Examination of U.S. and Foreign Markets*, Investigation No. 332-455, Publication 3679, Apr. 2004, pp. 2-14 - 2-16.

[83] U.S. trade in environmental services as reported by EBI (including repatriated profits) is an order of magnitude larger than officially reported U.S. environmental services trade. Department of Commerce data report that U.S. exports of "waste treatment and depollution services," which probably includes several of the categories EBI reports above, were $25 million in 2001 and $20 million in 2002, while U.S. imports were $5 million in 2001 and $14 million in 2002.

[84] The destination of the remaining 3 percent of U.S. remediation services exports is undetermined. EBI, "An Examination of Trade in Environmentally Preferable Goods and Services in the NAFTA Region," Spring 2004, data provided by e-mail correspondence with USITC staff, June 14, 2004.

Official U.S. Government data on sales of services by foreign waste management and remediation affiliates of U.S. parent companies, virtually all of which occurred in Canada, amounted to $1.1 billion in 2000, while sales of services by U.S. waste management and remediation services affiliates of foreign firms amounted to $11 million.[85] The USITC estimates, based on its recent investigation concerning U.S. and foreign solid and hazardous waste services markets,[86] that remediation services accounted for only a small part of such sales.

In general, U.S. firms providing services related to, but not classified as, remediation services are more active participants in foreign markets than are U.S. remediation services firms. About 13 percent of U.S. environmental consulting and engineering firms' revenues were generated abroad in 2002.[87] Examples of such firms with extensive foreign operations include Bechtel, CH2M Hill, ERM, MWH, URS, and Washington Group.[88] U.S. remediation services firms tend to prefer obtaining business abroad through relationships with existing multinational clients, U.S. Government agencies or departments, or guaranteed aid programs, as such arrangements typically involve a relatively low level of risk.[89] Numerous U.S. remediation services firms indicated having experienced problems that spanned several decades in providing services abroad, especially with regard to insufficient coverage against environmental liability, but also infringement of intellectual property rights, uncertain revenue streams in violation of contract terms, inadequate judicial remedies, restrictions on the establishment of an overseas office, inadequate enforcement of environmental regulations, protracted bureaucratic processes that delayed imports of environmental equipment needed to provide remediation services, and inadequate laboratory capability and environmental infrastructure.[90]

Foreign participation in the U.S. market for remediation and nature and landscape protection services is believed to be limited.[91] In 2003, Arcadis (the Netherlands) reportedly generated about $136 million in revenues from site evaluation and remediation services in the United States, accounting for 85 percent of the $160 million generated by the firm in the U.S. environmental services sector.[92] Arcadis ranked as the 21st largest consulting and engineering firm in terms of U.S. environmental revenues in 2002. AMEC Earth and Environmental (U.K.) reportedly

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[85] USDOC, BEA, *Survey of Current Business*, Oct. 2003, pp. 115, 117.

[86] USITC, *Solid and Hazardous Waste Services: An Examination of U.S. and Foreign Markets* (investigation No. 332-455), USITC publication 3679, 2004.

[87] EBI, data provided by e-mail correspondence with USITC staff, June 25, 2004.

[88] Corporate annual reports; and industry representatives, interviews by USITC staff, California and Pennsylvania, May 11-13, 2004; Mexico City, Mexico, June 9, 2003 and Apr. 22-23, 2004; and Prague, Czech Republic, Oct. 24 and 27, 2003.

[89] Industry representatives, interviews by USITC staff, California and Pennsylvania, May 11-13, 2004.

[90] Industry representatives, interviews by USITC staff, California and Pennsylvania, May 11-13, 2004; Mexico City, Mexico, June 9, 2003; and Prague, Czech Republic, Oct. 24, 2003.

[91] Industry representatives, interviews by USITC staff, California, Delaware, and Pennsylvania, May 11-13, 2004; and EBI, *Environmental Business Journal*, various issues.

[92] EBI, "Arcadis Fixed-Price Contracting Is Well Suited to Redevelopment Goals," *Environmental Business Journal*, vol. 17, No. 1/2, 2004, p. 12.

generated between $20 and $50 million in nature and landscape protection services revenues in 2000, and ranked as about the sixth-largest provider of such services in the U.S. market.[93]

The United States maintains no known trade restrictions specifically relating to foreign providers of remediation and nature and landscape protection services or relating to foreign investment in these industry segments. However, measures applied to other service sectors, or to all business sectors as a whole, may have an effect on suppliers of remediation and nature and landscape protection services. Certain professionals that provide services incidental to remediation and nature and landscape protection services, such as engineers, are subject to citizenship or residency requirements for licensing of persons that varies by state. For example, Michigan requires contractors that provide construction and related services to maintain an office in the state.

The United States is a party to numerous international, regional, and bilateral treaties and agreements that have direct implications concerning the provision of remediation and nature and landscape protection services. For example, the United States is a party to the CITES agreement to monitor trade in wildlife, the Ramsar Convention on Wetlands, the London Convention on the Prevention of Marine Pollution, the Framework Convention on Climate Change, and agreements with Canada and Mexico individually and under the North American Free Trade Agreement (NAFTA).[94]

The Trade Act of 2002[95] requires the President to conduct and report to Congress the results of environmental reviews of future trade and investment agreements. The reviews are coordinated by the Chair of the President's Council on Environmental Quality and the United States Trade Representative, and include comments from the public and government entities.

Future Prospects

The resolution of two long-standing, widely publicized environmental emergencies illustrates the U.S. market's responsiveness to regulation. In 2004, cleanup was completed at the Love Canal Superfund site, located near Niagara Falls, NY, which was severely contaminated by abandoned toxic chemicals and which became the catalyst for enactment of CERCLA. Secondly, the condition of the bald eagle population has improved to the extent that the Fish and Wildlife Service proposed in 1999 that the national bird be removed from the Endangered Species List in the lower

[93] EBI, *Environmental Business Journal*, vol. 16, No. 1/2, 2003, p. 3.

[94] For a more complete list of international conventions and agreements to which the United States is a party, see table 3-1.

[95] P.L. 107-210. Prior to the law's enactment, the President conducted systematic environmental reviews of multilateral trade rounds, bilateral and plurilateral free trade agreements, and trade liberalization agreements concerning natural resources under Executive Order 13141, November 1999. Prior to the Executive Order, environmental reviews were conducted on an ad-hoc basis, beginning with a review of the NAFTA in 1992. EPA, "Environmental Reviews of Trade and Investment Agreements," found at *http://ww.epa.gov/international/trade/reviews.html*, retrieved June 3, 2004.

48 States. However, in the absence of major new environmental regulations, economic incentives are likely to become increasingly important in determining the direction of revenues in remediation and nature and landscape protection services. Industry sources forecast that overall revenues in the U.S. site remediation market may decline by 2 percent per year, on average, during 2002-2006, primarily owing to insufficient public funding or decreasing demand for remediation of Superfund, RCRA, and underground storage tank projects.[96] During this period, revenues from privately initiated projects such as brownfields are projected to increase by 2 percent per year, on average. This is the only site remediation market segment expected to contribute increased revenues of any consequence. Even so, revenue for privately initiated work is projected to increase at a slower rate than the 15-percent average annual growth rate estimated for such projects during 1997-2001.

The evolution of federal and state regulation to a system that bases cleanup standards upon the ultimate specific use of a site is expected to drive major environmental projects as well as satisfy local private and public interests in the redevelopment of brownfield sites.[97] A limited number of complex, high-cost remediation projects involving watersheds, wetlands, ports, and harbors, and containing natural resource management, commercial, residential, and recreational components, are expected to attract teams of major consulting, engineering, and construction firms.[98] Some of these firms are beginning to provide value-added strategic management consulting services along with their technical specialty services to assist clients in these multidimensional projects.[99] Redevelopment of brownfields is likely to increase as the overall U.S. economy improves, although the variations in valuation of local real estate markets and the small share of such markets represented by brownfields suggest that uneven and unpredictable revenue generation from these projects is likely. Remediation firms state that the pool of potential projects is large, once the comfort level of prospective insurers and lenders is sufficient to cover liability concerns.[100]

Questions concerning environmental liability are expected to take on greater significance owing to the passage of the Sarbanes-Oxley Act of 2002, which requires corporations to disclose and certify more accurate and extensive information about all significant liabilities, including environmental liabilities.[101] Corporations appear to be assessing the cost of continuing to own property which may carry potential environmental liability. Industry sources suggest that many corporations historically

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[96] EBI data and forecasts provided by e-mail correspondence with USITC staff, and corroborated by industry representatives, interviews by USITC staff, California, Delaware, and Pennsylvania, May 11-13, 2004.

[97] EBI, *Environmental Business Journal*, vol. 13, No. 5/6, 2001; vol. 16, No. 7/8, 2003, p. 15; and vol. 17, No. 1/2, 2004.

[98] Industry representatives, interviews by USITC staff, California and Pennsylvania, May 11-13, 2004, and EBI, *Environmental Business Journal*, vol. 17, No. 1/2, 2004, p. 2.

[99] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[100] Ibid.

[101] EBI, *Environmental Business Journal*, vol. 17, No. 1/2, 2004, pp. 1, 2.

have not set aside sufficient reserves against potential environmental liability, which could introduce a certain volatility to the market for transferring such liability.[102]

Increased trade and foreign investment in the remediation and nature and landscape protection services industries is most likely to occur when consulting and engineering firms follow their federal or multinational clients abroad or provide advanced technical expertise on sophisticated remediation projects.[103] Beyond these established relationships, increased interest in providing services to most foreign markets reportedly is limited, based on past experience or perceptions that intellectual property rights may be compromised, payments in dollars as the preferred form of payment may not be guaranteed, contract terms may not be honored, and that regulations are not developed or sufficient.[104] Industry sources do not foresee the likelihood that foreign firms would significantly increase involvement in the U.S. market, given considerable domestic competition, the approaching maturity of the market, and the technological competence of U.S. firms.[105]

[102] EBI, *Environmental Business Journal*, vol. 13, No. 5/6, 2001, p. 1.

[103] Industry representatives, interviews by USITC staff, California, Delaware, and Pennsylvania, May 11-13, 2004; and Prague, Czech Republic, Oct. 24, 2003.

[104] Industry representatives, interviews by USITC staff, Delaware and Pennsylvania, May 11-12, 2004.

[105] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

CHAPTER 4
CANADA AND MEXICO

Introduction

The Canadian market for remediation services is in the early stages of development and displays significant growth potential. Canada is likely a net importer of remediation services, with leading U.S. and other foreign firms operating in Canada's market. Canada's market for nature and landscape protection (NLP) services is also in the early stages of development, and the supply of such services is dominated by the public sector. Mexico's newly emerging industry for remediation services is undercapitalized. Providers of remediation services in Mexico include multiple small- and medium-sized Mexican firms, and a handful of multinational firms, while government entities dominate the consumption of such services. Currently, there seems to be little or no market for NLP services in Mexico.

This chapter presents an overview of the regional market and the Canadian and Mexican markets individually with regard to size, key suppliers and consumers, principal technologies, and regulatory environments; addresses the nature and extent of trade and investment in both markets for the subject services; and discusses the future outlook for the Canadian and Mexican markets for remediation and NLP services.

Regional Market Overview

Since its inception, the NAFTA is thought to have stimulated economic development, especially in border areas, and accelerated trade and investment opportunities across all industry sectors, including environmental services.[1] Noting the increased opportunities and accompanying challenges of such growth, the NAFTA partners incorporated an environmental side agreement into the NAFTA that mandated, among other provisions, new cooperative efforts and regulatory harmonization, where feasible, on a range of environmental issues.[2] At the same time, the NAFTA created mechanisms for the settlement of disputes regarding alleged violations of domestic trade or environmental laws. In one recent case submitted under the NAFTA dispute settlement mechanism, a U.S.-based environmental organization argued that Mexico had not enforced its own environmental regulations as they applied to Metales y Derivados—a lead-smelting facility that was closed and

[1] For more information, please see United States International Trade Commission (USITC), the Impact of Trade Agreements: Effect of the Tokyo Round, U.S.- Israel FTA, U.S.-Canada FTA, NAFTA, and the Uruguay Round on the U.S. Economy, USITC Publication 3621, Aug. 2003.

[2] The North American Commission for Environmental Cooperation (CEC), mandated under the NAFTA, facilitates a trinational work program that addresses environmental issues.

abandoned with several thousand metric tons of contaminants left in place.[3] In 2002, a NAFTA panel ruled that the Mexican Government must pay damages and is responsible for cleaning up this site.[4]

Canada

Market Overview

The Canadian market for remediation services is in the early stages of development and displays significant growth potential, with nearly 30,000 contaminated sites identified (table 4-1).[5] In 2001, revenues for the remediation services[6] market totaled $1.1 billion,[7] representing an average annual growth rate of 15 percent during 1994-2001 (figure 4-1). The number of workers employed in the combined waste management and remediation related sectors totaled 22,474 in 2001.[8] Contaminated sites are generally scattered throughout Canada, although the most industrialized provinces – specifically Ontario and Quebec – account for approximately 70 percent of all environmental business in Canada.[9]

Airports, harbors, reserve lands, lighthouse stations, laboratories, military facilities, and landfills are among the many types of contaminated sites located in Canada.[10] Various pollutants are found at such sites, including, *inter alia*, explosives, heavy metals, oxygen-depleting waste products, petroleum products, and PCBs and other

[3] North American Commission for Environmental Cooperation, "Factual Record: Metales y Derivados SEM-98-007," found at http://www.cec.org/, retrieved Apr. 2, 2004.

[4] Ibid; and Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[5] National Round Table on the Environment and the Economy, *Cleaning up the Past, Building the Future: A National Brownfield Strategy for Canada*, 2003.

[6] Environmental Business International Inc. (EBI) defines remediation and industrial services to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment defined for the purposes of this report, though it does not include the activities defined as nature and landscape protection services. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1

[7] Environmental Business International, Inc. (EBI), *An Examination of Trade in Environmentally Preferable Goods and Services in the NAFTA Region*, 2004.

[8] While this figure includes employment in the waste management and remediation services sector, only the latter is included in this study. The share of workers employed by each industry segment is unknown. Statistics Canada, *Environment Industry Survey*, Business Sector 2000, catalogue No. 16F0008XIE, found at *http://www.statcan.ca/english/freepub/16F0008XIE/16F0008XIE00001.pdf/*, retrieved Aug. 18, 2004.

[9] U.S. Department of Commerce (USDOC) International Trade Administration (ITA), "Environmental Market in Canada," 2000, p. 1.

[10] Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 2 The Legacy of Federal Contaminated Sites*, 2002, p. 5.

Table 4-1
Selected characteristics of the Canadian market for remediation and nature and landscape protection services

Item	Characteristics
Market size (2001)	• Revenues for remediation and industrial services totaled $1.1 billion in 2001.[1] There is significant potential for growth in the Canadian market for remediation services, as approximately 30,000 contaminated sites have been identified.[2]
Employment (2000)	• The combined market for waste management and remediation services employed 22,474 workers in 2000.[3]
Trade (2001)	• The combined market for remediation and industrial services registered exports totaling $31 million in 2001.[1] • Although data are not available for total Canadian imports for remediation and industrial services, Canadian imports of such services from NAFTA partners totaled $16 million in 2001.[1]
Characteristics of remediation segment	• New initiatives from policy advisory committees and new legislation have created market opportunities for private firms. Currently, a small number of multinational firms control the market.
Characteristics of nature and landscape protection segment	• Primary types of projects in Canada are national parks, wildlife areas, national marine conservation areas, ecological reserves, and lands under private stewardship. The public sector controls the majority of the market.
Key market participants (and location of parent)	• Conestoga-Rovers & Associates Limited (Canada), Jacques Whitford Environmental (Canada), XCG Consultants Inc. (Canada), Gartner Lee Limited (Canada), and Decommissioning Consulting Services Limited (Canada)

[1] Environmental Business International, Inc. (EBI) reports data on remediation and industrial services, which it defines to include clean up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report, though it does not include activities defined as nature and landscape protection services. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.

[2] National Round Table on the Environment and the Economy, *Cleaning up the Past, Building the Future: A National Brownfield Strategy for Canada*, 2003.

[3] While this figure includes employment in the waste management and remediation services sector, only the latter is included in this study. The share of workers employed by each industry segment is unknown. Statistics Canada, *Environment Industry Survey*, Business Sector 2000, catalogue No. 16F0008XIE, found at *http://www.statcan.ca/english/freepub/16F0008XIE/16F0008XIE00001.pdf/*, retrieved Aug. 18, 2004.

Table 4-1—*continued*
Selected characteristics of the Canadian market for remediation and nature and landscape protection services

Item	Characteristics
Key legislation	Federal • Canadian Environmental Protection Act (1999).[4] • Canadian Environmental Assessment Act (1992) • Canada Water Act (1985) • Canada Wildlife Act (1985) • Department of the Environment Act (1985) • International River Improvements Act (1985) • Migratory Birds Convention Act (1994) • Species at Risk Act (2002) • Wild Animal and Plant Protection and Regulation of International and Inter-provincial Trade Act (1992) • Fisheries Act (1985) • Arctic Waters Pollution Prevention Act (1985) • Federal Real Property and Federal Immovables Act (1991) Provincial - Quebec • Environmental Quality Act (1977, amended 2002) • An Act Respecting the conservation and Development of Wildlife (2002) • Natural Heritage Conservation Act (2002) • An Act Respecting Threatened or Vulnerable Species (1989) Provincial - Ontario • Brownfields Statute Law Amendment Act (2001) • Environmental Protection Act (1990) • Ontario Water Resources Act (1990) • Environmental Assessment Act (1990) • Waste Management Act (1992)
Regulatory authorities	• Environment Canada • Provincial and territorial legislatures and ministries of the environment.
GATS commitments	• Canada has scheduled full commitments on nature and landscape protection services provided through cross-border supply (mode 1), consumption abroad (mode 2), and commercial presence (mode 3).[5]
Membership in multilateral and bilateral conventions and agreements[6]	• North American Agreement on Environmental Cooperation.[7] • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

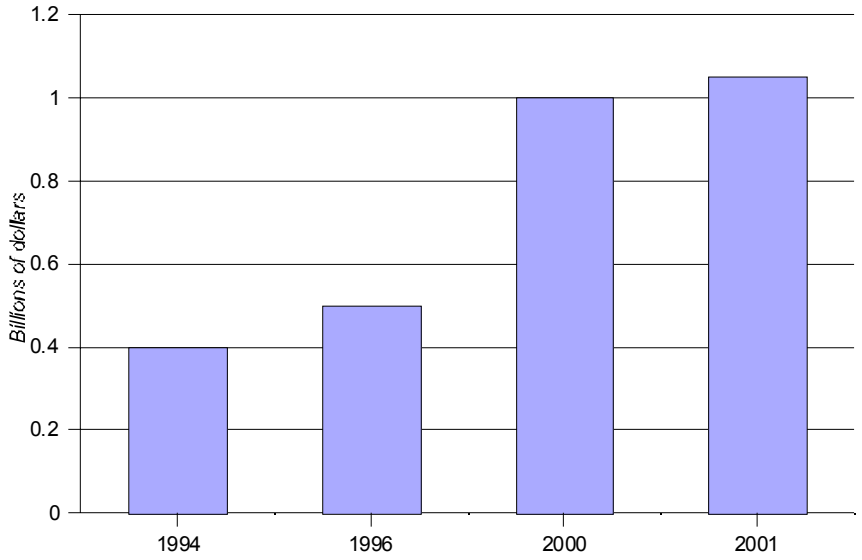
[4] Quebec and Ontario are highlighted as examples. Other provinces have additional laws. Government of Canada, Environment Canada, found at *http://www.ec.gc.ca/EnviroRegs/Default.cfm/*, retrieved Aug. 19, 2004; and Canadian Legal Information Institute, Statutes and Regulations of Ontario and Quebec, found at *http://www.canlii.org/*, retrieved Aug. 19, 2004.

[5] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), Canada: Schedule of Specific Commitments GATS/SC/16, Apr. 15, 1994.

[6] Ecolex environmental law database, found at *http://www.ecolex.org/ecolex/en/treaties*/, retrieved June 29, 2004.

[7] Environmental side agreement to the NAFTA. For more information, see *http://www.naaec.gc.ca/eng/index_e.htm*.

Figure 4-1
The Canadian market for remediation services,[1] 1994, 1996, 2000, and 2001[2]



[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.

[2] Data for 1995, 1997, 1998, and 1999 are not available.

Source: EBI. Environmental Business Journal, 8/95, p. 3; U.S. Department of Commerce, Office of Technology Policy, The U.S. Environmental Industry, Sept. 1998, pp. 30-31; EBI, The Global Market by Region, 2000, attachment to an email message, retrieved July 31, 2003; EBI, An Examination of Trade in Environmentally Preferable Goods and Services in the NAFTA Region, Spring 2004.

toxic organics.[11] Cost and time spent remediating contaminated sites vary significantly, depending on the size of the site and the type of remediation technology used. Principal remediation technologies and methods used in Canada include bioremediation, multiphase extraction, slag separation, ex situ treatment, dredging, installing impermeable geo-membrane beneath surface areas, pump removal of contaminated sediment, and removal of underground storage tanks.[12]

The Canadian Government's jurisdiction over environmental issues is limited to federal facilities and lands, aboriginal lands, the transboundary movement of hazardous waste, and the implementation of international commitments. The primary federal regulatory agency governing remediation is Environment Canada, which receives its authority from the Canadian Environmental Protection Act of 1999 (CEPA). First enacted in 1998, this legislation was significantly revised in 1999 to expand coverage and place focus on upstream methods of pollution and waste reduction. While the Canadian Environmental Protection Act (CEPA, 1999) enables the government to enact legislation for the remediation of government-owned

[11] Report of the Commissioner of the Environment and Development to the House of Commons, p. 34.

[12] AboutRemediation.com, *Case Studies*, found at Internet address *http://www.aboutremediation.com/casestudies/cs dundas.asp*, retrieved on Apr. 4, 2004.

contaminated sites, no such legislation currently exists. The government is not legally responsible for remediating any sites it has contaminated.[13] However, the Federal Real Property and Federal Immovables Act requires the government to assess the cleanup needs of any property it plans to buy or sell.[14]

To date, most regulations governing remediation services in Canada are issued at the provincial and municipal levels, and often lack harmonization. A number of new provincial laws regarding contaminated sites are creating increased market opportunities for private firms offering remediation services in Canada. Ontario and Quebec introduced new legislation addressing brownfield redevelopment in 2001 and 2002, respectively. Ontario's law, the Brownfields Statute Law Amendment Act of 2001, clearly outlines environmental liabilities and offers incentives for brownfield redevelopment. Under the regulations outlined in an amendment to Quebec's Environmental Quality Act, current rules and responsibilities for brownfield redevelopment are clearly defined for all parties.[15]

Differing regulations present challenges for private sector participants in the Canadian market for remediation services. Harmonization efforts are underway, primarily through the Canadian Council of Ministers of the Environment (CCME), an intergovernmental forum comprising environmental ministers from the federal, provincial, and territorial governments. In 1998, all Canadian provinces, with the exception of Quebec, signed the Canada-Wide Accord on Environmental Harmonization, under which provincial governments retain their existing authorities, but commit themselves to using this authority in a coordinated manner to achieve consistent environmental regulations. CCME has produced several model regulations and standards that reportedly have led to some harmonization.

The Canadian Government is a key consumer of remediation services, as the majority of contaminated sites are located on government-owned land. Most efforts to date have focused on policy initiatives, cost assessment studies, and guidance instead of actual site remediation. In 1990, the Canadian Government established the National Contaminated Site Remediation Program. This program was designed to remediate contaminated federal sites. Environment Canada began cataloging these contaminated sites, but the program ended in 1995. The Federal Contaminated Site Assessment Initiative was established in 2000, to help government agencies assess and manage their contaminated sites, but funding for this program lasted only until 2002.[16] Since 1996, the Canadian Government has evaluated more than 8,500 contaminated sites, and approximately 1,500 potentially contaminated sites are still in need of assessment.[17] Key suppliers of remediation services in Canada include Conestoga-Rovers & Associates Limited (Canada), Jacques Whitford Environmental (Canada), XCG Consultants Inc. (Canada), Gartner Lee Limited (Canada), and Decommissioning Consulting Services Limited (Canada).

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[13] Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 2 The Legacy of Federal Contaminated Sites*, 2002, pp. 11, 31.

[14] Ibid., p. 13.

[15] National Round Table on Environment and the Economy, *Cleaning up the Past, Building the Future: A National Brownfield Strategy for Canada*, 2003, p. 12.

[16] Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 2 The Legacy of Federal Contaminated Sites*, 2002, p. 16.

[17] Ibid., Appendix A, p. 1.

Abandoned mines are a significant and growing concern for the Canadian government, environmentalists, and the public at large.[18] In Northern Canada, 17 abandoned mines have been identified by the government as high priority contaminated sites, three of which had been remediated as of 2002.[19] These sites reportedly pose a hazard to the public and the environment as the structures securing contaminants, which include toxic chemicals, are deteriorating and constantly require repairs. The responsibility for these abandoned mine sites has recently[20] been assigned to the department of Indian and Northern Affairs Canada. This department has progressed in identifying contaminated mine sites and containing as much of the pollution as possible, but further studies, along with long term site management, will reportedly be needed.[21] The department has reportedly achieved notable progress since the late 1990s, successfully remediating 32 abandoned mine sites throughout Canada, and enforcing the provision requiring new mining companies to put down security deposits against future contamination before they begin operations. Four abandoned mines -- the Colomac Mine, Giant Mine, Faro Mine, and Mount Nansen Mine -- are causing the largest financial burden on the department. To date, the department has expended a total of $23 million to clean up and maintain these mines.[22]

The Sydney tar ponds, contaminated principally by steel, coke, and landfill operations between 1967 and 2000, are among the largest and most heavily polluted sites in Canada. The Canadian Government has spent approximately $192 million to evaluate, conduct surface remediation, and prevent further contamination of this site

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[18] The mining industry, valued at $28 billion, is a large industry, contributing roughly 4 percent of the country's gross domestic product. The Office of the Auditor General of Canada defines an abandoned mine as a site that has not been properly cleaned up and closed down, and whose ownership has transferred to the federal government, following the cessation of operations. Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 3 Abandoned Mines in the North*, 2002, pp. 3.-4

[19] Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 3 Abandoned Mines in the North*, 2002, p. 6

[20] Since 1999.

[21] Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 3 Abandoned Mines in the North*, 2002, p. 3.

[22] Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 3 Abandoned Mines in the North*, 2002, p. 8-18. The department's estimated cost for full remediation of these abandoned mines includes $53 million for Colomac Mine, between $40 million and $300 million for Giant Mine, a minimum of $150 million for Faro Mine, and about $5 million for Mount Nansen Mine. The department estimates that the total cost for cleaning up all of these contaminated sites would be about $417 million. These figures were derived by converting official estimates made in Canadian dollars to U.S. dollars.

and surrounding areas.[23] However, the Canadian Government has struggled to come to a consensus regarding how to approach the full remediation of this severely contaminated site. Complicating the situation is the fact that the polluting parties include three levels of government – the federal government owned the coke operations, the Government of Nova Scotia owned the steel mill, and the municipal government owns the landfill – which will need to coordinate responsibility and cleanup activities. Although the federal, territorial, and municipal governments have taken the important step of signing a memorandum of understanding of shared commitment to remediating this site, other challenges such as size, complexity of project, and the need for uniform guidelines remain unresolved. In February 2003, Canadian Prime Minister Paul Martin unveiled a plan to clean up the Sydney Tar Ponds over 10-years, with a $376-million budget.[24]

Incentive programs for brownfield redevelopment have also created opportunities for providers of remediation services in Canada. For example, the Green Municipal Enabling Fund, established in 2000, provides grants to local communities for brownfields and the development of brownfield policies.[25] In Quebec, the *Revi-Sols* program provides grants to communities which offset the costs of rehabilitation studies and cleanup efforts. Since its inception in 1998, the program has rehabilitated 153 contaminated sites, which contributed to local economies through increased property tax revenues and new housing.[26] Additionally, numerous private sector insurance companies are now offering cleanup cost cap policies, pollution liability policies, and secured creditor coverage that assist in site cleanup and assist the needs of developers.[27]

Although specific data on NLP services are not available, it is likely that the market is small in comparison with the remediation services market. The primary types of projects in Canada include the protection of wildlife areas, national marine conservation areas, ecological reserves, lands under private stewardship, and national, provincial, and territorial parks. Parks Canada is responsible for national parks and historic sites, and national marine conservation areas. Key legislation includes the Parks Canada Agency Act, the Canada National Marine Conservation Area Act, and the Canada National Parks Act. Regulatory responsibilities for other NLP issues are divided between Environment Canada, a federal agency, and provincial and territorial authorities.

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[23] This total includes over $50 million spent on environmental studies and approximately $140 million spent on modernizing steel facilities. Report of the Commissioner of the Environment and Development to the House of Commons, *Chapter 2 The Legacy of Federal Contaminated Sites*, 2002, Appendix A, p. 12. This modernization applied to the Sydney Steel Corporation (SYSCO), purchased by the Nova Scotia Government in 1967, and operating coke ovens from 1967-1973, finally shutting down in 2000.

[24] HazMat Management, "PM Pledges Billions to Clean Up Contaminated Sites," press release, Feb. 2, 2004.

[25] National Round Table on Environment and the Economy, *Cleaning up the Past, Building the Future: A National Brownfield Strategy for Canada*, 2003, p. 13.

[26] Ibid.

[27] Ibid., p. 14.

Trade and Investment

Canadian exports of remediation services totaled $31 million in 2001.[28] Although data are not available on total Canadian imports for remediation services, Canadian imports of such services from NAFTA partners totaled $16 million in 2001. By comparison, Canada's exports of remediation services to NAFTA partners totaled $23 million during that same year.[29] Leading U.S. and other foreign firms that provide remediation services in Canada include Canadian Waste Services (U.S.), Clean Harbors (U.S.), Phillip Services (U.S.), and Onyx Industries (France). Industry representatives anticipate that U.S. firms will likely be in a position to offer their services for high profile remediation projects that are emerging as top government priorities, such as the Sydney Tar Ponds.[30] Canada has scheduled full GATS commitments on NLP services provided through cross-border supply (mode 1), consumption abroad (mode 2), and commercial presence (mode 3).[31]

Mexico

Market Overview

The Mexican market for remediation services is in the very early stages of development and displays significant growth potential. In 2001, revenues for the remediation services market totaled about $300 million (table 4-2). U.S. Government estimates valued the soil remediation segment of the market at $120 million in 2000.[32] As of 2001, 105 sites were officially identified as contaminated and in need of remediation, and cleanup efforts had begun at 17 of those sites.[33] However, industry experts note that there are likely several hundred sites in critical need of remediation services.[34]

Contaminated sites in Mexico include mines, airports, oil refineries, power plants, railways, and maquiladora plants. Hydrocarbons, such as from oil and gasoline, are the most common contaminant in Mexican soil. Other pollutants include heavy metals, PCBs, lead, arsenic, and mercury.[35] Cost and time spent on remediating contaminated sites varies significantly depending on the size of the site, funding available, and the type of remediation technology used. Industry experts note that a

[28] EBI, *An Examination of Trade in Environmentally Preferable Goods and Services in the NAFTA Region*, 2004.

[29] Ibid.

[30] Industry representative, telephone interview by Commission staff, Feb. 2, 2004.

[31] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), Canada: Schedule of Specific Commitments GATS/SC/16, Apr. 15, 1994.

[32] USDOC, ITA, *Mexico Environmental Technologies Export Market Plan*, Dec. 2001, p. 38.

[33] Ibid., p. 8.

[34] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[35] Industry representatives, interviews by USITC staff, Mexico City, Mexico, Apr. 22 and 23, 2004.

Table 4-2
Selected characteristics of the Mexican market for remediation and nature and landscape protection services

Item	Characteristics
Market size (2001)	• Revenues for remediation and industrial services totaled $300 million in 2001.[1] Mexico's market for remediation services is small, as higher environmental priorities currently prevail. 105 contaminated sites have been identified, 17 of which have been remediated.
Trade (2001)	• Mexican exports of remediation services totaled $7 million in 2001. Data are not available for total imports of remediation and industrial services. However, Mexican imports of such services from NAFTA partners totaled $24.7 million in 2001.[1]
Characteristics of remediation segment	• Soil remediation services in Mexico are a newly emerging market. Domestic, private-sector firms are the key providers of such services.[2]
Characteristics of nature and landscape protection segment	• There seems to be little or no market for nature and landscape protection services in Mexico, but there is potential for future growth in this area.[2]
Key market participants (and location of parent)	• SIGEA (Mexico), IC Kaiser (Mexico), ERM (U.K.), and URS (U.S.)[2]
Key legislation	• General Law for the Prevention and Integral Management of Waste[3] • General Law of Ecological Balance and Environmental Protection.[4]
Regulatory authorities	• Secretariat of Environment and Natural Resources (SEMARNAT)[5] • Mexican Environmental Protection Agency (PROFEPA)
GATS commitments	• Mexico has scheduled no commitments on remediation and nature and landscape protection services.[6]

See footnotes at end of table.

Table 4-2—*Continued*
Selected characteristics of the Mexican market for remediation and nature and landscape protection services

Item	Characteristics
Membership in multilateral and bilateral conventions and agreements [7]	• North American Agreement on Environment Cooperation.[8] • Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • North American Agreement on Environmental Cooperation (formed under NAFTA) • United Nations Framework Convention on Climate Change

[1] Environmental Business International, Inc. (EBI) defines remediation and industrial services to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1. Environmental Business International, Inc. (EBI), *An Examination of Trade in Environmentally Preferable Goods and Services in the NAFTA Region*, 2004.

[2] Industry representatives, interviews by USITC staff, Mexico City, Mexico, Apr. 22 and 23, 2004.

[3] Baker & McKenzie, *Mexico's New Rules Regarding Liability for Soil Remediation*, found at *http://maquilaportal.com/public/artic/artic299e.htm,* retrieved July 8, 2004.

[4] Mexico's basic environmental law, may be viewed in English at *http://www.semarnat.gob.mx/dgeia/web_ingles/.*

[5] For more information, see *http://www.semarnat.gob.mx/dgeia/web_ingles/what_is_semarnat.shtml*.

[6] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), Mexico: Schedule of Specific Commitments. GATS/SC/56, Apr. 15, 1994.

[7] Ecolex environmental law database, found at *http://www.ecolex.org/ecolex/en/treaties/*, retrieved June 29, 2004.

[8] Environmental side agreement to the NAFTA. For more information see *http:www.naaec.gc.ca/eng/index_e.htm.*

small contaminated site, such as a minor oil spill, could be remediated within a few months while a larger project could take several months or years to complete.[36]

Industry representatives indicate that the Mexican market for remediation services is competitive, with many firms providing such services.[37] Domestic engineering firms dominate the Mexican market for remediation services. Due to a shortage of new construction projects in Mexico, numerous heavy construction equipment firms have also entered the remediation market in recent years. Government representatives indicate that firms must be authorized by the Secretariat of Environment and Natural Resources (SEMARNAT) to provide remediation services. As of October 2003, 85 firms appeared on SEMARNAT's list of approved remediation services providers.[38]

The government-owned petroleum company PEMEX is an especially large consumer of remediation services in Mexico. Mexico contains large oil reserves, and oil exploration, drilling, and the operation of refineries have led to significant contamination. In some cases, PEMEX has inherited contaminated sites and now is responsible for remediating those sites.[39] PEMEX has reportedly taken a proactive role in remediating contaminated sites and recently established an office within the company to handle soil contamination.[40] The Mexican National Railways (FNM) is another key government consumer of remediation services. The FNM recently claimed bankruptcy, and the government has started to hire remediation firms to clean up contaminated sites in order to prepare these sites for development or sale. To date, over 50 contaminated sites formerly owned by FNM have been identified.[41] Private real estate developers, both foreign and domestic, are also key consumers of remediation services in Mexico. Specifically, several industry experts note that the high commercial value of certain contaminated sites, such as those that are located in city centers, has created demand for remediation services.[42] In some cases, industries have moved production facilities to more remote—and thus less expensive—locations, giving developers the opportunity to remediate and sell older production sites that have a relatively high real estate value.

Remediation technologies and methods used in Mexico include, *inter alia*, in situ processes such as bioremediation, and ex situ processes such as multiphase extraction. Most consumers of soil remediation services in Mexico prefer ex situ methods as they tend to be less time consuming than other remediation technologies.[43] However, this method is frequently more expensive than in situ remediation due to the high costs transporting contaminated soils and landfilling.[44]

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[36] Ibid.

[37] Ibid.

[38] Industry representatives, interviews by USITC staff, Mexico City, Mexico, Apr. 21 and 22, 2004; and "Relacion de Emoresas Autorizadas Vigentes al 1 de Octubre del 2003 para Restaurar Suelos Contaminados," document provided to USITC staff, Mexico City, Mexico, Apr. 21, 2004,

[39] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[40] Ibid.

[41] Ibid.

[42] Industry representatives, interviews by USITC staff, Mexico City, Mexico, Apr. 22 and 23, 2004.

[43] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[44] Industry representatives, interviews by USITC staff, Mexico City, Mexico, Apr. 22 and 23, 2004.

There is only one hazardous waste landfill in Mexico,[45] and this shortage of landfill space, together with the considerable distance between the landfill and some contaminated sites, has driven up tipping fees and transportation costs.[46] Firms that cannot afford these high fees frequently choose to employ in situ remediation methods, such as bioremediation. Although this method often takes more time, it is often less expensive than ex situ methods.[47] Remediation methodologies are subject to a one-time approval by the federal government.[48]

Mexico currently has no law that specifically pertains to remediation.[49] The General Law of Ecological Balance and Environmental Protection is Mexico's principal environmental legislation. The General Law for the Prevention and Integral Management of Waste which came into effect in January 2004, also has implications for the Mexican remediation market. The law contains a provision requiring landowners to remediate soil contaminated with hazardous materials, even if they are not the polluters.[50] In 1995, the Mexican Government initiated an emergency environmental standard, Standard 138, which specifically addressed environmental contamination. This temporary standard set maximum limits on contamination, implemented site characterization, established procedures for site restoration, held landowners and polluters responsible for the cleanup of contaminated sites, and set health standards.[51] Despite being in place for only one year, Standard 138 reportedly led to increased demand for remediation services in Mexico. Moreover, despite expiration in 1996, providers of remediation services continue to follow the guidelines established in Standard 138 in anticipation of future legislation.[52] The Mexican Government is currently drafting a permanent law,[53] which will reportedly include many of the elements found in Standard 138 as well as new measures such as provisions regarding the cleanup of light, medium, and heavy hydrocarbons.[54] Despite the possibility of new legislation pertaining to remediation services in Mexico, more urgent environmental issues, such as waste management and air quality, receive greater attention under the current administration.[55]

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[45] This landfill is located in Monterrey, Mexico.

[46] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[47] Industry representatives, interviews by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[48] Government representative, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[49] Government representative, interview by USITC staff, Mexico City, Mexico, Apr. 21, 2004.

[50] A landowner has the right to seek compensation from the polluter, in the event that the two are separate parties. Baker & McKenzie, Mexico's New Rules Regarding Liability for Soil Remediation, found at *http://maquilaportal.com/public/artic/artic299e.htm,* retrieved July 8, 2004.

[51] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004; and Federal Registrar, Secretariat of Environment and Natural Resources, Official Mexican Emergency Standard NOM-EM-138-ECOL-2002, Aug. 2002.

[52] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22 and 23, 2004.

[53] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004. Federal Registrar, Secretariat of Environment and Natural Resources, Official Mexican Emergency Standard PROY-NOM-138-SEMARNAT-2003, Mar. 2004.

[54] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[55] Industry representative, telephone interview by USITC staff, Feb. 2004.

In Mexico, remediation issues lie completely within the jurisdiction of the federal government.[56] The Secretariat of Environment and Natural Resources (SEMARNAT) has a number of responsibilities relating to the provision of remediation services in Mexico. Specifically, SEMARNAT reviews and approves the use of certain remediation technologies. SEMARNAT also authorizes particular firms as providers of remediation services, and maintains a list of approved remediation services suppliers.[57] The Mexican Environmental Protection Agency (PROFEPA) serves as the enforcement arm of SEMARNAT. PROFEPA has the authority to inspect and enforce the cleanup of contaminated sites in Mexico.[58] If a violation is identified, PROFEPA can levy fines or force a firm to suspend operations.[59] In cases of abandoned contaminated sites, PROFEPA works to identify the responsible party and enforce cleanup, when possible. Additionally, PROFEPA is now working closely with the public, encouraging citizens to report contaminated sites within their community.[60] Industry officials indicate that PROFEPA's efforts have led to increased demand for remediation services in Mexico as firms are striving to comply with government guidelines, and land owners are increasingly interested in reducing environmental liability. Increasing awareness of the potential commercial value of many contaminated sites has also increased demand for remediation services in Mexico by encouraging property owners to pursue cleanup projects. However, demand for environmental cleanup in Mexico is reportedly dampened by a lack of available funds for such projects.[61]

While Mexico has established legislation relating to NLP services such as the general Law of Ecological Balance and Environmental Protection, the market for such services is in the early stages of development. An industry source indicates that a shortage of funding for such projects prohibits market growth.[62] However, there is potential for future growth in this area. Mexico is a member of several international environmental agreements, such as the North American Agreement on Environmental Cooperation, the Canada and Mexico U.S. Trilateral Committee for Wildlife and Ecosystem Conservation and Management, and the Convention on Biological Diversity. Such cooperative environmental efforts may stimulate demand for nature and landscape protection services in the future.

Trade and Investment

Mexican exports of remediation services totaled $7 million in 2001. Although data are not available on total Mexican imports of remediation services, imports from

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[56] Government representative, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[57] Industry and government representatives, interviews by USITC staff, Mexico City, Mexico, Apr. 21 and 22, 2004.

[58] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[59] Ibid.

[60] The public can file petitions by telephone or in person to PROFEPA's designated office. According to industry, public petitions have increased and served as a useful tool since the opening of this office. Government representatives, interview by USITC staff, Mexico City, Mexico, Apr. 21, 2004.

[61] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[62] Industry representative, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

NAFTA partners totaled $25 million in 2001.[63] By comparison, Mexican exports of the subject services to NAFTA partners totaled $1 million in that same year. Several leading foreign firms provide remediation services in Mexico, including ERM (U.K.) and URS (U.S.). According to industry experts, U.S. multinational firms often act as technical partners to small- and medium-sized Mexican firms that provide remediation services.[64] Foreign firms also perform studies and provide recommendations to government agencies.[65] Industry experts note that foreign investment in Mexico's remediation sector has declined in recent years.[66] This may be due to the high liability involved in the provision of remediation services, a lack of federal, state, and municipal regulations on soil and water contamination, and a lack of market transparency.

Several measures may serve as barriers to the foreign provision of remediation and NLP services in Mexico. For example, the Government requires environmental firms to use Mexican certified laboratories for the testing of site samples, which reportedly discriminates against foreign suppliers of such services.[67] Several remediation firms find the SEMARNAT authorized list burdensome for operations in Mexico as well.[68] Although industry sources report that some firms provide remediation services in Mexico without the benefit of being included on the SEMARNAT authorized list,[69] industry officials indicate that it is often difficult to obtain contracts, particularly government contracts, without being included on this list.[70] In addition, government policies regarding remediation are reportedly not transparent, making it difficult for foreign remediation firms to operate in the Mexican market without a local partner.[71] Mexico has not scheduled specific commitments on environmental services under the GATS.[72]

Future Prospects

The Canadian market for remediation services will likely grow in the near future. In addition to funding for remediating the Sydney tar ponds, Canadian Prime Minister

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[63] EBI, *An Examination of Trade in Environmentally Preferable Goods and Services in the NAFTA Region*, 2004.

[64] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[65] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[66] Several U.S. environmental firms operated in Mexico through joint-ventures with Mexican firms in the late 1990s. Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[67] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[68] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22 and 23, 2004.

[69] SEMARNAT refers clients exclusively to its official list. Firms that are not familiar with the market often refer to the official list when selecting firms. Furthermore, industry reports that many of the firms listed do not have the expertise they claim to, often resulting in unsuccessful projects. Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[70] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 23, 2004.

[71] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[72] General Agreement on Trade in Services (GATS), Mexico: Schedule of Specific Commitments. GATS/SC/56,
Apr. 15, 1994.

Paul Martin recently proposed a $2.6 billion plan to complete other cleanup projects in Canada.[73] In addition, remediation firms may benefit from greater market transparency as the Canadian Government continues to promote the harmonization of federal, provincial, and territorial laws on remediation.[74] The Canadian market for NPL services is likely to grow as government authorities continue to work together to enhance current programs, develop new programs, and strengthen legislation regarding nature and landscape protection.[75]

Efforts at the national and international levels are setting the stage for growth in the Mexican market for remediation services. Recently, the SEMARNAT and PROFEPA have been working with the government-owned petroleum company, PEMEX, and the U.S. Environmental Protection Agency to identify and address contaminated sites. The Mexican Government is currently working on permanent legislation that specifically addresses remediation, which may lead to increased demand for site cleanup. Industry experts feel that such legislation is critical for future development of the Mexican remediation market.[76] Industry representatives indicate that demand for remediation services in Mexico also may increase as contaminated sites that hold high commercial value are identified.[77] Further, the U.S. Department of Commerce notes that recent initiatives by SEMARNAT and State Governments to reduce pollution and identify toxic sites may increase the need for remediation equipment, which implies increased need for remediation services.[78] Regionally, the CEC is facilitating efforts among NAFTA partners to move toward greater harmonization of environmental regulations across North America and to increase information exchanges and capacity-building interaction in environmental markets.

[73] Ibid.

[74] Recent efforts have been led by the National Round Table on the Environment and the Economy.

[75] Some examples of current efforts include: the Minister's Round Table on Parks Canada 2003, the Canadian River Heritage Conference 2004, and Environment Canada's Environmental Assessment Programs, to name a few.

[76] Industry representatives, interview by USITC staff, Mexico City, Mexico, Apr. 22, 2004.

[77] Ibid.

[78] The Mexican market for remediation equipment is estimated to be valued at $2 billion.

CHAPTER 5
EUROPE

Introduction

Demand for remediation services varies considerably across European markets. While certain large markets are mature, other markets are exhibiting significant growth. In particular, Central and Eastern European (CEE) countries are potentially large markets for such services due to Communist-era environmental damage and environmental obligations stemming from the recent accession of many of these countries to the European Union. However, CEE markets are relatively small at present, as other environmental issues such as air and water pollution take precedence over remediation services.[1] The European market for nature and landscape protection (NLP) is also well established as evidenced by the number of legal instruments designed to protect the variation in natural habitats and wildlife that extends from the Arctic Circle to the Mediterranean.

This chapter comprises three interrelated discussions. The first focuses on the European Union,[2] which comprises the largest remediation services markets in Europe. This discussion centers principally on the member states of the former EU-15 by virtue of their larger and more mature markets and their relatively greater role in developing and implementing the environmental policies of the present-day European Union. The second and third discussions examine the Czech Republic and Poland, where nascent, but potentially large, markets for remediation and NLP services are forming. All three discussions provide information pertaining to market size, regulation, and trade and investment activity.

[1] Industry representative, interview by USITC staff, California, May 11, 2004.

[2] For the purposes of this report, the European Union refers to the 15 member countries of the European Union prior to the May 1, 2004 accession of 10 Central and Eastern European (CEE) countries, unless otherwise noted. The CEE countries that acceded are Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.

Regional Market Overview

In 2000, Europe as a whole accounted for $8.6 billion,[3] or 30 percent, of the global market for remediation services,[4] making it the world's second-largest market for such services behind the United States. Remediation service revenues grew at an average annual rate of 15.1 percent during 1994-2000 (figure 5-1).[5] According to data[6] provided by Environmental Business International (EBI), Western Europe[7] accounted for $7.9 billion, or 92 percent, of revenues generated in the European remediation services market in 2000.[8] In comparison, the research and consulting firm ECOTEC values expenditures on remediation and cleanup in the European Union at $4.1 billion in 1999. This appears roughly consistent with EBI data given that ECOTEC does not include data for Finland, France, or Portugal.[9]

In CEE countries, industrial and military activities conducted under former communist regimes caused extensive environmental damage. This in combination with the recent accession of many CEE countries to the European Union, which requires compliance with EU environmental directives, has created a large potential market for remediation services.[10] However, as of 2000, the CEE markets for

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[3] Environmental Business International (EBI), "The Global Environmental Market By Region, 2000," spreadsheets provided by email correspondence with USITC staff, received July 31, 2003; and information compiled by Commission, based on data from the World Bank and EBI.

[4] EBI, reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1.

[5] Although the total CEE market for remediation services is small, these countries recorded an average annual growth rate of 23.2 percent, likely as a result of efforts to clean up past environmental damage and preparation for EU accession.

[6] Please see chapter 1 for information on how EBI defines remediation and develops its data.

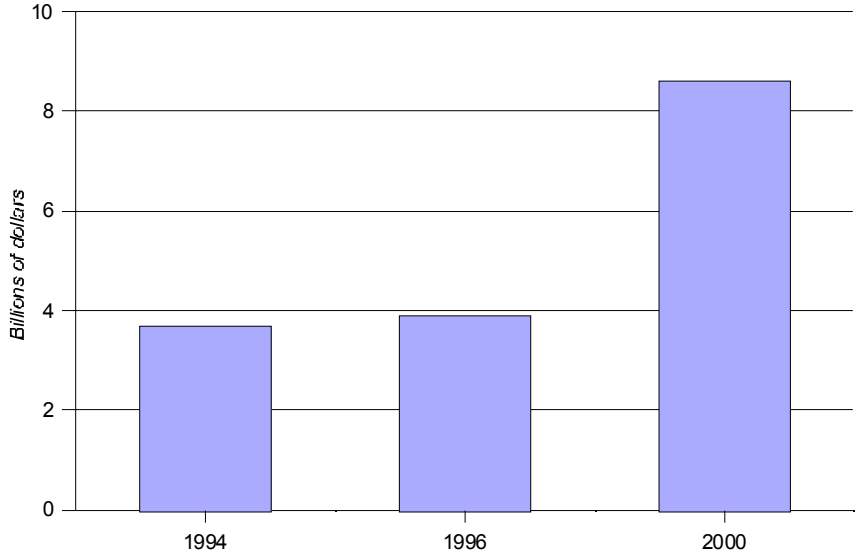
[7] For the purpose of this data discussion, Western Europe includes all Western European countries, whether or not they are members of the European Union.

[8] EBI, "The Global Environmental Market by Region, 2000," spreadsheets provided by email correspondence with USITC staff, received July 31, 2003.

[9] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[10] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe: Poland, Country Characterisation," found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; U.S. Department of Commerce, (USDOC), Industry Sector Analysis (ISA), "Soil Remediation: Poland," May 2003, found at *http://www.stat-usa.gov/*, retrieved Feb. 10, 2004; and USDOC, ISA, "Remediation: Czech Republic," 2004, document provided by email correspondence with USITC staff, received Mar. 31, 2004.

Figure 5-1
The European[1] market for remediation services,[2] 1994, 1996, and 2000[3]



[1] Includes Western, Central, and Eastern Europe.
[2] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.
[3] Data for 1995, 1997, 1998, and 1999 are not available.

Source: EBI, *Environmental Business Journal*, 8/95, p. 3; U.S. Department of Commerce, Office of Technology Policy, *The U.S. Environmental Industry*, Sept. 1998, pp. 30-31; and EBI, "The Global Market by Region, 2000," attachment to an email message, retrieved July 31, 2003.

remediation services were relatively small, accounting for only $700 million, or 8 percent, of the European market for such services.[11]

The European Environmental Agency (EEA) estimates that there are up to 1.5 million potentially contaminated sites in Western Europe. In CEE countries, many polluted sites have been identified through the environmental audits required by privatization programs (discussed later).[12] Soil contamination in Europe is the result of several factors, including acidification, heavy metal pollution, intensive use of fertilizers, mining activities, and industrial production. Europe's northeastern industrial areas have a particularly high concentration of soil contamination, as do industrial areas of the CEE countries. Notable among Europe's contaminated

[11] EBI, "The Global Environmental Market By Region, 2000," spreadsheets provided by email correspondence with USITC staff, received July 31, 2003.
[12] According to the EEA, contaminated sites are treated in stages - first, sites are surveyed to verify the presence and determine the potential effects of contamination; second, a "main site investigation" is conducted to determine the extent of the damage; and third, a remediation project is carried out. While many European countries have completed surveys, progress in the remaining stages is inconsistent and slow. EEA, Environmental Themes: Soil, "Contamination from Localised Sources," "Europe's Environment: The Third Assessment, Chapter 9 Soil Degration," and "Themes: Soil, Indicator: Progress in the Management of Contaminated Sites, al," found at *http://www.eea.eu.int/*, retrieved Apr. 8, 2004.

regions is the heavily polluted border area between the Czech Republic, Germany, and Poland, known as "the black triangle."[13]

EU environmental policies are generally codified in regulations, directives, decisions, and recommendations and opinions. Currently, several different EU directives deal with aspects of contaminated soil and water. Member states must comply with both regulations as issued and directives, though they have leeway as to their method of compliance with the latter. Decisions require full compliance from those member states to which they refer, while recommendations and opinions are "non-binding, declaratory instruments."[14]

Analysis of the European market for NLP services is challenging in that there are few established targets, a lack of comprehensive monitoring, and multiple data sources.[15] Measures available include the approximately $8.4 billion spent by the European Union on nature protection in 1999.[16] Europe is largely urbanized and densely populated, and contains some of the most varied ecosystems and landscapes in the world. However, land use, air and water pollution, climate change, and invasive species have all adversely affected Europe's biodiversity. Almost 3,000 plant species and 230 animal species are considered endangered in Europe. The European Union has committed to halt biodiversity declines by 2010 as part of its Sixth Environmental Action Program. The European Union is a member of several international conventions on biodiversity issues such as the Convention on Biodiversity, the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), the Convention on the Conservation of Migratory Species of Wild Animals, the Convention on the Conservation of European Wildlife and Natural Habitats, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The European Union has also adopted legislation such as the Birds Directive and the Habitats Directive.[17]

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[13] The "black triangle" area is heavily polluted from coal mining, heavy industries such as steel production, and energy production. Since 1991, the three countries have worked together to clean up this region. European Environmental Agency (EEA), "Europe's Environment: The Third Assessment, Chapter 9 Soil Degration," found at *http://www.eea.eu.int/*, retrieved Apr. 8, 2004; United Nations Environmental Program, "Black Triangle: On the Way to Environmental Recovery," found at *http://www.grid.unep.ch/proser/remotesens/blacktriangle.php/*, retrieved Apr. 12, 2004; and Department of Energy (DOE), Energy Information Administration, "Poland: Environmental Issues," found at *http://www.eia.doe.gov/emeu/cabs/polenv.html/*, retrieved Apr. 12, 2004.

[14] European Commission, Activities of the European Union - Summaries of Legislation, Community Legal Instruments, found at *http://europa.eu.int/scadplus/leg/en/cig/g4000c.htm/*, retrieved Aug. 18, 2004.

[15] European Topic Centre on Nature Protection and Biodiversity, found at *http://nature.eionet.eu.int/*, retrieved June 7, 2004.

[16] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, Their Employment and Export Potential: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[17] EEA, EEA Briefing, "Halting the Loss of Biodiversity in Europe," No. 1-2004, found at *http://www.eea.eu.int/*, retrieved May 5, 2004; EEA, "Europe's Environment: The Third Assessment," found at *http://www.eea.eu.int/*, retrieved May 5, 2004; and European Commission, "EU Focus on Nature Protection," Mar. 2002, found at *http://www.lkp.org.pl/n2k/focus_en.pdf/*, retrieved June 9, 2004.

These conventions and regulations are key drivers of demand for NLP services.[18] The European Union co-finances nature protection projects such as wildlife conservation and biodiversity restoration through tools such as structural funds, the Cohesion Fund, and the Financial Instrument for the Environment (LIFE).[19] The LIFE program has three components: LIFE-Environment, which funds environmental projects; LIFE-Third Country, which helps develop environmental policies in countries that border the Mediterranean and Baltic Seas; and LIFE-Nature, which funds NLP projects throughout the European Union. The LIFE program, now in its third phase, has a total budget of approximately $794 million, of which the LIFE-Nature budget is approximately $372 million. Since 1992, LIFE-Nature has supported over 700 NLP projects. For example, in 2003, LIFE-Nature contributed $1.3 million to restore the Saint-Hubert peat habitat in Belgium, and $2 million to conserve migratory bird wetland habitats in Northern Finland.[20] The Cohesion Fund provides environmental or transportation project financing to EU member states with per capita GNP levels of no more than 90 percent of average EU GNP. The Fund's budget for 2000-2006 is $22.3 billion. Currently Greece, Ireland, Portugal, and Spain are eligible for these funds.[21]

European Union[22]

Market Overview

The EU market for remediation services is home to several highly competitive multinational companies, including Vivendi Environnement (France), Suez SA (France), and RWE AG (Germany) (table 5-1).[23] Market maturity levels vary across

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[18] European Commission, "EU Focus on Nature Protection," Mar. 2002, found at *http://www.lkp.org.pl/n2k/focus_en.pdf/*, retrieved June 9, 2004.

[19] European Commission, "EU Focus on Nature Protection," Mar. 2002, found at *http://www.lkp.org.pl/n2k/focus_en.pdf/*, retrieved June 9, 2004; European Commission, LIFE-III, The Financial Instrument for the Environment, found at *http://europa.eu.int/comm/environment/life/life/index.htm/*, retrieved July 27, 2004; and European Commission, "The Cohesion Fund at a Glance," found at *http://europa.eu.int/comm/regional_policy/funds/procf/cf_en.htm/*, retrieved July 27, 2004.

[20] LIFE-Nature typically funds up to 50 percent of a given project, or up to 75 percent if the project is related to a priority species or habitat. European Commission, LIFE-III, The Financial Instrument for the Environment, found at *http://europa.eu.int/comm/environment/life/life/index.htm/*, retrieved July 27, 2004; European Commission, "LIFE-Nature," found at *http://europa.eu.int/comm/environment/life/life/nature.htm/*, retrieved Aug. 16, 2004; and European Commission, LIFE project database, found at *http://europa.eu.int/comm/environment/life/project/Projects/index.cfm/*, retrieved Aug. 16, 2004.

[21] European Commission, "The Cohesion Fund at a Glance," found at *http://europa.eu.int/comm/regional_policy/funds/procf/cf_en.htm/*, retrieved July 27, 2004.

[22] As stated above, this section focuses principally on the countries of Western Europe (the member states of the former EU-15) by virtue of their larger and more mature markets and their relatively greater role in developing and implementing the environmental policies of the present-day EU.

[23] Remediation services are generally a small component of the total scope of services provided by these firms and are usually provided by subsidiaries. These include SITA and SITA's wholly-owned affiliate, Teris, (SUEZ); GRS Valtech (Vivendi); and RWE Umwelt

member states. France, Germany, and the United Kingdom have large, mature markets for remediation services, while demand is growing in other markets such as Italy and Spain.[24]

As reported earlier, EU remediation expenditures for 1999 were $4.1 billion. Annual expenditures varied by member state, from a low of $24 million in Ireland to a high of $1.1 billion in Germany. Germany accounted for 25 percent of the European Union's total remediation expenditures, followed by Denmark, with 1999 expenditures of $859 million or 21 percent of the total, and the Netherlands with $569 million or 14 percent.[25] France and Germany are large markets for remediation services by virtue of their large number of contaminated sites. In 1999, Germany surveyed 362,000 contaminated sites, while France surveyed between 300,000 and 400,000 sites. Together, these two countries account for approximately 58 percent of surveyed sites in the European Union. However, data for Greece, Italy, Luxembourg, and Portugal are unavailable; therefore, the percentage of total sites surveyed is estimated. Differing site contamination criteria across member states compounds the difficultly in comparing the number of contaminated sites reported.[26] In 2000, the European Environmental Agency (EEA) estimated the total remediation costs for all contaminated sites in the European Union to be between approximately $68.4 billion and $129.9 billion. In both the high and low estimates, the Netherlands and the United Kingdom account for the highest total estimates with costs between $28.3 billion and $56.6 billion, and $16 billion and $48 billion, respectively. However, EEA data for Germany and Belgium are incomplete, and data for Greece, France, Luxembourg, and Portugal are not included.[27]

AG (RWE AG).

[24] USDOC, ISAs, "Remediation of Contaminated Sites: Germany," Sept. 2002, "Remediation of Contaminated Sites: France" Sept. 2002, "Remediation of Contaminated Sites: Germany," Sept. 2002, "Remediation of Contaminated Sites - Equipment and Services: Italy," Jan. 2003, and "Remediation of Contaminated Sites: Spain," Sept. 2002, all found at *http://www.stat-usa.gov/*, retrieved Feb. 17, 2004; and EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2002, p. 18-66.

[25] France is another large market for these services, but comparable information was not provided in this data set. Data is also unavailable for Finland and Portugal. Similar country-specific expenditures are not available from EBI. ECOTEC Research and Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[26] EEA, "Assessment of Data Needs and Data Availability for the Development of Indications on Soil Contamination," 2002; and "Management of Contaminated Sites in Western Europe," June 2000, both found at *http://www.eea.eu.int/*, retrieved Aug. 4, 2004; and GeneralCologne Re, "Contaminated Sites in Western Europe - Who Will Pay for Cleanup," found at *http://www.genre.com/, sharedfile/pdf/topics11kingdollar-en.pdf/*, retrieved Aug. 5, 2004.

[27] EEA,"Management of Contaminated Sites in Western Europe," June 2000, found at *http://www.eea.eu.int/*, retrieved Aug. 4, 2004.

Table 5-1
Selected characteristics of the EU market[1] for remediation and nature and landscape (NLP) protection services

Item	Characteristics
Market size (2000)	• In 2000, the market for remediation services was valued at $7.9 billion, while the total environmental sector was valued at $158 billion.[2]
Employment (1999)	• The EU remediation and NLP sectors employ approximately 23,100 and 99,800 workers, respectively.[3]
Trade (1999)	• The United States is the EU's largest export market for environmental goods and services. The European Union maintained a trade surplus of approximately $6 billion in 1999 in this sector of which remediation and nature and landscape services are a component. However, trade data specific to remediation and NLP services are unavailable.[4] • EU remediation firms generally do not have a significant presence in the United States. At least 5 of the larger U.S. environmental services firms have operations in the EU.[5] EU firms have an active presence in CEE markets.[6]
Characteristics of remediation segment	• The EU remediation market is primarily served by private sector firms. France and Germany are large markets for remediation services by virtue of their large number of contaminated sites. In 1999, Germany surveyed 362,000 contaminated sites, while France surveyed between 300,000 and 400,000 sites. Together, these two countries account for approximately 58 percent of survey sites in the European Union.[7]

[1] This table focuses principally on the countries of Western Europe (the member states of the former EU-15) by virtue of their larger and more mature markets and their relatively greater role in developing and implementing the environmental policies of the current EU.

[2] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the cleanup of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1. EBI, "The Global Environmental Market by Region, 2000," email message to USITC staff, received July 31, 2003.

[3] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," found at http://europa.eu.int/comm/environment/enlarg/pdf/qa.pdf/, retrieved Mar. 24, 2004.

[4] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, Their Employment and Export Potential, A Final Report to DG Environment," Nov. 2002, found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[5] USDOC, ISA, "Remediation of Contaminated Sites: Italy," Oct. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004; USDOC, ISA, "Soil Remediation: Belgium," Mar. 2003, found at *http://www.stat-usa.gov/*, retrieved Feb. 17, 2004; USDOC, ISA, "Remediation of Contaminated Sites: France," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004; and industry representative, interview by USITC staff, California, May 11, 2004.

[6] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.; and ECOTEC Research & Consulting Limited, "EU Eco-Industries: Trade and International Markets: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[7] EEA, "Assessment of Data Needs and Data Availability for the Development of Indications on Soil Contamination," 2002, and "Management of Contaminated Sites in Western Europe," June 2000, both found at http://www.eea.eu.int/, retrieved Aug. 4, 2004; and GeneralCologne Re, "Contaminated Sites in Western Europe - Who Will Pay for Cleanup," found at http://www.genre.com/, sharedfile/pdf/topics11kingdollar-en.pdf/, retrieved Aug. 5, 2004.

Table 5-1—*Continued*
Selected characteristics of the EU market[1] for remediation and NLP services

Item	Characteristics
Characteristics of NLP segment	• This market is primarily driven by regulation, and funded by various EU programs, such as the Life-Nature program, which funds projects in support of EU environmental policy.[8] The European Union spent approximately $8.4 billion on nature protection in 1999.[9]
Key market participants (and location of parent)	• ASA Abfall Service AG (subsidiary of EDF) (France) • Backhus (Germany) • Baure und Mourik (Germany) • Biogenie (France) • Bouygues (France) • CH2M Hill (United States) • Duke Engineering (United States) • Environmental Resources Management (United Kingdom) • Geoprobe Environmental Technologies (United States) • Group URS (United States) • Marius Pedersen (Denmark) • Polyfelt GmbH (Germany) • RWE AG (RWE Umwelt AG) (Germany) • Sondalp (France) • Sprying Systems Deutschland (Germany) • Suez SA (SITA) (France) • Veolia Environnement (France) • Vivendi Environnement (France)[10]
Key EU legislation[11]	Remediation-related: • Environmental Liability Directive, 2004/35/EC • Water Framework Directive 2000/60/EC • Directive on Incineration of Waste 2000/76/EC • Landfill of Waste Directive 1999/31/EC • Integrated Pollution Prevention and Control (IPPC) Directive 1996/61/EC • Disposal of PCBs and PCTs 1996/59/EC • Directive on Hazardous waste, 1991/689/EEC • Directive on the Protection of the Environment and in Particular the Soil when Sewage Sludge is used in Agriculture 1986/278/EEC • Directive on Procedures for the Surveillance and Monitoring of Environments Concerned by Waste from the Titanium Dioxide Industry 1982/883/EEC • Directive on Waste from the Titanium Dioxide Industry 1978/176/EEC • Disposal of Waste Oils Directive 1975/439/EEC • Waste Framework Directive 1975/442/EEC

[8] European Commission, "EU Focus on Nature Protection," Mar. 2002, found at *http://www.lpk.org.pl/n2k/focus_en.pdf,* retrieved June 9, 2004.

[9] ECOTEC Research and Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," found at http://europa.eu.int/comm/environment/pubs/studies.htm/, retrieved Mar. 25, 2004.

[10] USDOC, ISAs, "Remediation of Contaminated Sites: France" Sept. 2002, "Remediation of Contaminated Sites: Germany," Sept. 2002, "Remediation of Contaminated Sites - Equipment and Services: Italy," Jan. 2003, and "Remediation of Contaminated Sites: Spain," Sept. 2002, all found at *http://www.stat-usa.gov/*, retrieved Feb. 17, 2004; and EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2002, p. 18-66.

[11] For a list of EU member states laws on remediation, please see Table 5-2.

Table 5-1—*Continued*
Selected characteristics of the EU market[1] for remediation and NLP services

Item	Characteristics
Key EU legislation[11] —*Continued*	Landscape protection-related: • "Forest Focus" Regulation (2003/2152/EC), which incorporates Protection of Forest Against Fire Regulation (1992/2158/EEC) and Protection of Forests Against Atmospheric Pollution Regulation (1986/3528/EEC), both of which were set to expire in 2002. • Suspension of Introduction of Certain Flora and Fauna Regulation (2003/349/EC) • Endangered Species Regulation (1997/338/EC) • Habitats Directive (1992/43/EEC) • Protection of the Antarctic (1990/3943/EEC) • Birds Directive (1979/409/EEC)[12]
Regulatory authorities	• Environment Directorate General Develops new environmental legislation and policies, and ensures their enforcement by Member States. • European Environmental Agency Provides research and analysis for environmental policy makers and the public in its 31 member countries, which includes the European Union, the European Economic Area (EEA), and many CEE countries. • Various Member-state level agencies, e.g., Danish Ministry of the Environment, Denmark; Environment Agency, France; Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany; and Department for Environment, Food and Rural Affairs, UK.[13]
GATS commitments	• The EU made full commitments on NLP services (CPC 9406) provided through consumption abroad and commercial presence. The EU scheduled no commitments on the cross-border supply of such services due to technical infeasibility.[14]
Membership in multilateral and bilateral conventions and agreements	• Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention on Biological Diversity • Convention on the Conservation of European Wildlife and Natural Habitats • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Wetlands of International Importance especially as Waterfowl Habitat Many or all EU member countries are members of the following conventions: • Agreement on the Conservation of Bats in Europe • Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter[15]

[12] Commission of the European Communities, "Guide to the Approximation of European Union Environmental Legislation," found at *http://europa.eu.int/comm/environment/guide/guidfin.pdf/*, retrieved Feb. 12, 2004; and Eur-Lex, Directory of Community Legislation in Force, found at *http://europa.eu.int/eur-lex/en/lif/index.html/*, retrieved Aug. 18, 2004.

[13] European Commission, Environment Directorate General, Information Brochure, found at *http://europa.eu.int/*, retrieved Feb. 12, 2004; and EEA, "Who We Are . . ," found at http://org.eea.eu.int/documents/who_we_are/, retrieved Aug. 5, 2004 and various member state environmental ministry websites.

[14] WTO, GATS, *EU Schedule of Specific Commitments*, SC/GATS/31, Apr. 1994.

[15] The information focuses principally on the countries of Western Europe (the Member States of the former EU-15) by virtue of their larger and more mature markets and their relatively greater role in developing and implementing the environmental policies of the current EU. Ecolex environmental law database, found at *http://www.ecolex.org/ecolex/en/treaties*/, retrieved June 29, 2004.

The remediation and NLP sectors account for only a small share of the overall environmental goods and services industry in the EU. In 1999, the EU's remediation sector employed approximately 23,100 people, while the NLP sector employed 99,800 workers, representing just 1 percent and 5 percent, respectively, of the 2.1 million employees in the EU's environmental goods and services sector.[28]

Consumers of remediation goods and services include both private- and public-sector entities. For example, in Austria, redevelopers of industrial sites are the primary consumers of remediation services, followed by owners and operators of landfills and gas stations.[29] In Germany, those involved in brownfield redevelopment (such as property developers) and industrial firms (primarily within petrochemical and chemical industries) are primary consumers of remediation services.[30] In Italy, remediation of sites deemed "of national interest" is the responsibility of the Ministry of Environment and the National Agency of the Protection of the Government.[31] In France, major consumers consist of private firms, state and municipal governments, and developers.[32] Site redevelopment interests are expected to contribute significantly to future growth in the European remediation market.[33] While most countries adhere to the polluter pays principle, it is often difficult to determine the polluter. As a result, public funds are used for a significant portion of remediation expenditures.[34]

Remediation methods vary from country to country with respect to efficiency, cost, and site requirements.[35] Many Western European countries use physical or chemical remediation techniques to treat contaminated soil. These methods account for one-half of the European market for such services.[36] In general, ex-situ technologies dominate the West European market because results are faster, firms have more experience using these technologies, and the results are more easily controlled.[37] Results from use

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[28] Due to data limitations, it is unclear as to what share of remediation sector employees were engaged in the provision of services, and what share were engaged in the production of equipment. However, as services activities typically account for the majority of remediation sector revenues, it is likely that most remediation-sector employees were services suppliers. Data refer to direct employment. ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[29] USDOC, ISA, "Remediation of Contaminated Sites: Austria," Oct. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[30] USDOC, ISA, "Remediation of Contaminated Sites: Germany," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[31] USDOC, ISA, "Remediation of Contaminated Sites, Equipment and Services: Italy," Jan. 2003, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[32] USDOC, ISA, "Remediation of Contaminated Sites: France," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[33] Industry representative, interview by USITC staff, Pennsylvania, May 11, 2004.

[34] EEA, "Expenditures on Remediation of Contaminated Sites," Nov. 2002, found at *http://eea.eu.int/*, retrieved Aug. 3, 2004.

[35] Industry representative, interview by USITC staff, Pennsylvania, May 11, 2004.

[36] USDOC, ISA, "Remediation of Contaminated Sites: Germany," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[37] Contaminated Land Rehabilitation Network for Environmental Technologies (CLARINET), "Remediation of Contaminated Land Technology Implementation in Europe," found at *http://www.clarinet.at/*, retrieved Apr. 8, 2004.

of in-situ technologies are typically not as fast as those from ex-situ technologies, and concerns about the comprehensiveness of the results have constrained demand for on-site remediation. However, in-situ technologies are often used in areas where extraction is impractical, such as underneath existing structures, in large contaminated areas, or in areas that contain both contaminated soil and water.[38]

In the European Union, the Environment Directorate General is responsible for developing EU environmental policy, and each member state determines how best to comply with this policy. In November 2002, EU member states and then candidate countries for accession met to discuss solutions for remediation of soil and groundwater.[39] Additionally, the European Union has included soil protection as one of its seven themes under the Sixth Environment Action Program. Soil protection policies are under development and numerous environmental directives exist that indirectly affect soil protection, including the Nitrates Directive, the Water Framework Directive, the Air Quality Framework, the Directive on National Emissions Ceilings, the Sewage Sludge Directive, the Waste Framework Directive, the Landfill Directive, the Incineration Directive, the Urban Wastewater Directive, the Integrated Pollution Prevention and Control (IPPC) Directive, the Strategic Environmental Assessment Directive, the Environmental Impact Assessment Directive, Existing Substances Regulation, the Birds Directive, and the Habitats Directive.[40] The Water Framework Directive (2000/60) addresses water pollution and replaces the Directive on the release of dangerous substances into the aquatic environment (76/464), the Groundwater Pollution Directive (80/68), and the Directive on the quality of surface water for drinking water supply (75/440).[41] The European Union's Environmental Liability Directive (2004/35/CE) entered into force on April 21, 2004. The Directive holds operators liable for the costs associated with preventing and remediating environmental damage caused by their activities under the "polluter pays" principle. While national laws may vary, EU member states must bring their national laws into

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[38] Ibid.

[39] Common Forum on Contaminated Land in the European Union, Annex to the Minutes of the 9th Meeting in Berlin, 21-22 November 2002, found at *http://www.bmu.de/en/1024/js/download/soil/b_altlastenfachkon_uk/*, retrieved May 4, 2004; and European Commission, "Towards a Thematic Strategy for Soil Protection," Apr. 4, 2002, found at *http://europa.eu.int/eur-lex/en/com/pdf/2002/com2002_0179en01.pdf*, retrieved Apr. 12, 2004.

[40] Broadly speaking, these directives, along with other environmental legislation such as Community decisions and regulations, aim to protect discrete components of the environment. Commission of the European Communities, Communication from the Commission to The Council, The European Parliament, The Economic and Social Committee, and European Commission, "Towards a Thematic Strategy for Soil Protection," Apr. 4, 2002, found at *http://europa.eu.int/eur-lex/en/com/pdf/2002/com2002_0179en01.pdf*, retrieved Apr. 12, 2004; USDOC, ISA, "Remediation of Contaminated Sites: Germany," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004; USDOC, ISA, "Remediation of Contaminated Sites: Italy," Jan. 2003, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004; and USDOC, ISA, "Remediation of Contaminated Sites: Spain," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[41] Official Journal of the European Union, Directive 2000/60/EC of the European Parliament and of the Council of 23 Oct. 2000, Oct. 23, 2000, pp. 001-0073; and "EC Legislation on Air and Water Pollution," found at *http://www.jur.ku.dk/euenvironmental/law/pdf-2004113_air-water.pdf/*, retrieved Aug. 5, 2004.

compliance with the Environmental Liability Directive by April 30, 2007.[42] To comply with this directive, most member states will have to improve existing liability legislation or create new legislation, particularly in the area of damage to nature and landscape, where few member states have liability legislation.[43] In addition, many individual member states have legislation on contaminated sites. These include, *inter alia*, the Federal Soil Protection Act (1998) and the Contaminated Sites Ordinance in Germany; Ministerial Decree No. 471/99, which deals with remediation of contaminated sites in Italy; and The National Plan for Soil Remediation (1995) and The Industrial Wastes Law (1998) in Spain.[44] For a list of remediation related laws for individual EU member states, see table 5-2.

The European Union has two primary directives that address NLP the Birds Directive and the Habitat Directive. The Birds Directive was developed to protect all wild bird species and their habitats in the European Union, while the Habitat Directive was developed to protect species and habitats, and to set aside such habitats as "Special Areas of Conservation." Natura 2000 is the name given to the network of sites designated by these directives.[45]

The European Union is a party to the Rio Convention on Biological Diversity (CBD), which charges members to develop national strategies on biodiversity.[46] After ratifying the CBD, the EU developed its own biodiversity strategy, and adopted the Communication of the European Commission to the Council and to the Parliament on a European Community Biodiversity Strategy COM (98)42 in February 1998.

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[42] Damage from nuclear and maritime accidents is covered under international conventions and is thus outside the scope of the Directive. Daria N. Ratsiborinsaya, "Environmental Liability," found at *http://www.eel.nl/dossier/environmental_liability.htm/*, retrieved July 13, 2004; and *Official Journal of the European Union*, Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004, Apr. 30, 2004, pp. L143/56-L143/75.

[43] European Commission, Press Releases, "Questions and Answers Environmental Liability Directive," Jan. 04, 2004, found at *http://europa.eu.int/rapid/pressReleasesAction/*, retrieved Aug. 16, 2004.

[44] USDOC, ISA, "Remediation of Contaminated Sites: Germany," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004; USDOC, ISA, "Remediation of Contaminated Sites: Italy," Jan. 2003, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004; and USDOC, ISA, "Remediation of Contaminated Sites: Spain," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[45] European Commission, DGXI - Environment, "Natura 2000 Managing Our Heritage," found at *http://europa.eu.int/comm/environment/nature/natura.htm/*, retrieved Apr. 9, 2004; and EEA, EEA Briefing, "Halting the Loss of Biodiversity in Europe," found at *http://www.eea.eu.int/*, retrieved Apr. 9, 2004.

[46] The European Union defines biodiversity as "all of the different varieties and forms of life," captured in three categories - ecosystems, species, and genes. The EU estimates there are 2,500 different ecosystems and 215,000 different species in Europe. European Commission, "Caring for Our Future: Action for Europe's Environment," found at *http://europa.eu.int/comm/environment/caring/en/caring22_en.pdf*, retrieved Apr. 28, 2004.

Table 5-2
EU-15 Remediation Related Legislation

Member State	Legislation
Austria	The Act for the Cleanup of Contaminated Sites (No. 299/1989) The Water Act (No. 215/1959) The Water Substances Restoration Act (1989) The Waste Management Act (1990)
Belgium	Soil Remediation Decree (1995) Flemish Regulation on Soil Remediation (1995) Wallonia Decree on Waste (1996)
Denmark	Soil Contamination Act (370/1999) The Waste Deposits Act Environmental Damage Compensation Act (225/94) Guideline on Remediation of Contaminated Sites (1998)
Finland	Environmental Protection Act (86/2000) Environmental Damage Compensation Act (737/1994) Environmental Damage Insurance Act (81/1998) Waste Act (1993) Waste Management Act (1973)
France	None specific to contaminated sites. Mining Damage Liability Act (99/245) Barnier Law on Environmental Protection (95/245) Law 76/663 - IC - Law (Law on Environmental Permits for Industrial Sites (1976) Law on Elimination of Waste and Recovery Materials (1975) Law on Management of Domestic Waste (1992) Law on Funding of Orphan Sites (1995) Various circular letters from the Ministry of Environment that outline national policies on contaminated sites.
Germany	Federal Soil Conservation Act (1998) Environmental Liability Law (1991) Ordinance on Soil Conservation and Contaminated Sites (1999)
Greece	None specific to contaminated sites. Environmental Law(Law 1650/1986) Waste Management Act (Law 69728/1996) Hazardous Waste Management Act (Law 19396/1997)
Ireland	None specific to contaminated sites. The Waste Management Act (1996) The Environmental Protection Agency Act (1992) Local Government Water Pollution Acts (1977-1990)
Italy	Ministerial Decree on Remediation of Contaminated Sites (471/1999) Law on New Initiatives in the Environmental Field (426/1998) Ronchi Decree/Waste Management Act (22/1997) The Regional Contaminated Sites Plan (1989) Law 349/1986

See footnote at end of table.

Table 5-2—*Continued*
EU Member State Remediation Related Legislation

Member State	Legislation
Luxembourg	None specific to contaminated sites. Waste Management Act (1994)
Netherlands	Soil Protection Act (1975, amended in 1986, 1994) National Environmental Policy Plan (1989) Regulation on the Disposal of Contaminated Soils (1995)
Portugal	None specific to contaminated sites. Framework Law on the Environment (1987) Decree 70/90 (water protection) (1990) Decree 74/90 (water protection) (1990) Decree 239/97 (waste management) (1997)
Spain	National Plan for the Remediation of Contaminated Soils (1995-2005) National Plan for the Remediation of Contaminated Soils (1990-1995) Law 29/1985 Water Wastes Law (10/1998)
Sweden	The Environmental Code (1998)
United Kingdom	The Environment Protection Act (1990, amended 1995) Draft Statutory Guidance on Contaminated Land (1996)

Compiled by USITC staff from American Re, "A Survey of International Environmental Remediation Regulations," found at http://www.loureiroengineering.com/LEAguidancedocs.htm/, retrieved Aug. 5, 2004; Colin C. Ferguson, "Assessing Risks from Contaminated Sites: Policy and Practice in 16 European Countries, May 1999, found at *http://www.clarinet.at/library/Ferguson_Paper_Policies.PDF/*, retrieved Aug. 5, 2004; EEA, "Management of Contaminated Sites in Western Europe," June 2000, found at *http://www.eea.eu.int/*, retrieved Aug. 5, 2004; ENSR International, "Overview of Italian Environmental Legislation (with specific reference to soil and groundwater)," Mar. 2001, found at *http://www.emsr.com/locations/ronchilaw.htm*, retrieved July 13, 2004; and Chris Clarke, "Update Comparative Legal Study," found at *http://europa.eu.int/comm/environment/liability/legalstudy_full.pdf/*, retrieved Aug. 6, 2004.

This biodiversity strategy calls for member countries to anticipate, prevent, and reverse the causes of biological resource decline, treating the environment as an "economic asset." Such policies offer improvements to industries such as forestry and tourism. Under the Sixth Environmental Programme, the EU has established a goal to achieve its objectives under the Biodiversity Strategy by 2010. In addition, the European Union is also party to the Convention on Wetlands of International Importance especially as Waterfowl Habitat, The Helsinki Convention on the Baltic Sea, The Barcelona Convention on the Mediterranean, the Bonn Convention on Migratory Species, the Berne Convention on European Wildlife and Natural Habitats, and Convention on the International Trade in Endangered Species of Wild Fauna and Flora.[47]

[47] European Commission, "EU Focus on Nature Protection," Mar. 2002, found at *http://www.lkp.org.pl/n2k/focus_en.pdf*, retrieved June 9, 2004.

Trade and Investment

The United States is currently the largest export market for EU environmental goods and services. Prior to enlargement, EU-15 exports to the CEE countries grew rapidly, and supplanted Asia as the second-largest export market for EU environmental goods and services. Environmental firms from Austria, France, Germany, and the Netherlands still maintain a particularly strong presence in the CEE markets by virtue of proximity and established trading relationships.[48] Anecdotal evidence suggests that several foreign remediation firms provide services in the EU market. For example, subsidiaries of U.S. firms including Culligan Italiana S.p.A., Foster Wheeler, Golder Associates Geoanalysis, the IT Group and D'Appolonia have operations in Italy. U.S. firms URS, Duke Engineering, and Geoprobe Environmental Technologies have operations in Belgium.[49] URS and Duke Engineering also have operations in France.[50]

The EU scheduled full GATS commitments on NLP services (CPC 9406) provided through consumption abroad and commercial presence. The EU scheduled no commitments on the cross-border supply of such services due to technical infeasibility.[51] Various member states of the EU have scheduled industry-specific commitments, like those on architectural and engineering services, that may affect suppliers of remediation and NLP services.[52] In addition, certain member states scheduled horizontal reservations that may affect trade and investment by providers of remediation and NLP services. For example, France maintains equity limits in

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[48] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, Their Employment and Export Potential, A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[49] USDOC, ISA, "Remediation of Contaminated Sites: Italy," Oct. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004; and USDOC, ISA, "Soil Remediation: Belgium," Mar. 2003, found at *http://www.stat-usa.gov/*, retrieved Feb. 17, 2004.

[50] USDOC, ISA, "Remediation of Contaminated Sites: France," Sept. 2002, found at *http://www.stat-usa.gov/*, retrieved June 10, 2004.

[51] World Trade Organization (WTO), General Agreement on Trade in Services, (GATS), *European Community Schedule of Specific Commitments*, GATS/SC/31, Apr. 15, 1994.

[52] For example, Spain restricts market access for the provision of architectural services to natural persons, and France requires that such services provided through a commercial presence be supplied through a *Société d'Exercice Libéral* (SEL) or *Société Civile Professionnel* (SCP) only. Germany requires firms to apply German rules regarding payments for services supplied across borders. In both Italy and Portugal, market access is limited to natural persons. For services supplied through the presence of natural persons, France, Greece, and Portugal maintain a nationality requirement for market access, and Belgium, France and Germany recognize professional qualifications only if a mutual recognition agreement exists or if, in Belgium, special permission is granted. For engineering and integrated engineering services, market access through a commercial presence is limited to natural persons in Italy, Portugal, and Spain. For such services provided through natural persons, Greece maintains a nationality requirement for market access, and Italy and Portugal maintain a national treatment residency requirement. For urban planning and landscape architectural services, market access for services provided through a commercial presence is limited to natural persons in Italy and Portugal. For such services provided through natural persons, Greece and Portugal maintain nationality requirements for market access, and Belgium and Germany recognize professional qualifications only if a mutual recognition agreement exists or if, in Belgium, special permission is granted. WTO, GATS, *European Community Schedule of Specific Commitments*, GATS/SC/31, Apr. 15, 1994.

publically traded French companies and newly privatized companies, while government authorization is required for certain types of investment in Spain and Portugal. Horizontal limitations on the temporary presence of natural persons may also impede the provision of these services by foreign providers.[53]

Czech Republic

Market Overview

In 1999, the Czech market for environmental goods and services was valued at $1.6 billion,[54] making it the second-largest market for environmental goods and services among the newly acceded countries.[55] The Czech Republic has a large number of contaminated sites as a result of industrial and agricultural activities under the former communist regime, such as chemical production, coal and uranium mining, and milling.[56] To fund remediation activities, the government sells sites in need of remediation to private entities at full price. All proceeds from these sales go to the National Property Fund (NPF).[57] The Ministry of Environment, the NPF, and the new owner nominate firms to perform remediation work, and while the new owner hires the contractor, payment comes directly from the NPF.[58] In 2002, the NPF spent $216 million on remediation projects, accounting for 95 percent of the domestic remediation market. The total remediation services market was valued at $228 million in 2002 (table 5-3).[59] While some industry representatives are optimistic about the potential of the remediation market in the Czech Republic, others contend that the demand generated by privatization is declining.[60] In fact, the NPF will likely be dissolved in 2005 and its funds dispersed between the Ministry of Finance and the Ministry of Environment.[61]

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[53] WTO, GATS, *European Community Schedule of Specific Commitments*, GATS/SC/31, Apr. 15, 1994.

[54] ECOTEC Research & Consulting Limited, "Analysis of the Size and Employment of the Eco-Industries in the Candidate Countries," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[55] ECOTEC Research & Consulting Limited, "EU Eco-Industries: Trade and International Markets: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[56] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe: Czech Republic, Country Characterisation," found at *http://www.mst.dk/*, retrieved, Feb. 10, 2004.

[57] USDOC, ISA, "Remediation, Czech Republic," 2004, document provided by email correspondence with USITC staff, received Mar. 31, 2004; and OECD, "Environmental Performance Reviews: Czech Republic," (OECD: Paris, 1999), p. 89.

[58] Government representative, email correspondence with USITC staff, June 8, 2004.

[59] USDOC, ISA, "Remediation, Czech Republic," 2004, document provided by email correspondence with USITC staff, received Mar. 31, 2004.

[60] Industry representatives, interviews by USITC staff, Prague, Czech Republic, Oct. 24, 2003.

[61] Government representative, email correspondence with USITC staff, June 8, 2004.

Table 5-3
Selected characteristics of the Czech market for remediation and nature and landscape protection services

Item	Characteristics
Market size (2002)	• The total market for remediation was valued at $228 million in 2002.[1]
Trade (2002)	• Exports of remediation goods and services totaled $9 million in 2002, while imports totaled $12 million. Czech imports of such goods and services from the United States were $4 million.[1]
Characteristics of remediation segment	• The Czech Republic is a large, growing market for remediation services, as a result of industrial activities under the former communist regime, which caused extensive environmental damage, and accession to the European Union, which will require the Czech Republic to adopt higher environmental standards.[1]
Characteristics of nature and landscape protection segment	• Private sector firms are the primary providers of nature and landscape protection services. The market is expanding, partially as a result of EU accession.[2]
Key market participants (and location of parent)	• Aquatest a.s. (Czech Republic) • ASA Abfall Service AG (subsidiary of EDF, France) • Bijo TC a.s. (Czech Republic) • CH2M Hill (United States) • Duke Engineering (United States) • Geotest Brno a.s. (Czech Republic) • IT Group (United States) • KAP s.r.o. (Czech Republic) • Marius Pedersen (Denmark) • OKD, DBP Paskov a.s. (Czech Republic) • Pekonta Klando a.s. (Czech Republic) • REO-RWE Entsorgung (subsidiary of RWE AG, Germany) • Suez SA (SITA) (France) • Veolia Environment (France) • Vodni zdroje Holesov a.s. (Czech Republic)[3]
Key legislation	Remediation-related: • Act No. 199/1994 Coll. (Public Procurement Act) • Act. No. 92/1992 Coll. (The Privatization Act) • Act No. 17/1992: Coll. Amendments: 127/1994 Coll. And 287/1994 Coll. (The Environment Act) • Act No. 138/1973 Coll. (The Water Management Act) • Act. No. 125/1997 Coll. (The Waste Management Act) • Act No. 334/1992 Coll. and Decree No. 13/1994 Coll. (Protection of Agricultural Land Fund ALF) • The Water Quality Decree of 1992 • Environment Policy of 1995 • *Soil Protection Act - Under consideration* [4] Nature and landscape protection-related • Act. No. 114/1992 Coll.[5]

See footnotes at end of table.

Table 5-3—*Continued*
Selected characteristics of the Czech market for remediation and nature and landscape protection services

Item	Characteristics
Regulatory authorities	• Ministry of Environment Develops the nation's environmental policy. Responsible for cleanup of contaminated sites. • State Environmental Fund (SEF) Supports the Czech Republic's environmental policy goals. • National Property Fund (NPF) NPF is the government privatization organization. Funds generated through the sale of contaminated state-owned sites are used to pay for remediation projects. • Czech Inspectorate for the Environment Enforces environmental laws.[6]
GATS commitments	• The Czech Republic has scheduled no commitments that specifically apply to remediation or NLP services.[7]
Membership in multilateral and bilateral conventions and agreements	• Agreement on the Conservation of Bats in Europe • Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Conservation of European Wildlife and Natural Habitats • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change[8]

[1] USDOC, ISA, "Remediation, Czech Republic," 2004, document provided via email correspondence with USITC staff, received Mar. 31, 2004.

[2] Industry representatives, interviews with USITC staff, Prague, Czech Republic, Oct. 24, 2003, and SEF, Annual Report 2002, p. 11.

[3] USDOC, ISA, "Remediation, Czech Republic," 2004, document provided via email correspondence with USITC staff, received Mar. 31, 2004.

[4] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe: Czech Republic, Country Characterisation," found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; and USDOC, ISA, "Remediation, Czech Republic," 2004, document provided via email correspondence with USITC staff, received Mar. 31, 2004.

[5] "Report on the Environment in the Czech Republic in 2000," 2000, found at http://www.env.cebin.cz/, retrieved June 10, 2004.

[6] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe: Czech Republic, Country Characterisation," found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; and SEF, Annual Report 2002, p. 11.

[7] WTO, GATS, *Czech Republic Schedule of Specific Commitments*, GATS/SC/26, Apr. 15, 1994.

[8] Ecolex environmental law database, found at http://www.ecolex.org/ecolex/en/treaties/, retrieved June 29, 2004.

The Czech market for remediation services is competitive, with a number of well-established foreign and local firms. A.S.A. Abfall Service A.G., an Austrian waste management company that provides remediation services (owned by Electricite de France), is one of the largest such companies in the Czech Republic.[62] Other European firms active in the market include REO-RWE Entsorgung (Germany), SITA (France), Marius Pedersen (Denmark), and Veolia Water (France). U.S. firms supplied remediation goods and services valued at $4 million in 2002. In addition, many Czech environmental consulting firms are active in the market including KAP s.r.o, Aquatest a.s., Vodni zdroje Holesov a.s., and GEOtest Brno a.s.[63] KAP, which was purchased by environmental firm Earth Tech (Bermuda) in 2002, has 75 employees and 6 offices in the Czech Republic, and registered revenues totaling $10 million in 2002, the majority of which resulted from the firm's remediation work.[64]

Accession to the European Union, together with the need to develop flood management policies, have led to increased activity in the Czech NLP sector.[65] The State Environmental Fund (SEF) is charged with nature and landscape conservation, soil protection, and management of natural resources, among other activities.[66] SEF has developed many NLP projects including de-mudding of lakes and ponds, preserving and rehabilitating forests, and purchasing land for protected sites. SEF also aids municipalities with nature preservation projects.[67] SEF finances these projects with funds generated from environmental taxes and fines.[68] As the SEF is currently the only client for such services, and because the fund's financial resources fluctuate from year to year, private investors are not willing to invest extensively in the market.[69]

The Czech Republic is expected to come into compliance with EU environmental legislation within seven years.[70] Although a law on soil protection is under development, there is currently no single law that governs remediation in the Czech Republic. Remediation is covered in various pieces of legislation, including the Water Management Act, the Waste Management Act, the Privatization Act, a New Water Quality Decree, and a New Environmental Policy. In particular, the Privatization Act

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[62] A.S.A. Czech Republic, "A.S.A. in the Czech Republic," found at *http://www.asa-cz.cz/cz/index.htm/*, retrieved Aug. 13, 2004.

[63] USDOC, ISA, "Remediation, Czech Republic," 2004, document provided by email correspondence with USITC staff, received Mar. 31, 2004.

[64] Industry representative, interview by USITC staff, Prague, Czech Republic, Oct. 24, 2003.

[65] State Environmental Fund of the Czech Republic (SEF), *Annual Report 2002*, p. 11; and government representative, interview by USITC staff, Prague, Czech Republic, Oct. 24, 2003.

[66] SEF also supports measures involving water and air protection, waste management, environmental technologies and products, renewable energy, and accession-related programs. SEP's income consists of fines for environmental damage and allocations to the Air Improvement Program. SEF, *Annual Report 2002*, pp. 10-11.

[67] SEP, *Annual Report 2002*, p. 11; and government representative, interview by USITC staff, Prague, Czech Republic, Oct. 24, 2003.

[68] Government representative, email correspondence with USITC staff, June 8, 2004.

[69] Industry representative, interview by USITC staff, Prague, Czech Republic, Oct. 24, 2003.

[70] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, Their Employment and Export Potential," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

deals with audits of, and liability for, contaminated sites.[71] NLP in the Czech Republic is governed by Act No. 114/1992 Coll. In addition, the Czech Republic has developed programs such as the Landscape Program (1996), the River System Restoration Program, the Program of Minor Water Management Environmental Projects, and the Program of Conservation of the Natural Environment of the State Environmental Fund to help protect the nations landscape, waterways, flora, and fauna.[72] The Czech Republic is developing an amendment to the Act in order to comply with the EU Birds and Habitats directives which will provide the basis for the Natura 2000 system of protected sites. Due to the recent creation of nature preserves, the need for standards in this area is widely recognized.[73] The Ministry of Environment develops environmental laws and policies which the Czech Environmental Inspectorate enforces.[74]

Trade and Investment

The Czech market for remediation services hosts numerous well-established foreign firms. Foreign companies often partner with local Czech companies to perform remediation work in the Czech Republic, typically through NPF bidding. SITA, a subsidiary of Suez, is a market leader in remediation services, and recently won a large contract to clean up the Spolana chemical plant. The top U.S. firms active in the market are CH2M Hill Czech Republic and Framatome.[75]

Although the Czech Republic has not scheduled GATS commitments that specifically apply to remediation or NLP services, it will likely bring its schedule into broad conformity with that of the EU as regards NLP services (CPC 9406).[76] As noted, the EU commitments grant full market access and national treatment to foreign entities providing such services through consumption abroad or a commercial presence.[77] In its Uruguay Round schedule, the Czech Republic scheduled professional services commitments that may affect suppliers of remediation and NLP services. For

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[71] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe: Czech Republic, Country Characterisation," found at *http://www.mst.dk/*, retrieved, Feb. 10, 2004.

[72] Czech Environmental Institute, "Report on the Environment in the Czech Republic in 2000," 2000, found at *http://www.env.cebin.cz/*, retrieved June 10, 2004.

[73] Czech Environmental Institute, "Report on the Environment in the Czech Republic in 2000," 2000, found at *http://www.env.cebin.cz/*, retrieved June 10, 2004; and government representative, interview by USITC staff, Prague, Czech Republic, Oct. 24, 2003.

[74] Karl Wolfram Schäfer, "International Experience and Expertise in Registration, Investigation, Assessment, and Clean-Up of Contaminated Military Sites," Chapter 7 - Czech Republic, May 1997, found at *http://www.umweltbundesamt.de/altlast/web1/berichte/mooreeng/dmeng_t.htm/*, retrieved July 30, 2004.

[75] USDOC, ISA, "Remediation: Czech Republic," 2004, document provided by email correspondence with USITC staff, received Mar. 31, 2004; and UK Trade and Investment, "Environmental Market in the Czech Republic," found at *http://tradepartners.gov.uk/*, retrieved June 10, 2004.

[76] Similar conformity was noted when the EU included Austria, Finland, and Sweden in its GATS schedule.

[77] WTO, GATS, *Czech Republic Schedule of Specific Commitments*, GATS/SC/26, Apr. 15,1994, and *European Community Schedule of Specific Commitments*, GATS/SC/31, Apr. 15, 1994.

example, access to the Czech Republic's market for architectural and engineering services through a commercial presence requires authorization by the Czech Chamber of Architects, Chamber of Engineers, or any equivalent body in the supplier's home country. The Czech Republic also maintains a nationality and residency requirement, but may grant exceptions for architects.[78] These limitations will likely be integrated into the EU composite schedule. In addition, the Czech Republic is a member of several international conventions including the Convention on Biological Diversity, the Convention on the Conservation of European Wildlife and Natural Habitats, the Convention on the Conservation of Migratory Species of Wild Animals, and the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.[79]

Poland

Market Overview

Poland's market for environmental goods and services is the largest among all of the newly acceded countries, and while some opportunities exist in remediation, air pollution and waste water continue to dominate.[80] Poland's expenditures on environmental goods and services totaled approximately $4.5 billion in 1999, accounting for about one-third of such expenditures by all acceding countries.[81] Poland spent $113 million on remediation in 1999 (table 5-4), which reflects 63 percent of total remediation expenditures by all EU acceding countries in that year.[82] While these estimates include both goods and services, services constitute the bulk of the environmental "product" and thus likely account for the majority of the expenditure.[83] German firms such as Backhus, Polyfelt GmbH, and Sprying Systems Deutschland dominate the Polish market for remediation services and equipment.

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[78] WTO, GATS, *Czech Republic Schedule of Specific Commitments*, GATS/SC/26, Apr. 15,1994.

[79] For a more complete list of membership in international conventions or agreements, see table 5-2.

[80] UK Trade and Investment, "Environment Market in Poland," found at *http://www.tradepartners.gov.uk/*, retrieved June 10, 2004; and ECOTEC Research & Consulting Limited, "EU Eco-Industries: Trade and International Markets: A Final Report to DG Environment," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[81] ECOTEC Research & Consulting Limited, "Analysis of the Size and Employment of the Eco-Industries in the Candidate Countries," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[82] Ibid.

[83] Discrete data on services expenditures are not available. OECD, "Environmental Goods and Services, The Benefits of Further Global Trade Liberalisation," (OECD: Paris, 2001), p. 12.

Table 5-4
Selected characteristics of Poland's market for remediation and nature and landscape protection (NLP) services

Item	Characteristics
Market size (1999)	• Poland spent $113 million on remediation projects in 1999. The Institute of Ecology of Industrial Areas estimates Poland will need to spend $6.25 billion to remediate all of its contaminated sites.[1]
Trade (2001)	• Although it is not a significant exporter of these services, Poland is the second-largest exporter of environmental goods and services among the accession countries after the Czech Republic. German firms tend to dominate the Polish market for remediation services.[2]
Characteristics of remediation segment	• Poland is a large, growing market for remediation services, as industrial activities such as coal mining, steel, and chemical production under the former communist regime caused extensive environmental damage. Approximately 2.7 percent of Polish territory is contaminated, primarily in the heavily industrial region of Upper Silesia. The market is primarily served by private firms.[3]
Characteristics of NLP segment	• Little is known about Poland's market for NLP services.
Key market participants (and location of parent)	• Arcadis Ekokonrem (Arcadis) (Netherlands) • Arka Konsorcjum (Poland) • Backhus (Germany) • Baure und Mourik (Germany) • Eko-Krak 2000 (Poland) • Ekolog (Poland) • Fluor Daniel (United States) • Hydrogeotechnika (Poland) • Polyfelt GmbH (Germany) • Prote (Poland) • Segi-AT (Poland) • Sprying Systems Deutschland (Germany)[5]

[1] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe, Poland - Country Characterisation, found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; and USDOC, ISA, "Soil Remediation: Poland," May 2003, found at *http://www.stat-usa.gov/*, retrieved Feb. 10, 2004.

[2] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," Nov. 2002, found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004, and USDOC, "Soil Remediation: Poland," May 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004.

[3] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe, Poland - Country Characterisation, found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; and USDOC, ISA, "Soil Remediation: Poland," May 2003, found at *http://www.stat-usa.gov/*, retrieved Feb. 10, 2004.

[4] Global Leaders for Tomorrow World Economic Forum, Center for International Earth Science Information Network Columbia University, and Yale Center for Environmental Law and Policy, 2002 Environmental Sustainability Index, Annex 6, found at Internet address *http://www.ciesin.columbia.edu/indicators/ESI/*, retrieved July 1, 2004. Original data for 1998, from the World Conservation Monitoring Centre Protected Areas Database. In addition, another source states that Poland's protected areas covered approximately 26 percent of Polish territory in 2000. Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe: Poland, Country Characterisation," found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; and USDOC, ISA, Soil Remediation: Poland, found at *http://www.stat-usa.gov/*, retrieved Feb. 10, 2004.

[5] USDOC, Industry Sector Analysis, "Soil Remediation: Poland," May 2003, found at *http://www.stat-usa.gov/*, retrieved Feb. 10, 2004.

Table 5-4—*Continued*
Selected characteristics of Poland's market for remediation and NLP services

Item	Characteristics
Key legislation	Remediation: • The Environment Act • The Geological and Mining Act • Guidelines for the Assessment of Level of Contamination of Soil and Groundwater with Petrleum Products and Other Chemical Substances for Remediation Purposes • The Water Act (1974) • The Act on Environmental Protection and Management (January 1980) • The Mining and Geological Law (February 1994) • Law on the Protection of Agricultural and Forest Land (February 1995) • State Inspectorate for Environmental Protection Guidelines (1995) • The Act on Regional Development (1995) • The Waste Act (1997) • Law of Real Estate and Protection of Environment (2001) • Decree on Standards and Norms of Soil Quality (proposed)[6] Nature Protection • The Act on the Protection and Management of the Environment (1980) • The Act on Nature Protection (1991, amended 2000) • Order of the Minister of Environmental Protection, Natural Resources and Forestry on the protection of plant species (1995) and animal species (1996) • The Act on Forests (1991) • The Act on Protection of Agricultural and Forest Grounds (1995) • The Act on Physical Development (1994) • Order of the Minister of Environmental Protection, Natural Resources and Forestry for determining the types of investments potentially hazardous to the environment and human health, and on environmental impact assessment • The Hunting Law (1995)[7]
Regulatory authorities	• State Inspectorate for Environmental Protection • Ministry of Environmental Protection, Natural Resources, and Forestry • The National Fund for Environmental Protection and Waste Management • Provincial governments (voivodships)[8]
GATS commitments	• Poland has scheduled no commitments that specifically apply to remediation or landscape protection services.[9]

[6] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe, Poland - Country Characterisation, found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; USDOC, ISA, "Soil Remediation: Poland," May 2003, found at *http://www.stat-usa.gov/*, retrieved Feb. 10, 2004; and Karl Wolfram Schäfer, "International Experience and Expertise in Registration, Investigation, Assessment, and Clean-Up of Contaminated Military Sites," Chapter 15 - Poland, May 1997, found at http://www.umweltbundesamt.de/altlast/web1/berichte/mooreeng/dmeng_t.htm/, retrieved July 30, 2004.

[7] United Nations, Sustainable Development, "Natural Resource Aspects of Sustainable Development in Poland, found at http://www.un.org/esa/agenda21/natlinfo/countr/poland/natur.htm#biodiv/, retrieved July 6, 2004.

[8] Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe: Poland, Country Characterisation," found at *http://www.mst.dk/*, retrieved Feb. 10, 2004; and Poland Development Gateway, national Fund for Environmetal Protection and Water Management - Introduction, found at http://www.pldg/pl/plen/tar2/1-1-1-1-2/, retrieved Aug. 4, 2004, and The National Fund for Environmental Protection and Water Management (NFEP and WM), NFEP and WM Activites and Guidebook, found at http://www.nfosigw.gov.pl/, retrieved Aug. 5, 2004.

[9] WTO, GATS, *Poland - Schedule of Specific Commitments*, WTO/GATS/SC/71, Apr. 15, 1994.

Table 5-4—*Continued*
Selected characteristics of Poland's market for remediation and NLP services

Item	Characteristics
Membership in multilateral and bilateral conventions and agreements	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Agreement on the Conservation of Bats in Europe • Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Conservation of European Wildlife and Natural Habitats • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change[10]

[10] Ecolex environmental law database, found at *http://www.ecolex.org/ecolex/en/treaties/*, retrieved June 29, 2004.

Firms from other European countries also have a market presence, particularly those that contribute to the EcoFund, such as France, Italy, Norway, Sweden, and Switzerland.[84] Only a few small Polish firms provide remediation services. These include Prote, Segi-At, Arka Konsorcjum, Ekolog, Arcadis Ekokonrem, Hydrogeotechnika, and Eko-Krak.[85] Little is known about Poland's market for NLP services.

Approximately 2.7 percent of Polish territory is contaminated as a result of mining, industrial activities (such as fertilizer and chemical production), military waste,[86] and agricultural output. The Institute of Ecology of Industrial Areas estimates Poland will need to spend $6.25 billion to remediate all of its contaminated sites.[87] The most heavily contaminated soil is found in Upper Silesia (part of the Black Triangle), the Legnica Glogow copper-mining region, the Poznan region, the Plock region, parts of northeastern Poland, and Krakow and Warsaw. Upper Silesia is the most heavily contaminated region, as a result of steel production and coal, zinc, and lead mining.[88]

[84] Under a debt-for-environment swap arrangement, a lender can contribute a portion of Poland's debt to the EcoFund, which offers grants valued at up to 30 percent of the cost of particular environmental projects. Equipment financed through the fund is imported duty free. USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Apr. 10, 2003; and USDOC, "Environmental Consulting Services: Poland," Sept. 1999, found at *http://www.stat-usa.gov/*, retrieved Apr. 10, 2003.

[85] USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004.

[86] This report does not focus on remediation of military sites.

[87] USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004; and Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe, Poland, Country Characterisation," found at *http://www.mst.dk/*, retrieved, Feb. 10, 2004.

[88] USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004; and Danish Environmental Protection Agency, "Management of Contaminated Sites and Land in Central and Eastern Europe, Poland, Country

The National Fund for Environmental Protection and Water Management, created in April 1989, finances environmental protection projects in support of Poland's environmental policies. The Fund's revenues are typically generated through fees and penalties.[89]

Two Polish laws deal with soil remediation. The Environmental Protection Act (April 2001) is a framework for environmental protection in Poland, and aims to conform with EU environmental legislation. The Law on Real Estate and Environmental Protection (October 2001), required firms to report soil damage to local authorities by June 30, 2004. Together, these laws oblige property owners to remediate contaminated soil under the "polluter pays" principle.[90] Additionally, the State Inspectorate for Environmental Protection issued guidelines to determine soil and groundwater contamination levels. These guidelines, are entitled the "Methodology Guidelines for the Assessment of Level of Contamination of Soil and Groundwater with Petroleum Products and other Chemical Substances for Remediation Purposes."[91] With regard to privatization, the Polish Ministry of State Treasury conducts environmental audits of state-owned properties for sale, the results of which are used to mitigate risk to investors through various means such as price adjustments, since purchasers will assume the environmental liabilities of the privatized entity.[92]

Characterisation," found at *http://www.mst.dk/*, retrieved, Feb. 10, 2004.

[89] Poland Development Gateway, National Fund for Environmental Protection and Water Management - Introduction, found at http://www.pldg/pl/plen/tar2/1-1-1-1-2/, retrieved Aug. 4, 2004, and The National Fund for Environmental Protection and Water Management (NFEP and WM), NFEP and WM Activities and Guidebook, found at *http://www.nfosigw.gov.pl/*, retrieved Aug. 5, 2004.

[90] USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004; and OECD, "Environmental Performance Reviews, Poland," (OECD:Paris, 2003), p. 84.

[91] Karl Wolfram Schäfer, "International Experience and Expertise in Registration, Investigation, Assessment, and Clean-Up of Contaminated Military Sites," Chapter 15 - Poland, May 1997, found at *http://www.umweltbundesamt.de/altlast/web1/berichte/mooreeng/dmeng_t.htm/*, retrieved July 30, 2004.

[92] Robert Adamczyk, "Environmental Due Diligence in Poland," Sept. 1999, found at *http://www.masterpage.com.pl/outlook/diligence.html/*, retrieved July 30, 2004; and Karl Wolfram Schäfer, "International Experience and Expertise in Registration, Investigation, Assessment, and Clean-Up of Contaminated Military Sites," Chapter 15 - Poland, May 1997, found at *http://www.umweltbundesamt.de/altlast/web1/berichte/mooreeng/dmeng_t.htm/*, retrieved July 30, 2004.

As in other acceding countries, the primary driver for growth in the Polish environmental services market is accession to the European Union.[93] As part of its accession agreement, Poland agreed to implement the "*acquis communitaire*" - the body of laws governing EU member states. Poland is expected to comply with the environmental chapter of the *acquis communitaire* within nine years of accession,[94] at an estimated cost of between $26.2 and $78.7 billion.[95]

Trade and Investment

Anecdotal evidence suggests that Polish firms provide few, if any, remediation and NLP services to foreign clients. However, there is evidence that foreign firms provide such services to Polish customers.[96] Foreign investment in the remediation of pesticide storage depots is expected to increase, as Poland agreed to address this issue in the near future as part of its EU accession agreement. Poland does not have any domestic capacity for this type of remediation, and currently sends such pesticide-contaminated soil to the Netherlands to be incinerated. As noted, German firms tend to dominate the Polish market for remediation services.[97] High prices and a lack of a local presence have generally served to reduce demand for U.S. environmental goods and services.[98] However, U.S. firm Fluor Daniel has a joint-venture with a Polish firm to provide remediation services, making it one of the few U.S. firms active in the market.[99]

Poland has not scheduled GATS commitments that specifically apply to remediation or NLP services. However, it will likely bring its schedule into broad conformity with commitments scheduled by the EU as regards NLP services (CPC 9406). As noted, the EU commitments grant full market access and national treatment to foreign entities providing such services through consumption abroad or a commercial presence.[100] In

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[93] ECOTEC Research & Consulting Limited, "Analysis of the Size and Employment of the Eco-Industries in the Candidate Countries," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004; and USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004.

[94] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, Their Employment and Export Potential," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[95] OECD, "Environmental Performance Reviews, Poland," (OECD:Paris, 2003), pp. 183-184; and ECOTEC Research & Consulting Limited, "The Benefits of Compliance with the Environmental Acquis for the Candidate Countries," found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[96] ECOTEC Research & Consulting Limited, "Analysis of the EU Eco-Industries, their Employment and Export Potential: A Final Report to DG Environment," Nov. 2002, and "EU Eco-Industries: Trade and International Markets," Aug. 2002, found at *http://europa.eu.int/comm/environment/pubs/studies.htm/*, retrieved Mar. 25, 2004.

[97] USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004.

[98] USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004; and USDOC, "Environmental Consulting Services: Poland," Sept. 9, 1999, found at *http://www.stat-usa.gov/*, retrieved Apr. 10, 2003.

[99] USDOC, "Soil Remediation: Poland," May 5, 2003, found at *http://www.stat-usa.gov/*, retrieved Jan. 27, 2004.

[100] WTO, GATS, *Poland Schedule of Specific Commitments*, GATS/SC/71, Apr. 15, 1994, and *European Community Schedule of Specific Commitments*, GATS/SC/31, Apr. 15, 1994.

addition, in its horizontal commitments, Poland restricts the form of establishment a foreign firm may take when establishing a commercial presence to a limited liability company or a joint stock company. [101] Poland is also a member of several international conventions including the Convention on Biological Diversity, the Convention on the Conservation of European Wildlife and Natural Habitats, the Convention on the Conservation of Migratory Species of Wild Animals, and the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.[102]

Future Prospects

Future prospects for the EU remediation services market are most heavily dependent on the activities of newly acceded member states. While certain markets in the European Union have matured, the former member states of the EU-15 still account for the bulk of these services, given the large number of sites identified. However, the environmental damage that exists in CEE countries together with these countries' obligations as new members of the European Union may lead to increased market opportunities for remediation service providers.[103]

[101] WTO, GATS, *Poland Schedule of Specific Commitments*, GATS/SC/71, Apr. 15, 1994.

[102] For a more complete list of membership in international conventions or agreements, see table 5-3.

[103] European Commission, Enlargement, "Chapter 22 - Environment," found at *http://europa.eu.int/comm/enlargement/negotiations/chapters/chap22/index.htm/*, retrieved, May 5, 2004.

CHAPTER 6
ASIA AND THE PACIFIC

Introduction

Remediation and nature and landscape protection (NLP) services are generally considered to be emerging markets in the Asia-Pacific region. While a handful of countries have substantial market activity in this sector, most are still in the process of defining standards and regulations. Japan accounted for the largest share of the Asia-Pacific market for remediation, although remediation services account for a greater share of overall environmental expenditures in Australia. The Australian market for remediation services is considered mature[1] due to stringent regulations and increasing urban expansion that is raising the value of land and creating incentive for the transformation of former industrial sites into residential areas. Conversely, the Japanese remediation sector is poised for significant growth, with the country having passed its first national binding soil remediation law in 2003. Remediation markets are more consistently underdeveloped in low- and middle-income countries, where regulations are weak or non-existent, and limited funding is more likely to be directed toward higher environmental priorities such as water treatment and waste disposal.

This chapter includes a brief overview of the Asia-Pacific market for remediation and NLP services, and specific discussions regarding markets for such services in Australia, China, Japan, and Malaysia. Australia and Japan were selected for special emphasis due to the relatively large size and maturity of their overall environmental services markets, China was selected due to the significant size and the rapid growth of its environmental services market, and Malaysia was selected due to its relatively long experience with overall environmental regulation and its efforts to establish standards that may lay the foundation for future remediation legislation. The discussion of Malaysia also serves as an example of the challenges facing developing countries in the Asia-Pacific region as they attempt to address remediation and NLP issues.

[1] U.S. and Foreign Commercial Service Market Research Reports, *Australia: Remediation Equipment and Services*, July 2, 2002.

Regional Market Overview

Industry data indicate that the market for remediation services[2] in the Asia-Pacific region totaled $5.2 billion in 2000,[3] reflecting an average annual growth rate of 22 percent from 1994 to 2000 (see figure 6-1). Japan accounted for the largest share of this market, with expenditures valued at $4 billion, followed by Australia with an estimated market size of $675 million. However, remediation services account for a greater share of overall environmental expenditures in Australia (10 percent) than in Japan (4 percent). Remediation is considered to be an emerging industry in most of Asia. Many Asian countries lack regulations governing contamination issues, and the lingering effects of the Asian economic crisis have hindered the pace at which countries with regulations are able to enforce them. However, countries throughout the region are currently developing regulations on soil and water pollution, albeit at varying rates and degrees of stringency. Australia leads the Asia-Pacific region in sector maturity with comprehensive regulations and a competitive market.[4] Korea, Taiwan, and Singapore[5] are in the process of developing comprehensive regulatory frameworks that include, *inter alia*, the assignment of liability – a measure that Japan has recently adopted. The extent of enforcement in these countries is unclear due to the recent implementation of these measures. Hong Kong, China, and Thailand have either established or drafted standards for remediation, though enforcement mechanisms are not in place. In Malaysia and the Philippines, awareness of contamination issues has emerged, but other economic and environmental issues continue to take precedence over remediation and NLP issues.

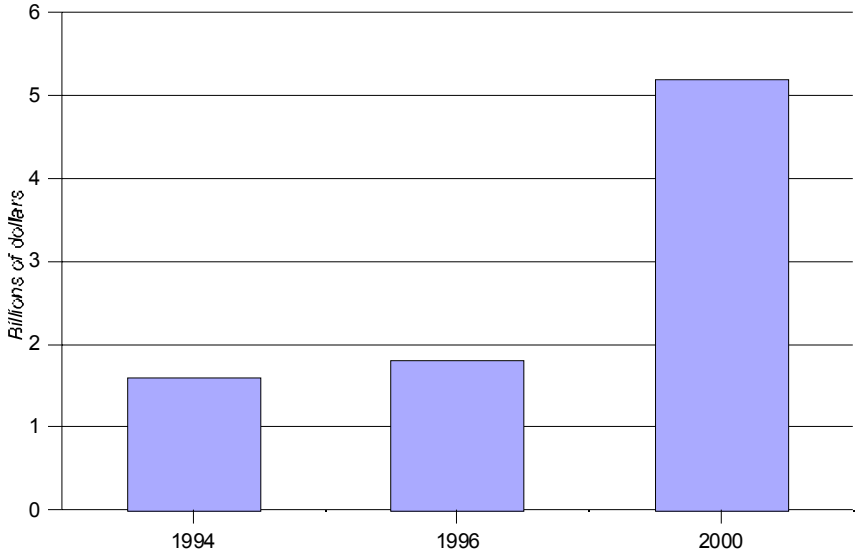
[2] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report, although it does not include activities defined as nature and landscape protection services. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1.

[3] EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001.

[4] Industry representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

[5] Ibid.

Figure 6-1
The Asia/Pacific[1] market for remediation services,[2] 1994, 1996, and 2000[3]



[1] Includes Japan, Asia, Australia, and New Zealand.
[2] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.
[3] Data for 1995, 1997, 1998, and 1999 are not available.

Source: EBI, *Environmental Business Journal*, 8/95, p. 3; U.S. Department of Commerce, Office of Technology Policy, *The U.S. Environmental Industry*, Sept. 1998, pp. 30-31; and EBI, "The Global Market by Region, 2000, "attachment to an email message, retrieved July 31, 2003.

Australia

Market Overview

Environmental Business International, Inc. (EBI), indicates that the market for remediation services in Australia was valued at $675 million in 2000 (table 6-1),[6] accounting for 10 percent of the country's overall expenditures on environmental goods and services.[7] In comparison, the U.S. Foreign and Commercial Service, which provides data only on the site assessment and soil remediation segments of the

[6] EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001. Figure was estimated by Commission staff based on EBI data.
[7] For the most part, data collection on environmental markets is conducted at the state and territory level in Australia, and is not typically aggregated at the national level. Difficulties regarding the availability and consistency of data across states do not permit meaningful trend analysis.

market,[8] indicates that such services were valued at $40 million and $50 million,[9] respectively, in 2001. In 1999, it was estimated that there were 80,000 contaminated sites in Australia, of which an estimated 88 percent were located in the three most populous states of New South Wales, Queensland, and Victoria.[10] The predominant causes of pollution in urban areas are industrial, municipal, and mining waste, whereas agrochemicals are principally responsible for rural land contamination.[11] According to industry sources, the market for site assessment and audit is believed to have peaked in 2001 and is declining, as most contaminated sites are believed to have already been identified and assessed.[12] There are as many as 50 companies participating in this market sector, many of which are Australian affiliates of U.S. parent firms. These affiliates reportedly offer more technologically advanced services than domestic firms.[13] By contrast, the site remediation segment of the market is more concentrated with a single Australian company, Theiss Services, accounting for 70 percent to 80 percent of the local market share.[14] The site remediation techniques commonly used by Theiss Services in Australia include bioremediation, thermal treatment, chemical treatment, in-situ reactive walls, and containment.[15] While these methods represent varying degrees of technological advancement, the most common remediation method among companies operating in Australia remains removal and storage of contaminated soil in hazardous waste facilities, a method that the Australian Government is increasingly trying to discourage.[16]

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[8] According to Australia's Department of the Environment and Heritage, the amount of publically available data on groundwater contamination is insufficient to determine the extent of the problem. *Australia State of the Environment Report 2001, Thematic Findings: Inland Waters*, found *at http://www.deh.gov.au/soe/2001/water.html,* retrieved Aug. 11, 2004.

[9] U.S. and Foreign Commercial Service, "Industry Sector Analysis: Pollution Control Equipment," July 2, 2002.

[10] Department of the Environment and Heritage, *Australia State of the Environment Report 2001*, Commonwealth of Australia, 2001, found at *http://www.deh.gov.au/soe/2001*, retrieved July 1, 2002.

[11] Ibid.

[12] U.S. and Foreign Commercial Service, "Industry Sector Analysis: Pollution Control Equipment," July 2, 2002.

[13] Ibid.

[14] Ibid.

[15] Theiss Services website, *Remediation Technologies*, found at *http://www.theiss-services.com.au,* retrieved June 8, 2004.

[16] The National Environment Protection Measure for the Assessment of Contaminated Sites established guidelines for the selection of remediation methods indicating that on-site treatment methods should take precedence, and when such methods are not possible, soil treated off-site should be returned once the contamination is neutralized. U.S. and Foreign Commercial Service, "Industry Sector Analysis: Pollution Control Equipment," July 2, 2002.

Table 6-1
Selected characteristics of the Australian market for remediation and nature and landscape protection services

Item	Characteristics
Market size	• Entire remediation services market valued at an estimated $675 million[1] in 2000; site assessment and soil remediation segments were valued at $40 million and $50 million, respectively, in 2001.[2] • Value of NLP services market is unknown
Trade	• While specific data are not available, anecdotal information suggests that Australia is an active importer and exporter of remediation and nature and landscape protection services.[2]
Characteristics of remediation segment	• The market is mature and highly consolidated; private sector dominates the supply of, and the demand for, remediation services. A single firm (Thiess Services) accounts for 70-80 percent of the site remediation market.[2]
Characteristics of nature and landscape protection segment	• Emphasis is placed on maintaining natural resources, ecological diversity, and biodiversity.[3]
Key market participants (and location of parent)	Site remediation:[2] • Thiess Services (Australia) • Wards Civil (Australia) • Walkers (Australia) • Clough (Australia) • Earthtech (Australia) Site assessment and audit:[2] • URS (United States) • ERM (United Kingdom) • PPK (United States) • CH2M Hill (United States) • Environ (United States) • Egis (Australia)
Key legislation[4]	• National Environmental Protection Measure for the Assessment of Contaminated Sites (1999)[3] • State and territorial laws governing remediation such as New South Wales' Contaminated Land Act 1997[3], Victoria's Environment Protection Act 1970, and Queensland's Environmental Protection Act 1994[3] • Environment Protection and Biodiversity Conservation Act (1999)[2] • Natural Heritage Trust of Australia Act 1997[3]
Regulatory authorities	• Department of the Environment and Heritage[3] • State Environment Protection Authorities[2] • Local councils [3]
GATS commitments	• Australia has scheduled no GATS commitments that specifically apply to remediation or NLP services.[5]
Other measures affecting trade and investment	• Prospective foreign investors must obtain investment approval from the Foreign Investment Review Board, which may deny specific foreign investments on the basis of national interest.[6]

See footnotes at end of table.

Table 6-1—*Continued*
Selected characteristics of the Australian market for remediation and nature and landscape protection services

Item	Characteristics
Membership in multilateral and bilateral conventions and agreements	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention for the Protection of the Natural Resources and Environment of the South Pacific Region • Convention on Biological Diversity • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • Convention on International Trade in Endangered Species of Wild Fauna and Flora • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the cleanup of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.
EB), *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001. Figure was estimated by Commission staff based on EBI data.

[2] U.S. and Foreign Commercial Service Market Research Reports, *Australia: Remediation Equipment and Services* , July 2, 2002.

[3] Department of the Environment and Heritage, "Land Management in Australia," found at *http://www.deh.gov.au,* retrieved July 1, 2004.

[4] For a more comprehensive list of regulations see Table 8-3.

[5] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), *Australia: Schedule of Specific Commitments*, GATS/SC/6, Apr. 15, 1994.

[6] U.S. Trade Representative, *2003 National Trade Estimate Report on Foreign Trade Barriers*.

The private sector[17] is the predominant consumer of soil remediation services in Australia, as most states have adopted some form of the polluter-pays principal.[18] In the event that the polluting company is unable to fund remediation efforts at a site which it no longer owns, it typically becomes the responsibility of the current

[17] In the event that pollution occurs on federal land, the polluter is responsible for remediation. If, however, the polluter is insolvent or cannot be found, the responsibility becomes that of the government. U.S. and Foreign Commercial Service, "Industry Sector Analysis: Pollution Control Equipment, " July 22, 2002.

[18] According to the OECD, under the polluter-pays principle the polluter bears "an increasing share of the costs of the pollution they cause, or risk causing." OECD, *The Polluter-Pays Principle as it Relates to International Trade*, Dec. 23, 2002, found at internet address *http://www.oecd.org,* retrieved May 26, 2004.

landowner.[19] In Australia, environmental legislation is drafted and enforced at the state level, with periodic guidance from federal regulators. For example, the Department of Environment and Heritage, Australia's national environmental protection agency, enacted the National Environment Protection Council Act 1994, which allows for the establishment of non-binding National Environment Protection Measures that serve as guidelines for state legislators.[20] In 1999, the Department enacted the Measure for the Assessment of Contaminated Sites, which seeks to harmonize site assessment standards throughout the country.[21] Each state or territory in Australia has its own Environment Protection Authority (EPA) which is ultimately responsible for creating and overseeing regulations regarding site contamination, and it is the responsibility of local governments to implement the laws. In New South Wales, the most populous state in Australia, the Contaminated Land Management Act 1997 gives the EPA authority to investigate contaminated sites and order that they be remediated.[22] Similarly, Victoria's Environment Protection Act 1970 and Queensland's Environmental Protection Act 1994 both contain provisions relating to pollution prevention, and management and cleanup of contaminated land.

Industry sources report that the Australian remediation industry as a whole is believed to be on the decline as stricter regulations governing hazardous waste and environmental protection have been embraced,[23] thus reducing the overall amount of new environmental contamination that requires remediation. Furthermore, it is believed that preparations for the Olympic games held in Sydney in 2000 were the impetus for greater-than-average activity in this segment during the late 1990s. However, as population growth and urban expansion continue, and as environmental legislation continues to evolve it is possible that unanticipated remediation requirements will emerge.

Nature and landscape protection has taken on increasing importance in Australia in recent years. The Australian Government created the National Heritage Trust in 1997 to distribute funding for environmental and natural resource protection programs among local communities. The Trust, which is valued at $1.9 billion,[24] is the largest environmental action program to be instituted in Australia. Grants are distributed for a variety of air, water, land, and biodiversity projects. Furthermore, in July 2000 the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) came into force with the objective of providing a comprehensive approach to environmental protection and management, ecologically sustainable development, and conservation of biodiversity among federal, state, and local

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[19] U.S. and Foreign Commercial Service, "Industry Sector Analysis: Pollution Control Equipment," July 2, 2002.

[20] Chris Clarke, "Update Comparative Legal Study," found at *http://europa.eu.int/comm/environment/liability/legalstudy_full.pdf/*, retrieved Aug. 6, 2004.

[21] Department of the Environment and Heritage, National Environmental Protection Council, found at *http://www.deh.gov.au/pcepd/nepc/,* retrieved Aug. 16, 2004.

[22] Chris Clarke, "Update Comparative Legal Study," found at *http://europa.eu.int/comm/environment/liability/legalstudy_full.pdf/*, retrieved Aug. 6, 2004.

[23] U.S. and Foreign Commercial Service, "Industry Sector Analysis: Pollution Control Equipment," July 2, 2002.

[24] Australian Government's Natural Heritage Trust website, found at *http://www.nht.gov.au,* retrieved July 1, 2004.

governments, and indigenous communities throughout Australia.[25] The Act requires, *inter alia*, that assessments be conducted on a range of actions that may potentially harm the environment, and government approval be obtained before such activities commence.[26] Additionally, responsible parties are required to rectify environmental damage under the Act.

Trade and Investment

While data on Australian trade in remediation and NLP services are not available, it is believed that the country actively imports and exports such services. There is a substantial U.S. presence in the Australian remediation market, and Australian firms are reportedly active in remediation projects throughout the Asia-Pacific region.[27] Opportunities will likely increase for experienced Australian firms in overseas remediation and NLP markets as the regulatory environments in other countries evolve and demand subsequently rises. While the U.S.-Australia Free Trade Agreement does not address impediments to trade in the subject services, it is unlikely that trade in this sector will fluctuate significantly given the already strong presence of U.S. companies in that market. Australia currently has no GATS commitments that directly apply to provision of the subject services. However, a provision requiring prospective foreign investors to obtain investment approval from the Foreign Investment Review Board may have an impact on foreign providers of remediation and NLP services. The Board may deny specific foreign investments on the basis of national interest.[28]

China

Market Overview

The remediation services market in China was valued at an estimated $40 million in 2000 (table 6-2), accounting for less than one percent of the country's overall expenditures on environmental goods and services.[29] Owing in part to the rapid industrialization occurring in China, and the large number of environmental challenges it subsequently faces, remediation is not as pressing an issue for the government as water treatment and waste management. However, contamination is a serious issue, with the Chinese government reporting 2,411 environmentally

[25] Department of the Environment and Heritage, *An Overview of the Environment Protection and Biodiversity Conservation Act*, Oct. 1999, found at *http://www.deh.gov.au/epbc/publications/pubs/overview.pdf,* retrieved Aug. 17, 2004.

[26] Ibid.

[27] Industry representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

[28] U.S. Trade Representative, *2003 National Trade Estimate Report on Foreign Trade Barriers*.

[29] EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001. EBI contends that reliable information on China's environmental goods and services market is difficult to obtain and any data presented in the company publications should be considered estimates.

Table 6-2
Selected characteristics of the Chinese market for remediation and nature and landscape protection services

Item	Characteristics
Market size (2000)	• Entire remediation services market valued at an estimated $40 million[1] • Value of the NLP services market is unknown
Trade (2001)	• Although specific data are not available, China is believed to be a net importer of remediation and NLP services.[2]
Characteristics of remediation segment	• The market is in its infancy, though some large-scale projects are underway with funding from international donor organizations and foreign governments.[2]
Characteristics of nature and landscape protection segment	• The market is in its early stages, though pollution control and prevention, and measures to stop desertification are issues of high importance.[3]
Key market participants (and location of parent)	• Foreign companies financed by international aid organizations are believed to dominate the market.[2]
Key legislation	• Desertification Prevention and Control Law (2001)[3] • Law of the People's Republic of China on Environmental Impact Assessment (2002)[4]
Regulatory authorities	• State Environmental Protection Administration[2]
GATS commitments	• Foreign suppliers of NLP services may only provide services in China through a joint venture. However, foreigners may hold majority stakes in these joint ventures. Commitments on Mode 1 (cross-border supply) apply only to environmental consultation services.[5]
Other measures affecting trade and investment	• Ambiguous licensing guidelines make it difficult for foreign engineering firms to obtain necessary permits except on a project-by-project basis.[6] • All land is owned by the Government, which grants fee-based usage rights for set periods. Compensation for early repossession of land is assured by law in some cases, but is inconsistent and standards are unclear.[6]

See footnotes at end of table.

Table 6-2—*Continued*
Selected characteristics of the Chinese market for remediation and nature and landscape protection services

Item	Characteristics
Membership in multilateral and bilateral conventions and agreements	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the cleanup of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1. EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001.

[2] Chinese Government and industry representatives, and U.S. government representatives, interviews by USITC staff, Beijing, China, Oct. 2003.

[3] U.S. Embassy Beijing, *China Adopts Law to Control Desertification*, Nov. 2001, found at *http://www.usembassy-china.org* retrieved May 28, 2004.

[4] Squire Sanders, "China and Japan Adopt New Requirements for Environmental Assessment and Remediation", *Environmental Law Update*, May 2003, found at *http://www.ssd.com*, retrieved June 1, 2004.

[5] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), *China: Schedule of Specific Commitments*, GATS/SC/135, Feb. 14, 2002.

[6] U.S. Trade Representative, *2003 National Trade Estimate Report on Foreign Trade Barriers*.

polluting accidents in the country in 2000, resulting in direct economic losses of approximately $22 million.[30] As heavily contaminated soil and water are widely recognized as a threat to human health, a number of foreign governments and international donor organizations are funding remediation projects in China. For example, the Government of Japan has undertaken an effort to remediate sites containing chemical munitions left over from World War II. Also, the World Bank has active environmental projects in China that include NLP services as in the case of the Guangdong Pearl River Delta Urban Environment Project, which includes a water

[30] Data include air, water, and noise pollution, as well as incidents involving solid waste. "Environmental Pollution and Damage Accidents by Region 2000," State Environmental Protection Administration, found at *http://www.sepa.gov.cn/english*, retrieved Aug. 4, 2004.

quality monitoring component.[31] Further, much of the academic and scientific community in China recognizes the urgent need for legislation that would promulgate remediation of mining sites, agricultural areas polluted with pesticides, and industrial sites.[32] There are currently no laws in China governing the remediation of contaminated land. However, in 2002 the government passed the Law of the People's Republic of China on Environmental Impact Assessment, and though it does not explicitly address remediation, the law allows environmental authorities to determine the cause of, and liability for, serious environmental pollution.[33]

Although the size of the market is unknown, there is activity in China's NLP sector. In 2000, the Chinese Government reported that there were 11,115 environmental protection institutions throughout the country employing 131,092 people.[34] Additionally, 1,227 nature reserves had reportedly been established in China by 2000.[35] One of the most pressing issues for China is desertification, a growing problem principally in western China due in large part to over-grazing by cattle and migration patterns among the rural population, which accounted for 62 percent of the country's total population in 2002.[36] It is estimated that the rate of desertification in China is 2,500 square kilometers per year, resulting in economic losses of approximately $6.5 billion annually.[37] In response, the government adopted the Law to Control and Prevent Desertification in 2001, which essentially prohibits activities that contribute to loss of grasslands. This law also encourages landowners to restore affected areas through tax incentives, subsidies, and technical support. It is unclear whether the Government of China currently has funding to support and enforce the law.

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[31] The World Bank Group, *World Bank Supports Guangdong's Program to Protect the Environment in the Pearl River Delta Region*, June 9, 2004, found at *http://www.worldbank.org.cn/English/content/395c62812233.shtml,* retrieved July 23, 2004.

[32] Yongming Luo, *Environmental Pollution and Remediation Technology Background in China*, Institute of Soil Science, Chinese Academy of Sciences, Nanjing, China, found at *http://www.ics.trieste.it/documents/chemistry/remediation/activities/egm-Apr2002/UNIDO-ICS-ABSTRACT-4-22.pdf,* retrieved June 1, 2004.

[33] Squire Sanders, "China and Japan Adopt New Requirements for Environmental Assessment and Remediation", *Environmental Law Update*, May 2003, found at *http://www.ssd.com*, retrieved June 1, 2004.

[34] Environmental protection institutions include environmental protection bureaus, monitoring centers, supervision centers, research institutions, education and communication centers, information centers, and others. "Number of Environmental Protection Institutions at End of Year by Region 2000," and "Staff in Environmental Protection Sector at the End of Year by Region and Professional Title 2000," State Environmental Protection Administration, found at *http://www.sepa.gov.cn/english*, retrieved Aug. 4, 2004.

[35] "Nature and Ecology Conservation by Region 2000," State Environmental Protection Administration, found at *http://www.sepa.gov.cn/english*, retrieved Aug. 4, 2004.

[36] This figure also includes Taiwan. *2004 World Development Indicators*, p. 116, The World Bank Group, found at *http://www.worldbank.org/data/wdi2004/tables/table3-1.pdf*, retrieved Aug. 4, 2004.

[37] U.S. Embassy Beijing, *China Adopts Law to Control Desertification*, Nov. 2001, found at *http://www.usembassy-china.org* retrieved May 28, 2004.

Trade and Investment

While data on Chinese trade in remediation and NLP services are not available, anecdotal evidence suggests that some cross-border provision of services is occurring. China's GATS commitments grant national treatment for the provision of landscape protection services through modes 1 (cross-border supply), 2 (consumption abroad), and 3 (commercial presence), and grant market access through mode 2.[38] Foreign firms may only provide environmental services in the Chinese market through a joint venture. Other factors that may affect the foreign provision of remediation and NLP services include ambiguous licensing guidelines for engineers, and government ownership of all land.[39]

Japan

Market Overview

EBI valued the remediation services market in Japan at $4 billion in 2000 (table 6-3), accounting for 4 percent of the country's overall expenditures on environmental goods and services.[40] U.S. Government representatives estimated that the site assessment and soil remediation segments of this market were valued at $600 million[41] in 2000, based on input from Japanese industry associations, government ministries, and market research firms.[42] Despite these relatively large figures, the Japanese remediation sector is considered to be on the verge of substantial growth, as the country recently passed its first national binding soil remediation law. In 2001, it was estimated that 300,000 of Japan's 900,000 existing factories,[43] the majority of which are reportedly located in industrial zones,[44] use hazardous materials that pollute the soil, and are therefore considered potential sites for assessment and remediation services.[45] It is believed that the value of such services

[38] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), *China: Schedule of Specific Commitments*, GATS/SC/135, Feb. 14, 2002.

[39] U.S. Trade Representative, *2003 National Trade Estimate Report on Foreign Trade Barriers*.

[40] EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001.

[41] The $1.4 billion discrepancy between the EBI and U.S. Government market estimates is likely attributable in large part to the inclusion of nuclear and military site remediation services in the EBI data.

[42] It is estimated that approximately 80 percent of the market is devoted to the soil cleanup activities while the remainder is attributable to planning, research, and design services. *Japan's Soil Remediation Market*, U.S. & Foreign Commercial Service, Mar. 22, 2002.

[43] The 300,000 factories include both operational and inactive facilities. Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[44] U.S. & Foreign Commercial Service, *Japan's Soil Remediation Market,* Mar. 22, 2002.

[45] U.S. Government estimates in 2002 indicate that the number of contaminated sites requiring clean-up in Japan is closer to 440,000. U.S. & Foreign Commercial Service, *Japan's Soil Remediation Market*, Mar. 22, 2002.

Table 6-3
Selected characteristics of the Japanese market for remediation and nature and landscape protection services

Item	Characteristics
Market size (2000)	• Entire remediation services market valued at $4 billion;[1] site assessment and soil remediation segments were valued at $600 million.[2] • Value of nature and landscape protection services market is unknown.
Trade (2001)	• Some joint venture activity is believed to be underway between Japanese and foreign firms in the soil remediation engineering segment.[2]
Characteristics of remediation segment	• The market is developing, although it is already dominated by large construction (general contracting) and water-treatment companies.[2]
Characteristics of nature and landscape protection segment	• Primary types of projects include creation of green spaces as buffers between industrial and residential areas, and the prevention of beach and riverbank erosion.[3]
Key market participants (and location of parent)	• Kurita Water Industries (Japan)[2] • Ebara Corporation (Japan)[2] • Organo Corporation (Japan)[2] • Shimizu Corporation (Japan)[2] • Obayashi Corporation (Japan)[2] • Taisei Corporation (Japan)[2]
Key legislation[4]	• Soil Contamination Countermeasure Law (2003)[3] • Basic Environmental Law (1993)[3] • Ambient Environmental Quality Standards • Environmental Quality Standards for Soil (1991)
Regulatory authorities	• Ministry of the Environment[3] • Prefectures and local governments
GATS commitments	• Japan scheduled full commitments on nature and landscape protection services through modes 2 (consumption abroad) and 3 (commercial persence).[5]
Other measures affecting trade and investment	• Foreign companies are unlikely to enter the market successfully without a joint venture with a Japanese firm.[3] • Foreign firms may find it difficult to establish a presence in Japan due to pre-qualification conditions that act as barriers to entry, such as contracts written to exclude provision of services by non-Japanese firms.[3]

See footnotes at end of table.

Table 6-3—*Continued*
Selected characteristics of the Japanese market for remediation and nature and landscape protection services

Item	Characteristics
Membership in multilateral and bilateral conventions and agreements	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • Convention on International Trade in Endangered Species of Wild Fauna and Flora • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the cleanup of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1. EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001.

[2] U.S. and Foreign Commercial Service, *Japan's Soil Remediation Market*, Mar. 22, 2002.

[3] Japanese Government and industry representatives, and U.S. government representatives, interviews by USITC staff, Tokyo, Japan, Oct. 2003.

[4] For a more comprehensive list of regulations see Table 8-3.

[5] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), *Japan: Schedule of Specific Commitments*, GATS/DC/46, Apr. 15, 1994.

provided to all potential sites could reach $119 billion.[46] However, most of the polluting factories are still in operation and would have to voluntarily terminate operations or be directed to do so by the government before they would be required to undertake remediation measures.[47]

In Japan, responsibility for remediation essentially falls on the landowner, though if it is known that the contamination was caused by a previous occupant of the site, the landowner may charge them the cost of remediation or allow them to undertake the remediation efforts themselves.[48] In the case of government-owned land, the agency

[46] This figure was derived by converting an estimate of 13 trillion yen. Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[47] Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[48] When the polluter is unknown, the landowner may be eligible to receive financial assistance for remediation from funds provided jointly by government and industry. Mr. Hiroshi Tsujihara, Ministry of Environment, "Japan's Soil Contamination Law," presentation to the American Chamber of Commerce Japan, July 23, 2003.

that discovers the contaminated area is primarily responsible for the subsequent cleanup. For example, if a contaminated site was discovered during a road construction project, the Ministry of Transportation would be primarily responsible for cleaning the site, but would work in tandem with the Ministry of Environment.[49] Legislation concerning soil contamination in Japan has lagged behind that of air and water pollution. The Basic Environmental Law, enacted in 1993, established guidelines for environmental protection, which addressed soil contamination, but did not include binding legal measures.[50] The Ambient Environmental Quality Standards, and Environmental Quality Standards for Soil followed, establishing criteria for measuring contamination, but neither required firms to clean up contaminated soil. It is reported that some municipalities established ordinances regarding remediation of contaminated sites, but that such actions were confined to approximately one percent of local governments.[51] Despite the absence of binding laws, however, Japanese corporations are reportedly expected to adapt to environmental guidelines established by the government,[52] and are driven in large part by a desire to avoid negative publicity for not doing so.[53]

In 2003, Japan passed the Soil Contamination Countermeasure Law,[54] which established the first national binding regulations under which landowners must identify and treat soil that is contaminated with any of 25 toxic substances.[55] Under the law, landowners are required to test for soil contamination when industrial operations cease and the land is to be used for another purpose. Local governments can also require testing at any time if it is believed that pollution has occurred that may pose a risk to human health.[56] In the event that soil is found to be contaminated, the local government will publicize the information and the landowner has the choice of limiting access to the area, paving, layering with clean soil, containing the contaminated soil,[57] cleaning the soil,[58] or removing and properly disposing of the contaminated soil.[59] Some industry sources believe that the new law is insufficient in

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[49] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.

[50] U.S. & Foreign Commercial Service, *Japan's Soil Remediation Market,* Mar. 22, 2002.

[51] Ibid.

[52] Chris Clarke, "Update Comparative Legal Study," found at *http://europa.eu.int/comm/environment/liability/legalstudy_full.pdf/*, retrieved Aug. 6, 2004.

[53] U.S. & Foreign Commercial Service, *Japan's Soil Remediation Market,* Mar. 22, 2002.

[54] Prior to enactment of the Soil Contamination Countermeasure Law, Japan's environmental laws established standards for measuring soil pollution, but did not require parties to undertake soil remediation. U.S. & Foreign Commercial Service, *Japan's Soil Remediation Market*, Mar. 22, 2002.

[55] Toxins include heavy metals (e.g., mercury, cyanide), volatile organic compounds (e.g., drycleaning chemicals), or herbicides. Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[56] Mr. Hiroshi Tsujihara, Ministry of Environment, "Japan's Soil Contamination Law," presentation to the American Chamber of Commerce Japan, July 23, 2003.

[57] When the containment method is used, iron walls are inserted into the ground surrounding the contaminated area. Because the pollutants are still present in the soil, uses for the land are limited and the site is likely to be paved over and used as a parking lot.

[58] When contaminated soil is removed it is either taken to a soil dumpsite which is specially designed for hazardous waste, or to a soil purification facility. The cost to clean soil can be prohibitively high for many Japanese companies, prompting them to select another treatment method.

[59] The appropriate method depends upon factors related to human exposure, risk of groundwater contamination, future land use, and others.

its scope and severity, and will more likely result in responsible parties paving over contaminated sites rather than properly treating the soil.[60] However, some U.S. government officials suggest that because land is the primary collateral for business loans in Japan, it is unlikely that the government will adopt sudden and aggressive soil remediation laws that would cause land values to drop and subsequently worsen the country's non-performing loan market.[61]

Despite the recent passage of soil remediation legislation in Japan, the market is already crowded and competition is intense.[62] Waste incineration companies are reportedly tailoring existing capacities to meet emerging demands in this field.[63] Further, many steel companies in Japan are entering the environmental services market, particularly in the soil remediation segment,[64] for which they adapt smelting technologies to treat contaminated soil.[65] Steel companies, as well as large construction and water treatment firms, have reportedly established themselves firmly in the market. These firms obtain orders for remediation services and distribute contracts to smaller companies. Once a company obtains certification from the Ministry of the Environment to provide remediation services, it often takes at least one to two years before it has active projects, as that is the amount of time it typically takes for contracts to be awarded. Under the Soil Contamination Countermeasure Law, special tax benefits, low interest loans, and loaned equipment are being made available to soil and groundwater remediation companies, though it is unclear whether foreign companies are eligible for such benefits. It is reported that some Japanese remediation firms have cultivated alliances with foreign firms in order to benefit from proven methods and technologies.[66] To date, no U.S. companies have attempted to enter the Japanese remediation market independently.

Little information on Japan's NLP services market is available. The Japanese Environment Corporation, a quasi-government agency created in 1965 to guide pollution prevention efforts, has recently undertaken initiatives to create green spaces to act as buffers between industrial and residential areas.[67] In addition, the prevention of beach erosion is a significant market segment in Japan. This activity is principally carried out by placing tetrapods in the surf to break waves before they reach the shore.[68] Further attempts at erosion control have been concentrated on rivers throughout Japan where banks have been lined with concrete, a measure

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[60] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.
[61] Ibid.
[62] Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.
[63] Ibid.
[64] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.
[65] Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.
[66] U.S. firms believed to have alliances with Japanese remediation firms include Jacobs Engineering Group, CH2M Hill, and Unvironment. The extent of such relationships is unclear. U.S. & Foreign Commercial Service, *Japan's Soil Remediation Market*, Mar. 22, 2002.
[67] Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.
[68] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.

purported to stem erosion and control flooding. However, such projects can cause substantial harm to riverbank ecosystems.[69]

Trade and Investment

While data on Japanese trade in remediation and NLP services are not available, anecdotal evidence suggests that some cross-border provision of services is occurring. For example, under the Chemical Weapons Convention, the Government of Japan has sponsored one of the largest remediation projects in China. This multi-billion dollar project is focused on the cleanup of abandoned chemical weapons sites. There has been some limited coordination with U.S. remediation firms on the project, and it is believed that there is potential for contracts to be awarded to these firms in the future.[70] It is reported, however, that there are currently no foreign firms participating in the domestic remediation market in Japan.[71]

Foreign companies attempting to enter the Japanese market may encounter pre-qualification conditions that act as barriers to entry. For example, there is a perception that contracts are sometimes written to exclude the provision of services by non-Japanese firms.[72] Market entry is reportedly easier for foreign firms if they already have a presence in Japan, or they are willing to enter into a joint venture with a Japanese service provider.[73] Japan's current GATS commitments grant full market access and national treatment for the provision of NLP services through consumption abroad or a commercial presence.

Malaysia

Market Overview

The Malaysian market for remediation services was estimated at $34 million in 2001 (table 6-4),[74] much of which is likely attributable to voluntary activities by

[69] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003. A Japanese industry source indicated that standards for riverbank construction have recently changed requiring the inclusion of gaps in the concrete that would allow flora and fauna to better thrive; Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[70] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.

[71] Japanese government representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[72] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.

[73] Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[74] EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001. Figure was estimated by Commission staff based on EBI data.

Table 6-4
Selected characteristics of the Malaysian market for remediation and nature and landscape protection services

Item	Characteristics
Market size (2000)	• Entire remediation services market valued at an estimated $34 million[1] • Value of NLP services market is unknown
Trade (2001)	• While trade data are not available, it is believed that Malaysia is a net importer of remediation and NLP services.[2]
Characteristics of remediation segment	• The market is in its infancy, but there is potential for growth, as industry and government awareness of soil and water pollution is growing.[2] Industrial sites are the focus of current activities, though gas station and mining sites have been identified as areas in need of attention.[2]
Characteristics of nature and landscape protection segment	• While the market is in its infancy, erosion control is receiving increased attention.[2]
Key market participants (and location of parent)	• Coffey (United States)[2] • ENSR (United States)[2] • Environ Corp (United States)[2] • ERM (United Kingdom)[2] • GeoSyntec Consultants (United States)[2] • Some multinational corporations (e.g., oil companies) are conducting cleanup of the contamination that they produce.[2]
Key legislation	• There are guidelines for soil erosion control, but there is no legislation dealing specifically with remediation.[2]
Regulatory authorities	• Ministry of Environment[2]
GATS commitments	• Malaysia has scheduled no GATS commitments on remediation or nature and landscape protection services.[3]
Other measures affecting trade and investment	• Foreign investors are limited to a 30-percent equity stake.[2]

See footnotes at end of table.

Table 6-4—*Continued*
Selected characteristics of the Malaysian market for remediation and nature and landscape protection services

Item	Characteristics
Membership in multilateral and bilateral conventions and agreements	• Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the cleanup of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1. EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001. Figure was estimated by Commission staff based on EBI data.

[2] Malaysian and U.S. government and industry representatives, interviews by USITC staff, Kuala Lumpur, Malaysia, Oct. 2003.

[3] World Trade Organization (WTO), General Agreement on Trade in Services (GATS), *Malaysia: Schedule of Specific Commitments*, GATS/SC/52, Apr. 15, 1994.

multinational corporations operating in Malaysia.[75] There are believed to be 5 remediation service providers currently in Malaysia.[76] While remediation activities are becoming more prevalent in the country, Malaysia does not currently have any regulations mandating the cleanup of polluted sites. Mass industrialization is a relatively recent occurrence in Malaysia so the country's exposure to ground contaminants is reportedly low[77] and an urgency to address contamination issues has been slow to emerge. However, an increase in problems such as soil contaminated by hydrocarbons from gas stations, and groundwater containing metal levels so high that it cannot even be used for industrial purposes,[78] is drawing greater attention to the

[75] Many of the MNCs operating in Malaysia are subject to corporate environmental regulations that may be more stringent than those of the countries in which they operate. However, because there are no national laws governing this sector in Malaysia, and the companies do not have to report to the Ministry of Environment on self-initiated activities, firms are often selective about the remediation projects they undertake and the methods they employ. U.S. Government representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003, and industry representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

[76] Industry representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

[77] Malaysian Government representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

[78] Industry representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

country's need to address such issues. The Ministry of the Environment is in the process of developing standards that would likely lay the foundation for eventual legislation.[79] Until such legislation is in place, it is likely that the Ministry of the Environment will apply pressure on industry to act in a manner consistent with evolving standards. A handful of local and foreign firms are trying to enter the market and perpetuate awareness among industry and government that could advance such remediation legislation.

The need for NLP services has become apparent in Malaysia as soil erosion resulting from a surge in development has contributed to an increase in landslides. The Ministry of the Environment has developed guidelines for erosion control, but many residential and commercial developers lack the expertise to effectively implement them. Developers are required to conduct environmental impact assessments that must address landscape architecture, and submit the plans to various government agencies prior to beginning construction, but the ultimate approval authority rests with local governments that may have different priorities than federal regulators.[80]

Trade and Investment

Some foreign companies are trying to penetrate the Malaysian market for remediation services, but often find it to be prohibitively expensive without a local presence in an uncertain market.[81] While data on trade in remediation and NLP services are not available, anecdotal evidence indicates that some U.S.-based firms maintain a market presence. A number of Malaysian firms are vying for shares of the domestic market, but it is unlikely that they are exporting such services at this time. In fact, Malaysian firms currently lack much of the technical knowledge and expertise required to compete in the remediation sector, presenting opportunities for foreign firms to enter the market. However, local firms are endeavoring to build capacity by recruiting employees from other sectors and retraining them in chemical and environmental engineering.[82] Malaysia has not scheduled GATS commitments specifically regarding the provision of remediation or NLP services. However, Malaysia's GATS schedule indicates that foreign companies entering the market are limited to a 30-percent financial stake in local operations.

Future Prospects

As countries in the Asia-Pacific region continue to identify and address remediation and NLP needs, and subsequently implement legislation, market opportunities will

[79] There are currently 19 categories of prescribed waste – i.e., waste that the Ministry of Environment deems hazardous, upon which the government could potentially impose remediation regulations.

[80] Malaysian government representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

[81] Without a local partner, firms may have to import remediation equipment on a project-by-project basis which can be very costly. Industry representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003.

[82] Industry representative, interview by USITC staff, Kuala Lumpur, Malaysia, Oct. 9, 2003

emerge. It is likely that the most promising markets in the near future are those that have recently adopted or are crafting legislation, such as Japan, Korea, Taiwan, and Singapore.

In Japan, it is believed that environmental management consulting will become a substantial market segment as eco-awareness and social responsibility become more pervasive.[83] In addition to the new remediation law in Japan, an increase in performance of due diligence on commercial real estate purchases,[84] combined with a likely increase in sales of potentially contaminated land used by manufacturers that have moved operations offshore in response to the country's recession, will likely create more opportunities for site assessment and remediation activities.[85]

[83] Japanese Government representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

[84] U.S. Government representative, interview by USITC staff, Tokyo, Japan, Oct. 6, 2003.

[85] Japanese industry representative, interview by USITC staff, Tokyo, Japan, Oct. 7, 2003.

CHAPTER 7
DEVELOPING-COUNTRY MARKETS

Introduction

Markets for remediation and nature and landscape protection (NLP) services in developing countries are generally quite small, although the potential for growth exists. Anecdotal evidence suggests that demand for remediation services in developing countries may be driven by the cleanup activities of European- or North American-based multinational corporations[1] which have established operations in developing economies, while demand for NLP services in these markets is driven by multilateral and non-governmental organizations (NGOs) and high-income countries.[2] Legislative efforts pertaining to remediation and NLP appear to be on the rise, although the enforcement of such legislation is sometimes weak.[3] The extent of developing-country trade in remediation and NLP services is unknown, but anecdotal evidence suggests that such trade generally takes place through a commercial presence in the importing country. Factors that may deter trade and investment in developing markets for remediation and NLP services include non-transparent customs environments, investment measures, employment restrictions, patent infringement, and corruption. This chapter provides an overview of developing-country markets for remediation and NLP services, examines trade and investment in such markets, and discusses future prospects. For the purposes of this chapter, developing countries are defined as those middle- and low-income countries that are located in the following regions: Africa, Latin America and the Caribbean, Asia and the Pacific, and the Middle East. Thus, there may be some overlap between this chapter and chapters 4 and 6 of this report. When possible, information on certain economies in these regions was excluded, as they are considered high-income economies by the World Bank. These countries include Aruba, Australia, the Bahamas, Bahrain, Bermuda, Brunei, the Cayman Islands, the Channel Islands, French Polynesia, Guam, Hong Kong, Israel, Japan, Korea, Kuwait, Macao, the Netherlands Antilles, New Caledonia, New Zealand, Puerto Rico, Qatar, Singapore, the United Arab Emirates, and the U.S. Virgin Islands. However, industry sources may use different definitions of the term "developing country" in the formulation of data and other information.

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[1] For example, ChevronTexaco recently completed cleanup efforts at a production facility in Indonesia prior to turning its lease over to a new operator. ChevronTexaco, *ChevronTexaco 2002 CR Report: Decommissioning & Remediation*, found at *http://www.chevrontexaco.com/cr_report/enviromental_issues/decomm_remediation.asp*, retrieved July 2004.

[2] Industry representative, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[3] Industry representative, interviews by USITC staff, Pennsylvania, May 11-12, 2004; and The World Bank Group, Development Research Group, *Inspections and Emissions in India: Puzzling Survey Evidence on Industrial Water Pollution*, Policy Research Working Paper #1810, August 1997, found at *http://www.worldbank.org/nipr/work_paper/1810/1810-abstract.htm*, retrieved July 2004.

Market Overview

The market for remediation services in developing countries represents only a small fraction of the global market for such services. Industry data indicate that Latin America, Africa, Asia, and the Middle East together accounted for $3.3 billion,[4] or approximately 11 percent, of the nearly $29 billion global market for remediation services[5] in 2000 (table 7-1).[6] During 1994 to 2000, the market for remediation services in these areas grew at an average annual rate of 29.5 percent (figure 7-1).[7] As noted, key consumers of remediation services in developing markets appear to include North American- or European-based multinational corporations in the mining, oil, chemical, and fishing industries. Key suppliers are often North American or European environmental service firms.

Relatively low levels of industrialization are commonly cited as the primary reason for the comparatively low level of demand for remediation services in developing markets. Stated differently, developing countries reportedly have not produced sufficient contaminants to spur the emergence of remediation services markets. However, several other factors reportedly contribute to low demand for the subject services in developing markets. Industry representatives contend that political leaders and the public often do not perceive threats posed by existing contamination, primarily due to a lack of awareness of environmental threats, as well as a lack of

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[4] Reflects revenues in all countries in Latin America, Africa, Asia, and the Middle East, with the exception of Australia, Japan, and New Zealand. Because country-specific data for most regions are not available, it is not possible to establish the exact size of remediation service markets in developing countries. Environmental Business International (EBI), "The Global Environmental Market by Region, 2000," email message to USITC staff, received July 31, 2003.

[5] EBI reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1. EBI, *EBI Report 2000: The U.S. Environmental Industry and Global Market*, Sept. 2001.

[6] Numerous sources–including, *inter alia*, the World Bank, the International Monetary Fund (IMF), the United States Agency for International Development (USAID), the Asia-Pacific Economic Cooperation (APEC), the Organization for Economic Cooperation and Development (OECD), the United Nations Conference on Trade and Development (UNCTAD), and the United National Environmental Programme (UNEP)–were consulted for this chapter. While such sources provided valuable qualitative information, none of these sources offered estimates on the overall market sizes of remediation and NLP services in developing countries.

[7] Compiled by the Commission based on data from EBI. The average annual growth rate is the annual, uniform rate at which the 1994 market for remediation services in developing countries– estimated by EBI at $700 million– would have had to grow each successive year to reach $3.3 billion in 2000.

Table 7-1
Selected characteristics of developing-country markets for remediation and nature and landscape protection (NLP) services

Item	Characteristics
Market size (2000)	The total market for remediation services in developing countries totaled an estimated $3.3 billion.[1]
Trade	Although trade data are unavailable, qualitative information suggests that the subject services are predominantly supplied through firms' presence in-country (mode 3), although smaller consulting projects may be serviced through cross-border transactions (mode 1) or movement of natural persons (mode 4).[2]
General characteristics of remediation markets	Demand for such services is comparatively low due to relatively low levels of industrialization, limited government funds, as well as a lack of public environmental awareness, regulation, enforcement, and economic incentives. However, demand may be rising due to increased industrial development, privatization, private-company incentives, multilateral funding, and regional agreements. The mining, oil, chemical, and fishing industries account for the majority of demand.[2]
General characteristics of NLP services markets	Demand for such services is comparatively low in developing countries due to a lack of funds. Existing demand is largely driven by overseas development assistance (ODA) from multilateral, bilateral, and non-governmental sources. Latin America/Carribean and Africa appear to be priority regions for ODA, having received 76 percent of total multilateral funding over the last five years.[3]
Key market participants	Based on anecdotal evidence, services are generally supplied by European or North American firms.[2]
Status of legislative efforts	Legislative efforts across developing countries appear to be on the rise. However, enforcement of such legislation is often weak.[2]
Summary of GATS commitments	Ecuador, El Salvador, Lesotho, Morocco, Oman, Panama, Sierra Leone, and Thailand are the only developing countries which have scheduled commitments on NLP services.[4]

[1] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the cleanup of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the cleanup of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1. EBI, "The Global Environmental Market by Region, 2000," email message to USITC staff, received July 31, 2003.

[2] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004. Sources including, *inter alia*, web sites of the World Bank, the Inter-American Development Bank (IADB), the United Nations Environmental Programme (UNEP), the Asian Development Bank (ADB), and the Organization for Economic Cooperation and Development (OECD) were consulted but provided no data relevant to market participation by private firms.

[3] Includes commitments to developing regions from the World Bank Group, the United Nations Environmental Programme (UNEP), and the Global Environmental Facility (GEF). Compiled by the Commission based on The World Bank Group, *Cornerstones for Conservation: World Bank Assistance for Protected Areas, 1988-2003,* Aug. 2003, found at *http://www.worldbank.org/*, retrieved Jan. 2004; and United Nations Environmental Programme (UNEP), UNEP's Action in the Framework of the Global Environmental Facility, *UNEP/GEF: Promoting Conservation and Sustainable Use of Biodiversity*, Oct. 2002, found at *http://www.unep.org/,* retrieved Jan. 2004.

[4] Compiled by the Commission based on country-specific GATS commitments found at *http://www.wto.org/english/tratop_e/serv_e/environment_e/environment_e.htm*..

Table 7-1—*continued*
Selected characteristics of developing-country markets for remediation and nature and landscape protection (NLP) services

Item	Characteristics
Membership in multinational and bilateral conventions and agreements	Many developing countries are members of the following international conventions: • Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

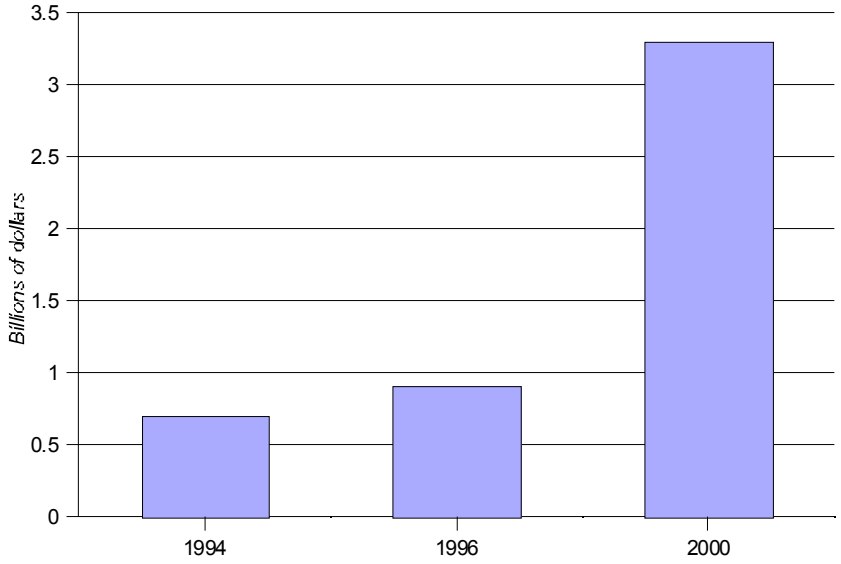
[5] Ecolex environmental law database, found at *http://www.ecolex.org/ecolex/en/treaties/*, retrieved June 29, 2004.

data and documentation on the scope of contamination. Moreover, industry sources indicate that developing countries tend to lack regulatory measures, enforcement infrastructure, and economic incentives pertaining to remediation.[8] The absence of such mechanisms may be related to limited government resources.[9]

Despite the comparatively low level of demand for remediation services in developing markets, the potential for growth exists. Higher demand may be driven by several factors. For example, rapid industrial development, especially in urban areas, is reportedly contributing to higher levels of pollution, the effects of which are becoming increasingly visible and detrimental to public health.[10] In an increasing number of countries, governments are implementing privatization initiatives that may include remediation efforts.[11] Additionally, overseas development assistance (ODA) from multilateral organizations such as the World Bank and the Organization for Economic Cooperation and Development (OECD) may help to facilitate provision of remediation services.[12] After having declined in the 1990s,[13] ODA–which often

[8] Ibid.
[9] Ibid.
[10] U.S. & Foreign Commercial Service (USFCS) and U.S. Department of State (USDOS), selected US & FCS market research reports on Azerbaijan, Brazil, Columbia, India, Kazakhstan, Malaysia, Uruguay, Venezuela, and Vietnam, found at *http://www.stat-usa.gov/*, retrieved Mar. 2004.
[11] Ibid.
[12] Ibid.
[13] The World Bank, *News Release No 220/225/S*, Mar. 2002, found at *http://www.worldbank.org/*, retrieved July 2004.

Figure 7-1
The developing countries[1] market for remediation services,[2] 1994, 1996, and 2000[3]



[1] Includes Latin America, Africa, Asia, and the Middle East, with the exception of Australia, Japan, and New Zealand.
[2] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.
[3] Data for 1995, 1997, 1998, and 1999 are not available.

Source: EBI, Environmental Business Journal, 8/95, p. 3; U.S. Department of Commerce, Office of Technology Policy, The U.S. Environmental Industry, September 1998, pp. 30-31; and EBI, The Global Market by Region, 2000, attachment to an email message, retrieved July 31, 2003.

includes funds for cleanup activities– has increased in recent years.[14] Such assistance can be direct– whereby firms bid on work outlined in development projects– as well as indirect– whereby development projects require specific firms to purchase remediation services.[15] For example, the World Bank is currently overseeing the $250 million "African Stockpiles Program," the purpose of which is to inventory and clean up 50,000 tons of expired or illegal pesticides located in Africa– as well as to provide related technical assistance.[16] The World Bank estimates that highly persistent organic pollutants (POPs) account for 30 percent of these pesticides, and

[14] The OECD increased its level of development assistance to developing countries by 7.0% in 2002 and 3.9% in 2003, and the World Bank estimates that ODA to developing countries increased by 11.5% in 2002. OECD, "Modest Increase in Development Aid in 2003," Apr. 2004, found at *http://www.oecd.org/*, retrieved July 2004; and The World Bank, *News Release No 2004/SAR*, June. 2004, found at *http://www.worldbank.org/*, retrieved July 2004.
[15] Ibid.
[16] "Rotting Pesticides Plague Africa; Cleanup Planned," Planet Ark, website, found at *http://www.planetark.org/dailynewsstory.cfm/newsid/26067/story.htm*, retrieved July 2004.

that seepage of such pollutants has led to the contamination of distant marine environments.[17]

A combination of tougher domestic legislation, often requiring companies to perform Environmental Impact Assessments (EIAs), and stricter enforcement have begun to create incentives for better environmental management in many developing countries.[18] For example, the recent signing of the Philippine Clean Water Act is expected to give the Philippine government increased regulatory authority in its fight against water contamination.[19] UNCTAD indicates that multilateral and regional environmental agreements also may stimulate demand for environmental services by stipulating that private companies in signatory economies must improve their environmental practices.[20]

Private companies also appear to recognize the benefits that accrue from better environmental management. For example, many companies operating throughout the developing world have adopted ISO 14001 management structures to minimize adverse environmental effects. By adopting such structures, these companies are able to market themselves as ISO-certified, which is considered an increasingly beneficial designation.[21] Although ISO certification may contribute to higher demand for remediation services in the short run, industry sources have pointed out that in the long run demand may decrease among firms that have obtained such certification, since firms that maintain high environmental management standards release fewer pollutants into the environment.[22] While the appeal of ISO certification, at present, seems largely confined to North American- and European-based multinational corporations, which seek to maintain favorable corporate images in home markets, such certification may also prove to be valuable in developing markets. Overall, private companies operating in developing markets are slowly becoming more environmentally responsible due to market pressure, the high cost of treatment as compared to pollution prevention, a rise in the number of environmental liability cases brought to trial, the prospect of improved business image and enhanced borrowing capability, and the increasingly stringent environmental guidelines stipulated by overseas parent companies.[23]

The market for NLP services in developing economies is quite small and appears to be heavily dependent on ODA from multilateral organizations, NGOs, and high-income countries, as limited government resources in developing countries are often

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[17] The World Bank Group, *World Development Report 2003*, 2002, found at *http://econ.worldbank.org/wdr/wdr2003/text-17926/*, retrieved July 2004.

[18] International Trade Administration (ITA), U.S. Department of Commerce (USDOC), "India Environmental Export Market Plan," found at *http://web.ita.doc.gov/ete/eteinfo.nsf*, retrieved March 2004.

[19] PricewaterhouseCoopers LLP, "International Briefings," May 2004.

[20] UNCTAD, "Sub-Regional Brainstorming Workshop on the Trade and Environmental Issues Contained in Paragraphs 31 and 32 of the WTO Doha Ministerial Declaration," 2003.

[21] International Trade Administration (ITA), U.S. Department of Commerce (USDOC), "India Environmental Export Market Plan," found at *http://web.ita.doc.gov/ete/eteinfo.nsf*, retrieved March 2004.

[22] Industry representatives, interviews by USITC staff, California, May 12, 2004.

[23] USFCS and USDOS, selected US & FCS market research reports on Azerbaijan, Brazil, Columbia, India, Kazakhstan, Malaysia, Uruguay, Venezuela, and Vietnam, found at *http://www.stat-usa.gov/*, retrieved Mar. 2004.

directed towards more immediate environmental concerns, such as drinking water purification and waste management.[24] As discussed previously, such assistance may result either in bidding by private firms engaged in the supply of NLP services on work outlined in development projects or in new measures that require local industry to seek out NLP services from private firms.[25] Overseas funding– often in the form of grants but occasionally in the form of loans– generally takes one of three forms: multilateral funding; bilateral funding; and funding from NGO sources. Most multilateral funding to developing countries originates from the World Bank Group, the United Nations Environmental Programme (UNEP), and the Global Environmental Facility (GEF). With regard to biodiversity protection or preservation projects, funding from these organizations to developing countries totaled approximately $774 million over the last five years. This represents about half of the $1.5 billion that these mulitlateral organizations indicate is necessary to fully fund the biodiversity-related needs of developing countries (table 7-2).[26] Examined by region, Latin America and the Carribean received the most multilateral funding within the last five years, having received $323 million toward 64 new biodiversity-related projects, followed by Africa, which received approximately $248 million toward 51 new projects. Over the last five years, these two regions together accounted for 76 percent of total funding for biodiversity-related projects. Developing countries also receive a significant amount of funding for NLP projects on a bilateral basis. According to Conservation International, average annual biodiversity funding from the United States (primarily the United States Agency for International Development, USAID), Germany, the Netherlands, France, Japan, and the United Kingdom totaled $113.6 million during 1998-2000, of which 86 percent was provided by the United States, Germany, and the Netherlands.[27] Non-government sources such as the World Wildlife Fund, Conservation International, and the Rainforest Alliance are another significant source of funding for biodiversity projects in developing countries.[28]

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[24] Gonzalo Castro, "Conservation Finance: the Long Road to Sustainability," Fifth World Parks Congress: Sustainable Finance Stream, Durban, South Africa, Sept. 2003.

[25] U.S. & Foreign Commerical Services (USFCS) and U.S. Department of State (USDOS), selected USFCS market research report on Azerbaijan, Brazil, Colombia, India, Kazakhstan, Malaysia, Uruguay, Venezuela, and Vietnam, found at *http://www.stat-usa.gov/*, retrieved Mar. 2004.

[26] The World Bank estimates that $1.5 billion is needed to protect biodiversity in developing economies. As of 2003, approximately $756 million in biodiversity funding has been provided to developing economies. Compiled by the Commission based on The World Bank Group*, Cornerstones for Conservation: World Bank Assistance for Protected Areas,1988-2003*, Aug. 2003, found at *http://www.worldbank.org/*, retrieved Jan. 10, 2004; and United Nations Environmental Programme (UNEP), UNEP's Action in the Framework of the Global Environmental Facility, *UNEP/GEF: Promoting Conservation and Sustainable Use of Biodiversity*, Oct. 2002, found at *http://www.unep.org*/, retrieved Jan. 11, 2004.

[27] Conservation International (CI), Centers for Applied Biodiversity Science and Conservation and Government, *Striking a Balance: Ensuring Conservation's Place on the International Biodiversity Assistance Agenda*, 2003.

[28] World Wildlife Fund (WWF), website, found at *http:// www.panda.org/*; CI, website, found at *http://www.ci.org/;* and Rainforest Alliance, website, found at *http://www.rainforest-alliance.org/*, retrieved Feb. 2004.

Table 7-2
Financial commitments to biodiversity projects in developing areas by the World Bank Group, United Nations Environmental Programme (UNEP), and the Global Environmental Facility (GEF), 1998-2003

Region	Developing countries in which multilateral organizations have funded biodiversity projects	Number of Projects	Identified Need for Biodiversity Funding	Actual Biodiversity Funding Committed
			Million dollars	*Million dollars*
Africa	Benin, Botswana, Burkina Faso, Cameroon, Comoros, Cote d'Ivoire, Ethiopia, Gambia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Seychelles, South Africa, Tanzania, Uganda, Zimbabwe.	51	420.39	247.86
East Asia/Pacific	Cambodia, China, Indonesia, Laos, Malaysia, Mongolia, Nepal, New Guinea, Philippines, Samoa, Solomon Islands, Thailand, Vanuatu, Vietnam.	28	125.20	92.39
Latin America & Caribbean	Argentina, Bahamas, Belize, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Grenada, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Lucia.	64	693.85	323.07
Middle East/North Africa	Egypt, Jordan, Morocco, Tunisia, Yemen.	8	69.08	36.15
South Asia	Bangladesh, India, Pakistan, Sri Lanka.	8	164.88	68.68
Mixed Areas[1]	Brazil, Cote d'Ivoire, India, Indonesia, Jordan, Kenya, Mexico, Uganda.	2	15.89	5.93
Total		**161**	**1,489.30**	**774.07**

[1] Reflects projects for which funding was provided to countries in more than one region.

Sources: The World Bank Group, *Cornerstones for Conservation: World Bank Assistance for Protected Areas, 1988-2003*, found at *http://www.worldbank.org/*, retrieved Jan. 2004; and United Nations Environmental Programme (UNEP), UNEP's Action in the Framework of the Global Environmental Facility, *UNEP/GEF: Promoting Conservation and Sustainable Use of Biodiversity*, found at *http://www.unep.org/*, retrieved Jan. 2004.

Multilateral organizations and NGOs have become increasingly concerned about the broader environmental implications of biodiversity loss.[29] Since over one-third of terrestrial biodiversity is located in habitats covering just 1.4 percent of the Earth's surface, factors affecting small areas of land may have significant, irreversible repercussions.[30] Moreover, the estimated worldwide population living on fragile lands has doubled since 1950, with nearly 40 percent of the populations of North Africa and the Middle East currently living on such lands.[31] Multilateral organizations and NGOs have emphasized the need to engage in sustainable development, and many developing country governments have begun to implement such measures, which may spur demand for NLP services. For example, in 2003, the World Bank committed $32.8 million to improve biodiversity and natural resource conservation and management in Guatamala. The objectives included establishing conservation areas, increasing sustainable farm and non-farm productivity, and establishing local markets for environmental services.[32]

Legislative efforts may drive demand for both remediation and NLP services in developing economies, though at present the regulatory frameworks in these countries are sometimes weak. In South and Southeast Asia, for example, formal regulation has been hampered by an absence of clear and legally-binding regulations, limited institutional capacity, a paucity of trained personnel and proper equipment, and inadequate data on the scope of pollution.[33] A notable exception is India, which from 1974 to the mid-1990s enacted seventeen constitutional provisions relating to environmental quality, making it the first country to include environmental protection in its constitution.[34] Despite this robust regulatory framework, industry sources indicate that enforcement of environmental laws is lacking or inconsistent, as is general public knowledge of environmental risks.[35] While high levels of pollution in India may elicit formal inspections, this regulatory response is often ineffective in changing behavior due to bureaucratic inefficiency, lack of follow-through, and corruption on the part of poorly-compensated inspectors.[36] However, enforcement efforts by India's Central Pollution Control Board, the Ministry of Environment and

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[29] Biodiversity loss may be caused by domestic and international pressures. Domestic pressures which may contribute to biodiversity loss in developing countries include expansion into sensitive or protected areas, the over-use of existing resources, and the introduction of techniques which prove environmentally destructive. Such pressures may be linked to poverty and demographic change. International pressures which may contribute to biodiversity loss include unsustainable consumption and use of natural resources by developing countries to meet productivity goals, WWF, "The Root Causes of Biodiversity Loss," found at *http://www.panda.org/downloads/policy/rcexsum.doc*, retrieved Apr. 2004.

[30] The World Bank Group, *World Development Report 2003*, 2002, found at *http://econ.worldbank.org/wdr/wdr2003/text-17926/*, retrieved July 2004.

[31] Ibid.

[32] The World Bank Group, "Western Altiplano Natural Resources Management Project," 2003, found at *http://www.worldbank.org/*, retrieved Feb. 2004.

[33] The World Bank Group, "Determinants of Pollution Abatement in Developing Countries: Evidence from South and Southeast Asia," *World Development* 24, No. 12 (Dec. 1996), found at *http://www.worldbank.org/nipr/work_paper/det-abs.htm*, retrieved July 2004.

[34] ITA, USDOC, "India: Pollution Control in Chemicals and Petrochemicals," found at *http://web.ita.doc.gov/ete/eteinfo.nsf*, retrieved Mar. 2004.

[35] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[36] The World Bank Group, Development Research Group, *Inspections and Emissions in India: Puzzling Survey Evidence on Industrial Water Pollution*, Policy Research Working Paper #1810, Aug. 1997, found at *http://www.worldbank.org/nipr/work_paper/1810/1810-abstract.htm*, retrieved July 2004.

Forests, and state regulatory bodies, combined with increased judicial activism, have begun to close the enforcement gap and may help to increase demand for related services.[37] Nevertheless, industry sources contend that the market for remediation and NLP services in India, as elsewhere in the developing world, is under-developed and expect it to remain that way for several years.[38]

Trade and Investment

Data on cross-border trade and investment in developing markets for remediation and NLP services are not available.[39] Anecdotal information suggests that such services are predominantly supplied through firms' commercial presence in foreign markets, although smaller consulting projects may be serviced through cross-border transactions or movement of natural persons. Several foreign firms, principally from Europe and North America, are serving developing-country markets. For example, Paris-based Suez, which employed approximately 185,000 workers and generated global revenues of $48 billion in 2002, supplies remediation services worldwide through its SITA subsidiary. By comparison, Phoenix-based Tierra Dynamic, which employs 30 workers and generates a small fraction of Suez' revenues, supplies remediation services to a few key overseas customers in Latin America and Indonesia.[40] In general, however, U.S.-based firms involved in remediation and NLP tend to avoid investing substantial amounts of resources in developing markets, because they believe that market conditions are insufficient to generate sustained profitability, and because the market for such services in the United States remains strong.[41] Those U.S. firms that choose to invest significant resources in developing markets do so primarily to service a particular project requested by a U.S.-based multinational client. Industry sources indicate that in these instances, firms are willing to make this type of investment, as the risks of potential default on project fees and patent infringement are typically low.[42] Foreign remediation and NLP service firms wishing to supply services either on a project-specific or more permanent strategic basis may form joint ventures with other foreign or domestic firms.[43] Such joint venture arrangements reportedly diversify risk and present

[37] ITA, USDOC, "India: Pollution Control in Chemicals and Petrochemicals," found at *http://web.ita.doc.gov/ete/eteinfo.nsf*, retrieved Mar. 2004.

[38] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[39] Sources including, *inter alia*, web sites of the World Bank, IADB, UNEP, ADB, and OECD were consulted, but these sources provided no data relevant to cross-border trade and investment in developing markets for remediation and NLP services.

[40] Suez, company website, found at *http://www.suez.com*/, retrieved Apr. 2004, and Tierra Dynamic, company website, found at *http://www.tierradynamic.com*/, retrieved Apr. 2004.

[41] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[42] Ibid.

[43] International Trade Administration (ITA), U.S. Department of Commerce (USDOC), "India Environmental Export Market Plan," found at *http://web.ita.doc.gov/ete/eteinfo.nsf*, retrieved March 2004.

prospective customers with a more attractive suite of capabilities than that characterized by single-company investment. Such activities are typically limited to medium and large firms.[44]

Factors that may act as barriers to trade and investment in developing markets for remediation and NLP services include non-transparent customs environments, investment measures, employment restrictions, patent infringement, and corruption. In Brazil, for example, the ability of foreign firms to profitably complete remediation projects is reportedly inhibited by the country's customs environment, in which the timely inspection of technologically-advanced equipment often is not possible.[45] In Chile, the ability of foreign firms to invest in service industries may be contingent on employment generation, the terms of compensation, and the use of local inputs.[46] Moreover, the Foreign Investment Committee (FIC) of the Ministry of Economy– the Chilean agency responsible for approving foreign investment and setting contract terms and conditions– must approve investment projects which are valued above $5 million or which are related to activities normally provided by the government or carried out through public service.[47] In India, construction contracts, which may include remediation and/or NLP components, can only be offered on a non-convertible rupee payment basis. Furthermore, foreign construction firms, which often supply remediaton services in conjunction with construction services, can be awarded government contracts only if local firms are unable to perform the required services, and only if they form joint ventures with Indian firms.[48] In Venezuela, foreign employees may not constitute more than 10 percent of the workforce in any service industry, and foreign employee salaries must not exceed 20 percent of the enterprise's total payroll.[49] Requirements such as these may have a dispositive affect on the ability and willingness of foreign firms to provide remediation services in developing markets, as commercial presence tends to be the preferred method of providing such services abroad.

Issues such as patent infringement and corruption may also impact U.S. and foreign firms' willingness to participate in developing-country markets for remediation and NLP services. In most developing countries, little or no legal protection is extended to foreign patent-holders, leaving proprietary technologies and equipment vulnerable to intellectual property infringement. Asia has specifically been cited as a region where U.S. remediation service firms may encounter difficulty in protecting intellectual property.[50] Industry sources indicate that the continued insecurity of intellectual property and the prospect of corrupt customs and local business

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[44] According to industry sources, medium and large remediation and NLP service firms are generally acknowledged to be those that generate more than $20 million in revenues per year. Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[45] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[46] U.S. Trade Representative (USTR), "2004 National Trade Estimate Report on Foreign Barriers," found at *http://www.ustr.gov/reports/nte/2004/index.htm*, retrieved Apr. 2004.

[47] Ibid. Recent implementation of the U.S-Chile FTA has not changed the FIC's role in approving foreign investment, although the Committee's authority to reject a particular foreign investment is significantly limited by the Chilean Constitution, and its decisions may be appealed if a foreign investor believes he or she has been discriminated against. USFCS, "Chile: Investment Climate," found at *http://www.buyusa.gov/chile/en/99.html*, retrieved Sept. 24, 2004

[48] Ibid.

[49] Ibid.

[50] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

environments may discourage foreign remediation and NLP firms from participating in developing markets.[51] Only ten developing countries have scheduled GATS commitments on NLP services: China,[52] Ecuador, El Salvador, Lesotho, Morocco, Oman, Panama, Sierra Leone, South Africa, and Thailand (table 7-3). Six of these countries have scheduled commitments that apply to the entire sector. The commitments submitted by Lesotho and South Africa cover only consultancy services, Panama's commitments cover only services related to studies on the association between environment and climate, and China's commitments exclude quality monitoring and pollution source inspection. Among the developing countries which have scheduled commitments on NLP, only Ecuador, Oman, and South Africa have scheduled full commitments. El Salvador requires that NLP services be provided through commercial presence (mode 3), an implicit restriction on the provision of services through cross-border supply (mode 1). Morocco and Sierra Leone reserve the right to limit the provision of these services through cross-border supply and consumption abroad. Thailand limits foreign equity ownership in the NLP services sector to 49 percent. China allows only environmental consulting services to be supplied through mode 1, and requires foreign providers of NLP services to form joint ventures with local firms in order to supply such services through mode 3. Lastly, Panama's commitments do not extend national treatment to NLP services provided through cross-border supply or a commercial presence.

Future Prospects

Industry representatives contend that due to the weak enforcement of environmental laws, it is unlikely that sizable markets for remediation and NLP services will emerge in developing economies in the near future.[53] However, higher awareness of the scope and effects of contamination and other environmental threats reportedly may increase pressure on governments to enact and enforce environmental laws.[54] In the long term, as developing-country markets for remediation and NLP services evolve, industry sources contend that foreign environmental service firms may gradually shift their focus from mature domestic markets characterized by low margins to developing countries, where higher margins and better growth prospects may eventually be achieved.[55]

[51] Ibid.

[52] For a more detailed discussion of the Chinese market for remediation and NLP services, see chap. 6 of this report.

[53] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

[54] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004; and Bennet Environmental Inc., company website, found at *http://www.bennettenv.com*, retrieved July 2004.

[55] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12, 2004.

Table 7-3
Nature of GATS commitments on nature and landscape protection (NLP) services

Member country	Do commitments apply to all or part of the sector?	Did the member country schedule full or partial commitments?[1]	Nature of limitations listed in GATS schedule
China	Part	Partial	Commitments exclude quality monitoring and pollution source inspection. Additionally, foreign firms are granted market access through a commercial presence (mode 3) only in the form of joint ventures, although foreign majority ownership is permitted. Environmental consultation is the only cross-border (mode 1) service covered by these commitments.
Ecuador	All	Full	--
El Salvador	All	Partial	Commitments only cover market access for the provision of services through a commercial presence (mode 3). There are no commitments on national treatment.
Lesotho	Part	Full	Commitments cover consultancy services only.
Morocco[2]	All	Partial	Morocco reserves the right to limit market access through cross-border supply (mode 1) and consumption abroad (mode 2).
Oman	All	Full	--
Panama	Part	Partial	Commitments apply exclusively to services for conducting studies on the relationship between the environment and climate, including the evaluation of natural disasters and the reduction of their consequences. These commitments do not grant national treatment for the provision of services through cross-border supply (mode 1) and commercial presence (mode 3).
Sierra Leone[3]	All	Partial	Sierra Leone reserves the right to limit the provision of NLP services through cross-border supply (mode 1) and consumption abroad (mode 2).
South Africa	Part	Full	Commitments apply to consultancy services only.

Table 7-3—*Continued*
Nature of GATS commitments on nature and landscape protection (NLP) services

Member country	Do commitments apply to all or part of the sector?	Did the member country schedule full or partial commitments?[1]	Nature of limitations listed in GATS schedule
Thailand	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility. There are no limitations on national treatment for the supply of services through a commercial presence (mode 3), as long as foreign equity participation does not exceed 49 percent.

[1] Most measures regarding the supply of services through the presence of natural persons (mode 4) are addressed in a member country's horizontal commitments. Thus, for the purposes of this table, a full commitment is any commitment that grants full market access or national treatment to foreign individuals or firms that provide NLP services through cross-border supply (mode 1), consumption abroad (mode 2), and commercial presence (mode 3).

[2] Does not specifically identify NLP Services or CPC 9406, but uses the broader CPC 940 category -- which includes NLP Services -- to define the scope of the sector covered by these commitments.

[3] Commitments include Other Environmental Services but do not specifically identify NLP Services or CPC 9406.

Source: Compiled by the U.S. International Trade Commission.

CHAPTER 8
SUMMARY

A cross-country comparison of the information presented throughout this report illustrates that the United States is the world's largest market for remediation services. The U.S. market was largely created by the promulgation of regulations requiring cleanup of polluted sites, in particular the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) and the Resource Conservation and Recovery Act (RCRA). Most observers agree that the U.S. market is mature, reflecting a situation under which U.S. regulations have already led to the cleanup of many of the most highly contaminated sites in the country. Further, these and other regulations which assign liability for environmental cleanup to the polluter have ensured that there are progressively fewer new sites in need of remediation in the United States. In most other countries, the regulatory process is at a much earlier stage of development. Observers expect that foreign remediation markets will grow during the next 10 to 15 years, as regulations are clarified, and more funding is devoted to remediation projects in those markets.

The market for nature and landscape protection (NLP) services is harder to characterize, as a wide variety of laws and regulations pertain to the market, and there are few firms which specialize in the industry, making data compilation difficult. However, the prevalence of biodiversity-related regulations in the subject markets as well as widespread membership in multilateral conventions on NLP issues demonstrate global awareness of these concerns.

This chapter provides an overview of the country-specific information presented in the preceding chapters, and compares the information in an effort to identify trends in the global markets for remediation and NLP services, and in the provision of such services across national borders.

Market Conditions

Remediation Services

An analysis of the information presented in this investigation suggests that many high-income countries have legislation in place to regulate pollution emissions and remediation of polluted sites, including soil, groundwater, and surface water (table 8-1). This is typically not true of middle- and low-income countries, for which concerns related to environmental remediation have received less attention than problems that are perceived as more pressing, such as sewage treatment and air pollution. As a consequence, high-income countries devote a greater level of funding to remediation services, in terms of absolute dollars, than middle- and low-income countries. The estimated market size in the subject countries ranged from $34 million in Malaysia to $12.1 billion in the United States. The developing

Table 8-1
Characteristics of selected markets for remediation services

Country	Annual market size (in $U.S.)	Principal types of cleanup sites and remediation methods	Extent of private participation	Market characteristics (competitiveness, consolidation, maturity, and market drivers)	Regulatory environment
Australia	The remediation services market was valued at an estimated $675 million in 2000.	Off-site remediation methods are most commonly used. The Australian Government is trying to encourage on-site methods, such as soil washing, vapor extraction, bio-remediation, thermal treatment, chemical treatment, and stabilization.	Private sector firms make up most of the market for both providers and consumers of remediation services, following the "polluter pays" principle. The site assessment market includes approximately 50 private-sector firms, with U.S. firms strongly represented.	The Australian market is mature and beginning to decline as existing incentives, including brownfields redevelopment and stringent regulations, have led to the cleanup of many contaminated sites.	Stringent regulations. The Environmental Protection Authority establishes guidelines at the national level, but individual states and territories enact and enforce their own legislation.
Canada	The remediation and industrial services market[1] was valued at $1.1 billion in 2001.	Former industrial sites, including abandoned mines. The majority of contaminated sites are owned by the federal government, which is responsible for cleanup on those sites. Many different types of remediation methods are used, depending on the type of site.	Remediation service providers are primarily private sector firms, mostly large multinationals. The Canadian Government is one of the largest consumers of remediation services.	There is significant growth potential, as 30,000 contaminated sites have been identified. New legislation has created additional market opportunities for private firms.	Regulatory responsibilities are divided between Environment Canada, a federal agency, and provincial and territorial authorities. Efforts to harmonize federal, provincial, and local regulations are ongoing.
China	The remediation services market was valued at an estimated $40 million in 2000.	Currently sites containing chemical munitions left over from World War II, polluted bodies of water containing oil spills, mining sites, agricultural areas polluted with pesticides, and industrial sites have been identified as high priority areas for future cleanup.	Remediation services are carried out primarily by private sector firms, often funded by international aid organizations.	Soil remediation is a new and emerging market in China with few participants. The current regulatory environment does not promote significant demand for such services.	There are currently no laws directly pertaining to remediation activities. However, the Law of the People's Republic of China on Environmental Impact Assessment allows environmental authorities to determine cause and liability for serious environmental pollution.

See footnotes at end of table.

Table 8-1—C*ontinued*
Characteristics of selected markets for remediation services

Country	Annual market size (in $U.S.)	Principal types of cleanup sites and remediation methods	Extent of private participation	Market characteristics (competitiveness, consolidation, maturity, and market drivers)	Regulatory environment
Czech Republic	The remediation services market was valued at $228 million in 2002.	Former industrial sites – particularly chemical production, coal and uranium mining, and milling sites – as well as agricultural sites.	The government sells contaminated sites to private sector buyers at market rates, then puts the proceeds of these sales into a national fund used to reimburse the new property owners for remediation expenditures. Most remediation work is performed by private-sector firms based in Western Europe.	The remediation services market is large and growing, but the government funding mechanism has dampened competition and investment by private firms. EU accession, which requires the Czech Republic to adopt higher environmental standards, is one of the primary drivers of the expansion of the overall environmental services market.	A number of laws – such as those regarding public procurement, privatization, the environment, water management, waste management, protection of agricultural land, and water quality, and the Environment Policy of 1995 – contain provisions relating to the remediation industry. A soil protection law is under consideration. The Ministry of Environment develops environmental policy and is responsible for cleaning contaminated sites. The Czech Inspectorate for the Environment enforces environmental laws.
EU[2]	The Western European remediation and industrial services market,[1] which is controlled by firms based in EU member states, was valued at $7.9 billion in 2000.	Industrial areas, primarily using ex-situ methods.	Private-sector firms are the primary providers of remediation services. Europe is home to the world's largest environmental services firms – such as Suez and Vivendi Environment – both of which provide remediation services.	The EU remediation services market is highly competitive. Germany, France, and the United Kingdom have the largest, most mature markets, and the markets in Italy and Spain are characterized by growing demand.	EU directives regarding environmental liability, waste, disposal of waste oils, PCBs and PCTs, hazardous waste, sewage sludge and soil, and the shipment of waste all impact the remediation services industry. The EU Environment Directorate General is the EU-wide regulator.

See footnotes at end of table.

Table 8-1—C*ontinued*
Characteristics of selected markets for remediation services

Country	Annual market size (in $U.S.)	Principal types of cleanup sites and remediation methods	Extent of private participation	Market characteristics (competitiveness, consolidation, maturity, and market drivers)	Regulatory environment
Japan	The remediation and industrial services market[1] was valued at $4 billion in 2000. Total estimated cost to clean up all potential remediation sites is $119 billion.	Industrial areas, primarily using containment, layering, removal, and paving. Soil washing is available, but is uncommon due to the high cost.	Private sector firms provide the majority of remediation services in Japan, though some public funds are allocated to private companies to offset their costs.	The market is entering a growth stage, in response to new legislation. Landowners are responsible for remediation of polluted sites. Sites must be tested when industrial operations cease, and the land is to be used for another purpose. The Japanese market is quickly becoming competitive, but there are no reports of foreign companies active in the market.	Japan's first national, binding soil remediation law was passed in 2003. The Soil Contamination Countermeasure Law established for the first time a comprehensive regulatory framework that addresses the assignment of liability.
Malaysia	The remediation services market was valued at an estimated $34 million in 2001.	Industrial sites are the current focus of remediation efforts. Gas stations and mining sites have been identified as areas highly in need of remediation.	The private sector is the primary provider of remediation services in Malaysia, as most activity is self-initiated in the absence of government regulation.	Most remediation services are purchased by multinational corporations operating in Malaysia. Currently, there are only 5 remediation firms in Malaysia, but there are reports of foreign and local firms interested in entering the market.	Malaysia does not have any regulations mandating cleanup of polluted sites, but standards are currently under development.

See footnotes at end of table.

Table 8-1—C*ontinued*
Characteristics of selected markets for remediation services

Country	Annual market size (in $U.S.)	Principal types of cleanup sites and remediation methods	Extent of private participation	Market characteristics (competitiveness, consolidation, maturity, and market drivers)	Regulatory environment
Mexico	The remediation and industrial services market[1] was valued at approximately $300 million in 2001.	Former industrial sites, including mines, oil refineries, railways, and maquiladora sites. The majority of contaminated sites in Mexico are remediated using off-site remediation methods. Most remediation activities in Mexico involve the cleanup of contaminated soil, rather than bodies of water.	Private-sector firms are the primary suppliers of remediation services, while PEMEX and the Mexican National Railways are key consumers of such services.	Soil remediation is a newly emerging market in Mexico, with a few multinational companies and numerous small- and medium-sized Mexican firms active in the field.	The General Law of Ecological Balance and Environmental Protection is Mexico's key piece of environmental legislation. The General Law for the Prevention and Integral Management of Waste also has implications for the Mexican remediation market. In 1995, Mexico passed an emergency environmental law specifically regarding environmental contamination, which has since expired. Regulatory authorities include the Secretariat of Environment and Natural Resources (SEMARNAT) and the Mexican Environmental Protection Agency (PROFEPA).

See footnotes at end of table.

Table 8-1—C*ontinued*
Characteristics of selected markets for remediation services

Country	Annual market size (in $U.S.)	Principal types of cleanup sites and remediation methods	Extent of private participation	Market characteristics (competitiveness, consolidation, maturity, and market drivers)	Regulatory environment
Poland	Poland spent $113 million on remediation services in 1999. The total cost of remediating all of Poland's contaminated sites is estimated to be $6.25 billion.	Primarily former industrial sites, including coal mines, and steel and chemical factories. The most heavily contaminated sites are largely concentrated in the region of Upper Silesia.	Most remediation work is performed by private, Western European firms, with a few small Polish firms also active in the market.	Poland adheres to the "polluter pays" principle. EU accession, which requires Poland to adopt higher environmental standards, is one of the primary drivers of the expansion of the overall environmental services market.	Poland has existing laws related to water, environmental protection and management, mining, protection of agricultural and forest land, regional development, waste, and real estate, as well as a proposed decree on standards and norms for soil quality. The Ministry of Environmental Protection, Natural Resources, and Forestry develops Poland's environment legislation, while the State Inspectorate for Environmental Protection is responsible for ensuring legislative compliance. The provincial governments (voivodships) also hold environmental responsibilities.

See footnotes at end of table.

Table 8-1—C*ontinued*
Characteristics of selected markets for remediation services

Country	Annual market size (in $U.S.)	Principal types of cleanup sites and remediation methods	Extent of private participation	Market characteristics (competitiveness, consolidation, maturity, and market drivers)	Regulatory environment
United States	The remediation services market[1] was valued at $12.1 billion in 2002.	Declining market in underground storage tanks, mature market for Superfund sites, growing market for brownfield sites and sites contaminated with certain chemicals, particularly MTBEs and perchlorates. Remediation methods vary depending on the characteristics of the site.	Remediation services are principally performed by private-sector firms. Federal and state government agencies form an important segment of the client base, but there is growing consumption of remediation services by private sector clients primarily interested in brownfields redevelopment.	The largest 15 firms account for approximately one-half of total remediation revenues; 85 percent of firms are small and account for approximately 20 percent of revenues.	Highly regulated, primarily due to RCRA, CERCLA, and their amendments. The U.S. EPA and state environmental authorities are the primary regulators. A number of U.S. federal agencies also have responsibilities which impact the remediation market, such as the U.S. Army Corps of Engineers, the U.S. Department of Defense, and the U.S. Department of Energy.

See footnotes at end of table.

Table 8-1—C*ontinued*
Characteristics of selected markets for remediation services

Country	Annual market size (in $U.S.)	Principal types of cleanup sites and remediation methods	Extent of private participation	Market characteristics (competitiveness, consolidation, maturity, and market drivers)	Regulatory environment
Developing countries	The countries of Latin America, Africa, Asia, and the Middle East (excluding Australia, Japan, and New Zealand) together accounted for $3.3 billion in remediation and industrial services[1] in 2000.	Mining, oil, chemical, and fishing industry sites are the most common remediation sites.	Private firms based in Europe or North America are the primary providers of remediation services.	Existing anecdotal evidence suggests that remediation markets in developing countries are approximately 20 years behind the United States in terms of maturity. Privatization initiatives often have a remediation component, which has created some demand for remediation services.	There tends to be little environmental regulation in developing countries, but some progress has been made. For example, some countries require companies to perform environmental impact assessments on new projects, and to improve their environmental management practices. Enforcement of existing laws may also be minimal.

[1] See chap. 1 for additional information regarding the composition of the remediation and industrial services market.
[2] The information on the EU, as presented in this table, focuses principally on the Member States of the former EU-15 by virtue of their larger and more mature markets and their relatively greater role in developing and implementing the environmental policies of the present-day EU. However, data on market size refers to all Western European countries whether or not they are members of the European Union.

Note: Data for environmental remediation services as a percentage of GDP are approximate. GDP data are 2002 figures from the World Bank, while data regarding the size of the remediation market varies by year.

Source: Compiled by the Commission.

countries of Latin America, Africa, Asia, and the Middle East[1] together devoted $3.3 billion to remediation services in 2000.[2]

The types of contaminated sites requiring remediation services tend to vary in different markets. Industrial sites and underground storage tanks appear to account for a significant share of the demand for remediation services in high-income countries, while contamination from the mining, oil, and agricultural sectors is a primary source of such demand in most developing countries. By contrast, it does not appear that remediation methods follow any broad trends. Rather, the choice of cleanup technology largely depends on the specific type of pollution and the characteristics of the polluted site. In many cases, ex situ methods (e.g., excavation, landfill, and incineration) may be less expensive than in situ methods and require less technological expertise, so it is likely that such methods will be chosen more frequently where cost is a primary consideration.

In all of the subject countries, remediation work is performed largely or exclusively by private sector firms. The funding for such projects varies: some cleanup projects are funded by the private sector while other work is funded by governments through government procurement contracts or – in the case of some developing countries – through bilateral or multilateral foreign aid. In all cases, the vast majority of the demand for remediation services has been created by the institution of government regulations requiring the cleanup of polluted sites, and identifying parties that are liable for remediation expenses. The United States was the first country to undertake such regulatory action, followed by other high-income countries, with Japan being the most recent high-income country to pass national legislation related to remediation. In addition, the EU directive on environmental liability entered into force in April 2004. Among the countries highlighted in this report, the remediation market is expected to grow particularly rapidly in Poland and the Czech Republic, as those countries became subject to EU environmental regulations upon accession.

Nature and Landscape Protection Services

There does not appear to be a defined market for NLP services among the subject countries. Market data are available only for the United States, which reported a total market size of $2.3 billion in 2001, including related consulting and engineering services. However, all of the subject countries have passed legislation related to such services (table 8-2). For most countries, these laws center around biodiversity

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[1] Excludes Australia, Japan, and New Zealand. Due to data aggregation, it is not possible to exclude other high-income economies that are in these regions.

[2] Environmental Business International, Inc. (EBI), reports data on remediation and industrial services, which it defines to include the clean-up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, the EBI remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chap. 1.

Table 8-2
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Australia	Issues of primary significance include maintaining natural resources, ecological integrity, and biodiversity.	The regulatory environment is believed to be strong, with the government continuing to increase the scope and enforcement of laws and standards. Legislation regarding nature and landscape protection includes the Environment Protection (Impact of Proposals) Act (1974), Great Barrier Reef Marine Park Act (1975), Australian Heritage Commission Act (1975), National Parks and Wildlife Conservation Act (1975), Environment (Financial Assistance) Act (1977), Antarctic Treaty (Environment Protection) Act (1980), World Heritage Properties Conservation Act (1983), Environmental Management Charge-Excise Act (1993), National Environment Protection Council Act (1994), Natural Heritage Trust of Australia Act (1997), National Environment Protection Measures (Implementation) Act (1998), Environment Protection and Biodiversity Conservation Act (1999), and Environmental Reform Act (1999).	The majority of nature and landscape protection services are reportedly provided by the private sector, with extensive cooperation with and guidance from the public sector.	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention for the Protection of the Natural Resources and Environment of the South Pacific Region • Convention on Biological Diversity • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • Convention on International Trade in Endangered Species of Wild Fauna and Flora • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Canada	Although specific data on nature and landscape protection services are not available, it is likely that the market is small in comparison with the remediation services market. The primary types of projects in Canada include the protection of wildlife areas, national marine conservation areas, ecological reserves, lands under private stewardship, and national, provincial, and territorial parks.	Parks Canada is responsible for national parks and historic sites, and national marine conservation areas. Key legislation includes the Parks Canada Agency Act, the Canada National Marine Conservation Area Act, and the Canada National Parks Act. Regulatory responsibilities for other nature and landscape protection issues are divided between Environment Canada, a federal agency, and provincial and territorial authorities.	There is no information available on the Canadian market for nature and landscape protection services.	• Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • North American Agreement on Environmental Cooperation (formed under the NAFTA) • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
China	Pollution control and prevention, and measures to stop desertification are issues of high importance in China.	In general, nature and landscape protection regulation is not believed to be a high priority at present. However, certain segments of the market, such as desertification control and prevention, are subject to regulation. The Desertification Prevention and Control Law, passed in 2001, requires action at all levels to stop activities that contribute to loss of grasslands, and to restore affected areas by offering tax incentives, subsidies, and technical support. In addition, the Government of China recently passed the Law of the People's Republic of China on Environmental Impact Assessment, which requires government and private companies to conduct thorough assessments prior to new project construction.	It is believed that the market is led by the public sector, with much responsibility for individual projects resting with private companies.	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Czech Republic	The State Environmental Fund (SEF) has sponsored a variety of projects including de-mudding of lakes and ponds, preserving and rehabilitating forests, purchasing land for the purpose of establishing protected sites, and nature preservation projects.	The Czech National Council Act No. 114/1992 Coll. – Protection of Nature and the Landscape – is the primary legislation for this sector. A number of other laws also relate to the sector, including those regarding public procurement, privatization, the environment, water management, waste management, protection of agricultural land, water quality, and the environment policy of 1995. The Ministry of Environment develops environmental policy. The Czech Inspectorate for the Environment enforces environmental laws.	The primary consumer of remediation services in the Czech market is the State Environmental Fund (SEF), which has pursued a variety of projects. Private sector firms are the primary providers of nature and landscape protection services. The market is expanding, partially as a result of EU accession.	• Agreement on the Conservation of Bats in Europe • Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Conservation of European Wildlife and Natural Habitats • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
EU[2]	Nature and landscape protection projects include the restoration of the Saint-Hubert peat habitat in Belgium and the conservation of migratory bird wetland habitats in Finland.	There are EU directives related to habitats, birds, endangered species, protection of the Antarctic, protection of forests against atmospheric pollution, and forest fires. The EU Environment Directorate General is the EU-wide regulator.	This market is primarily driven by regulation, and funded by various EU programs, such as the Life-Nature program, which funds projects in support of EU environmental policy.	• Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention on Biological Diversity • Convention on the Conservation of European Wildlife and Natural Habitats • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change Many or all EU member countries are members of the following conventions: • Agreement on the Conservation of Bats in Europe • Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Japan	Ongoing efforts include government initiatives to create green spaces as buffers between industrial and residential areas, and the prevention of beach and riverbank erosion.	The regulatory environment is believed to be strong, with the government continuing to increase the scope and enforcement of laws and standards. Legislation relating to nature and landscape protection includes the Basic Environment Law, Nature Conservation Law, Natural Parks Law, Law for the Conservation of Endangered Species of Wild Fauna and Flora, and Environmental Impact Assessment Law.	It is believed that the market is led by the private sector, with much cooperation with and guidance from the public sector.	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • Convention on International Trade in Endangered Species of Wild Fauna and Flora • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Malaysia	Erosion control is the primary nature and landscape protection issue.	The overall regulatory environment for nature and landscape protection is not believed to be stringent at present. However, certain segments of the market, such as erosion control, are subject to regulation. The Ministry of Environment has developed erosion control guidelines, but they are difficult to enforce, due to developers' lack of expertise. Additionally, environmental impact assessments are required for new developments, but this rule is not always enforced.	There is no information available regarding the character of the Malaysian market for nature and landscape protection services. However, anecdotal evidence indicates that U.S.-based firms do maintain a presence in this market.	• Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Mexico	Currently, there is little market for nature and landscape protection services in Mexico, as the current administration is focused on higher-priority environmental issues.	The key piece of legislation on nature and landscape protection is the General Law of Ecological Balance and Environmental Protection. Regulatory authorities include the Secretariat of Environment and Natural Resources (SEMARNAT) and the Mexican Environmental Protection Agency (PROFEPA).	There appears to be little market for nature and landscape protection services in Mexico.	• Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • North American Agreement on Environmental Cooperation (formed under NAFTA) • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Poland	Little is known about Poland's market for nature and landscape protection services.	Poland's laws on nature and landscape protection include the Act on the Protection and Management of the Environment (1980); the Act on Nature Protection (1991), Order of the Minister of Environmental Protection, Natural Resources and Forestry on the protection of plant species (1995) and animal species (1996); the Act on Forests (1991); the Act on Protection of Agricultural and Forest Grounds (1995); the Act on Physical Development (1994); Order of the Minister of Environmental Protection, Natural Resources and Forestry for determining the types of investments potentially hazardous to the environment and human health, and on environmental impact assessment; and the Hunting Law (1995). The State Inspectorate for Environmental Protection, which enforces the laws, and the provincial governments (voivodships) which implement environmental policy, manage contaminated sites in Poland.	EU accession, which requires Poland to adopt higher environmental standards, is one of the primary drivers of the expansion of the overall environmental services market.	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Agreement on the Conservation of Bats in Europe • Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Conservation of European Wildlife and Natural Habitats • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
United States	Approximately 650 nature and landscape protection firms earned revenues totaling $1.3 billion in 2002, while consulting and engineering firms generated an additional $1.0 billion in nature and landscape protection revenues. Watershed management and restoration are the primary types of projects.	There is a high level of federal and state regulation, primarily based on the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and the Clean Water Act (CWA).	Nature and landscape protection services are provided solely by private-sector firms, with more than 80 percent of projects considered small, valued at an average of $5,000. Firms tend to be either large firms which offer remediation services as well as nature and landscape protection services, or very small firms concentrating on a local market. The regulation of discharges into surface water and groundwater is considered an important driver of this market.	• Agreed Measures for the Conservation of Antarctic Fauna and Flora • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention for the Protection of the Natural Resources and Environment of the South Pacific Region • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere • Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • North American Agreement on Environmental Cooperation (formed under NAFTA) • United Nations Framework Convention on Climate Change

See footnotes at end of table.

Table 8-2—*Continued*
Characteristics of selected markets for nature and landscape protection services

Country	Annual market size (in $U.S.) or number of sites, and principal types of projects/sites and technologies	Regulatory environment	Market characteristics - Extent of private participation, competitiveness, market drivers, etc.	Membership in international conventions or agreements[1]
Developing countries	The market is quite small, and is largely dependent on foreign aid funding. Multilateral funding totaled $774 million during the past 5 years. Additional funding comes from bilateral and NGO sources. Multilateral funding is largely directed toward biodiversity projects.	Few developing countries have an extensive network of environmental regulations. An exception is India, which has a legislative framework for environmental protection. Reportedly, India's environmental laws are poorly enforced, although this may be starting to change.	Services primarily are supplied by private firms based in Europe or North America.	Many developing countries are members of the following international conventions: • Cartagena Protocol on Biosafety to the Convention on Biological Diversity • Convention concerning the Protection of the World Cultural and Natural Heritage • Convention on Biological Diversity • Convention on the Conservation of Migratory Species of Wild Animals • Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal • Convention on International Trade in Endangered Species of Wild Fauna and Flora • Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere • Convention on Wetlands of International Importance especially as Waterfowl Habitat • International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa • United Nations Framework Convention on Climate Change

[1] Indicates that the country has ratified or acceded to the agreement. Countries which have signed an agreement but not ratified it are not included. This is meant to be an illustrative, not an exhaustive list. The subject countries may also be parties to other bilateral and/or multilateral agreements relating to nature and landscape protection issues.

[2] The information on the EU, as presented in this table, focuses principally on the countries of Western Europe (the Member States of the former EU-15) by virtue of their larger and more mature markets and their relatively greater role in developing and implementing the environmental policies of the present-day EU.

Source: Convention membership data: Ecolex environmental law database, found at *http://www.ecolex.org/ecolex/en/treaties*/, retrieved June 29, 2004.

concerns such as protecting endangered plant and animal species. Other concerns include erosion control (in Japan and Malaysia), desertification (in China), and watershed management and restoration (in the United States). All of the subject countries have regulatory agencies in place to enforce laws related to NLP, although few of the developing countries appear to have extensive networks of environmental regulations, or strong regulatory enforcement of existing laws.

There are a number of multilateral conventions related to NLP, many of which have been signed by most of the subject countries. For instance, all of the subject countries are parties to the Convention on International Trade in Endangered Species (CITES), all of the countries except for Malaysia are parties to the Convention on Wetlands of International Importance especially as Waterfowl Habitat, and all except the United States are parties to the Convention on Biological Diversity. In addition, Canada, Mexico, and the United States are parties to the North American Agreement on Environmental Cooperation, created in connection with the North American Free Trade Agreement (NAFTA).

Trade and Investment

The extent of cross-border trade and investment in remediation and NLP services markets is small compared with some other segments of the environmental services industry, but is expected to grow in the long term, as the market for these services matures outside of the United States. Observers expect that foreign remediation markets will grow during the next 10 to 15 years, as regulations are clarified and more funding is devoted to remediation projects in these markets. It is unclear whether this work will generate significant overseas opportunities for U.S. firms, however. According to industry representatives, the best opportunities for U.S. firms are likely to be found in the area of environmental consulting—such as the provision of services related to site assessment and the development of remediation and landscape protection plans—while the actual work of remediation or landscape protection is most likely to be performed by local firms. This is due to the cost and difficulty that U.S.-based firms face in shipping equipment across international borders. Under these circumstances, U.S.-based firms are cost-competitive only when they provide services based on new and/or complex technology that is not widely available. Since much of the technology involved in remediation is well-known and widely available, local firms have a cost advantage over U.S.-based firms.

Both the United States and the European Union are net exporters of remediation services (table 8-3). In Japan, where the remediation market is just beginning to respond to new regulations, very little trade in remediation services takes place. Most of the remaining subject countries, including most middle- and low-income countries, are likely net importers of such services, although the extent of trade in these markets is unclear. Very little is known regarding trade in NLP services, and it is not possible to draw conclusions from available data.

Among the countries selected for discussion in this report, only Canada, China, the European Union, Japan, and the United States have scheduled specific commitments

Table 8-3
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
Australia	Although specific data are not available, Australia is believed to an active exporter and importer of remediation and nature and landscape protection services.	Australian firms are reportedly active in remediation projects throughout the Asia-Pacific region. Many U.S.-based remediation services firms have branches or affiliates in Australia.	• GATS commitments • Investment approval	• Australia has scheduled no GATS commitments that apply specifically to remediation or nature and landscape protection services. • Prospective foreign investors must obtain investment approval from the Foreign Investment Review Board, which may deny specific foreign investments on the basis of national interest.

Table 8-3—*Continued*
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
Canada	Even though all data are not available, Canada is most likely a net exporter of remediation services. In 2001, Canada recorded global exports of $31 million in such services. Data for total Canadian imports of remediation services are not available, but in the same year, Canada recorded remediation services exports of $23 million and imports of $16 million from the United States and Mexico combined.	U.S. companies are the largest foreign suppliers of remediation services in Canada.	• GATS commitments	• Canada has scheduled full GATS commitments for nature and landscape protection services provided through modes 1, 2, and 3.
			• Land purchase	• Canada's GATS commitments indicate that numerous provinces place national treatment limitations on the purchase of land by non-residents.
			• Accreditation of engineers: market access and national treatment	• With regard to the provision of engineering services through modes 1, 2, and 4, most provinces limit accreditation to permanent residents, while Quebec limits accreditation to citizens. With regard to the provision of engineering services through modes 1 and 4, Saskatchewan limits accreditation to residents.
			• Accreditation of consulting engineers: market access	• With regard to the provision of services through modes 1 and 2, Manitoba requires a commercial presence for the accreditation of consulting engineers.

Table 8-3—*Continued*
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
China	Although specific data are not available, China is believed to be a net importer of remediation services.	Japanese and U.S. firms are active in the Chinese market. Such projects are generally funded through foreign aid provided by the firms' home governments or by international development organizations.	• GATS commitments • Licensing requirements • Land ownership	• Under China's GATS commitments for nature and landscape protection services, mode 1 commitments apply only to environmental consultation services. For mode 3, foreign firms may only provide services suppliers in the form of a joint venture, with foreign majority ownership permitted. • Ambiguous licensing guidelines make it difficult for foreign engineering firms to obtain necessary permits except on a project-by-project basis. • All land is owned by the government, which grants fee-based usage rights for set periods. Compensation for early repossession of land is assured by law in some cases but the rules are inconsistent and standards are unclear.

Table 8-3—*Continued*
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
Czech Republic	The Czech Republic is a net importer of remediation goods and services. In 2002, exports of such goods and services totaled $9 million, while imports totaled $12 million. Imports included $4 million from the United States.	Firms based in the European Union and the United States operate in the Czech market. Foreign companies often partner with local companies to bid on remediation projects.	• GATS commitments • State-run remediation market	• The Czech Republic has scheduled no GATS commitments that apply specifically to remediation or nature and landscape protection services. Following its recent accession to the EU, the Czech Republic is likely to conform to EU GATS commitments. • The unique structure of the Czech remediation market, under which the National Privatization Fund acts as the only Czech consumer of remediation services, has discouraged foreign investment in this market.
EU[1]	The United States is the largest export market for EU environmental goods and services, followed by the newly acceded EU countries.	EU-based firms have a strong presence overseas, particularly in the newly acceded EU countries. Although Arcadis (Netherlands) has a U.S. presence, EU remediation firms generally do not have a significant presence in the United States. At least 5 of the larger U.S. environmental services firms have operations in the EU.	• GATS commitments	• The EU has scheduled full GATS commitments on nature and landscape protection services provided through modes 2 and 3. The EU scheduled no commitments on remediation or nature and landscape protection services provided through mode 1, due to technical infeasibility.

See footnote at end of table.

Table 8-3—*Continued*
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
Japan	There is little evidence of Japanese trade in remediation or nature and landscape protection services, most likely due to the evolving nature of development of those markets in Japan.	Most, if not all, remediation activity in Japan is executed by Japanese firms. Japanese remediation firms are not believed to be currently active in foreign markets.	• GATS commitments • Effective barriers to market entry	• Japan has scheduled full GATS commitments on nature and landscape protection services provided through modes 2 and 3. Japan scheduled no commitments on remediation or nature and landscape protection services provided through mode 1, due to technical infeasibility. • Foreign firms may find it difficult to establish a presence in Japan due to pre-qualification conditions that act as barriers to entry, such as contracts written to exclude provision of services by non-Japanese firms, and to compete for contracts on an equal basis with Japanese contractors.
Malaysia	While specific data are not available, it is most likely that Malaysia is a net importer of remediation and nature and landscape protection services.	U.S.-based firms maintain a presence in the Malaysian remediation market.	• GATS commitments • Equity limitations	• Malaysia has scheduled no GATS commitments that apply specifically to remediation or nature and landscape protection services. • Foreign investors are limited to a 30-percent financial stake in any business enterprise.

Table 8-3—*Continued*
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
Mexico	Mexican exports for remediation services totaled $7 million in 2001. Data are not available for total imports of remediation and industrial services, however, Mexican imports of such services from NAFTA partners totaled $24.7 million in 2001.	U.S. firms have a presence in the Mexican market. The principal activities of these firms involve the remediation of sites owned by U.S. multinational companies operating in Mexico.	• GATS commitments • Equity limitations	• Mexico has scheduled no GATS commitments that apply specifically to remediation or nature and landscape protection services. • Mexico's GATS commitments limit foreign investment in the architectural and engineering industries to consultancy services. Foreign investment in construction services is limited to 49 percent of a firm's total equity. However, Mexico's commitments under the NAFTA are less restrictive.
Poland	Among the newly acceded EU countries, Poland is the second largest exporter of environmental goods and services to the EU, although Poland is not a significant exporter of remediation services.	German firms hold the leading position in the Polish remediation market, but firms from other European countries, such as France, Italy, Norway, Sweden, and Switzerland, are also present.	• GATS commitments • Form of establishment	• Poland has scheduled no GATS commitments that apply specifically to remediation or nature and landscape protection services. Following its recent accession to the EU, Poland is likely to conform to EU GATS commitments. • All foreign service providers must form as a limited liability or joint stock company when establishing a commercial presence in Poland.

Table 8-3—*Continued*
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
United States	The United States is a net exporter of remediation services. In 2002, U.S. exports of such services totaled $460 million, while imports totaled $400 million, generating a net surplus of $60 million.	U.S. firms tend to focus on the U.S. market, although they have some operations overseas. The majority of foreign operations consists of work for U.S. multinational corporations and work on U.S. military bases overseas. Foreign firms do not have a strong presence in the U.S. market, although a few do operate in the United States through affiliates. U.S. affiliate sales of all services by waste management and remediation services affiliates to foreign persons, primarily in Canada, totaled $1.1 billion in 2000. Sales of such services to U.S. persons by foreign-owned affiliates totaled $11 million. Remediation services are believed to account for only a small part of these totals.	• GATS commitments • Licensing of contractors and engineers: market access and national treatment	• The United States has scheduled full GATS commitments on remediation and nature and landscape protection services. • U.S. citizenship is required for a license to provide engineering or integrated engineering services in the District of Columbia. Twelve states require in-state residency for a license to provide engineering or integrated engineering services. Michigan requires contractors providing construction and related engineering services in Michigan to maintain an office in the State.

Table 8-3—*Continued*
Extent of remediation and nature and landscape protection services trade and investment by certain countries, and measures affecting such trade and investment

Country	Cross-border trade	Foreign operations	Type of measure affecting trade/affiliate transactions	Description of measure
Developing countries	Although no data are available, foreign firms may provide consulting services related to remediation on a cross-border basis.	U.S. firms working in developing countries tend to work on a project-by-project basis, with projects funded either by North American- or European-based multinationals that own contaminated sites overseas, or by international development banks or bilateral foreign aid. In either case, U.S. firms may provide the majority of remediation services in developing countries. Firms based in North America and Europe generally provide actual remediation services through a joint venture established in the host country.	• GATS commitments • Common market access and national treatment barriers	• Among developing countries, only Ecuador and Oman have scheduled full commitments on nature and landscape protection services. Four others (El Salvador, Morocco, Sierra Leone, and Thailand) have scheduled partial commitments which apply to the entire industry. Lesotho's commitments on nature and landscape protection services apply only to consultancy services, and Panama's apply only to a small segment of the industry. • The GATS schedules of developing countries, like all countries, contain a variety of exceptions to market access and national treatment principles. Types of barriers which may be encountered include joint venture requirements, limits on employment of foreign personnel, barriers to licensing of foreign professionals, limits on foreign equity, and limits on the corporate form of a foreign-invested enterprise.

[1] The information on the EU, as presented in this table, focuses principally on the countries of Western Europe (the Member States of the former EU-17) by virtue of their larger and more mature markets and their relatively greater role in developing and implementing the environmental policies of the present-day EU.

Source: Compiled by the Commission.

on NLP services. In addition, 10 developing countries[3] have scheduled GATS commitments for the NLP services industries.[4] Few of the countries maintain explicit restrictions on trade in remediation services, or in NLP services, but regulations and practices that pertain to all sectors, or to related sectors such as engineering or environmental consulting, can potentially limit trade in the remediation and NLP industries. The most common trade barriers maintained by middle- and low-income economies are limitations on foreign equity. Specifically, China, Malaysia, and Mexico limit the share of equity that foreign investors can hold in any given enterprise. Additionally, complex licensing requirements and limitations on land ownership are prevalent among both developing and high-income countries.

[3] China, Ecuador, El Salvador, Lesotho, Morocco, Oman, Panama, Sierra Leone, South Africa, and Thailand.

[4] As discussed in Appendix C, remediation services are not clearly addressed by the WTO Services Sectoral Classification List, WTO MTN.GNS/W/120, July 10, 1991, the document which forms the basis of each country's GATS commitments.

APPENDIX A
Request Letter

chair rec'd 7/1/03
✓1-Secretary
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3-BPS
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EXECUTIVE OFFICE OF THE PRESIDENT
THE UNITED STATES TRADE REPRESENTATIVE
WASHINGTON, D.C. 20508

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DOCKET NUMBER 2319
Office of the Secretary
Int'l Trade Commission

The Honorable Deanna Tanner Okun
Chairman
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

DOCKET

Dear Chairman:

As you know, members of the World Trade Organization (WTO) have been engaged in negotiations under the General Agreement on Trade in Services (GATS) since January 2000. These negotiations are intended to liberalize services trade by reducing or eliminating measures that limit effective market access.

With these negotiations in mind, two concise reports on discrete segments of the environmental services industry would be of interest to my office. The environmental services industry is currently receiving special emphasis in the WTO, as the reduction or elimination of barriers affecting trade in such services has been identified in the Doha Ministerial Declaration as one of the principal goals of the present negotiating round. Further information about environmental services markets will also be useful in carrying out the environmental review of this element of the current WTO negotiations, and in conducting future negotiations and reviews. Environmental services-- such as solid and hazardous waste management services and nature and landscape protection and remediation services– are of great importance to the global economy in terms of both market size and the role of such industries in achieving sustainable development. Government efforts to address environmental degradation and industry efforts to increase efficiency and maintain favorable environmental records have increased demand for environmental services. Trade in such services ensures that all economies have access to reliable environmental technologies, and thus facilitates global environmental protection.

Therefore, I request, pursuant to authority delegated by the President under section 332(g) of the Tariff Act of 1930, that the U.S. International Trade Commission conduct two investigations and prepare reports. Each of these reports should, to the extent possible, (1) provide an overview of foreign and domestic markets for certain environmental services; (2) examine trade and investment in environmental services markets, including barriers affecting such trade and investment, if any; and (3) if possible, discuss existing regulatory practices. With regard to the geographic coverage of these reports, the Commission should endeavor to include examples from both developed- and developing-country markets. The Commission is also encouraged to include information gathered through public hearings and other consultations with interested parties.

Title: Enviromental Remediation

The Commission is requested to deliver a report on the solid and hazardous waste services industry no later than nine months from receipt of this letter. For the purpose of this report, I urge the Commission to define the solid and hazardous waste management services industry to include the collection of solid and hazardous waste from households and industry; the treatment and disposal of solid and hazardous waste by various means; the collection, separation, and sorting of recyclable materials; waste compacting; waste reduction services; and incidental services. The Commission is requested to deliver a report on the remediation and nature and landscape protection services industry fifteen months from the receipt of this letter. The range of services to be investigated in the remediation and nature and landscape protection services industry report will be determined upon further consultation between USTR and USITC staff.

Upon completion of these reports, this office may make a similar request of the Commission with respect to the air pollution abatement services industry.

My office intends to make the Commission's reports available to the general public in their entirety. Therefore, the reports should not contain any confidential business or national security classified information.

The Commission's assistance in this matter is greatly appreciated.

Sincerely,

Robert B. Zoellick

APPENDIX B
Federal Register Notice

TABLE 1.—PROPOSED SHORT-TERM WATER MANAGEMENT PROJECTS TO BE ANALYZED IN THE PROGRAMMATIC EIS/EIR*—Continued

Project name (type)	Proponent	County	Description
Water Management Project (Water Management) ...	Meridian Farms	Sutter County	Installation of extraction wells.
American Sub-basin:			
Conjunctive Use Project (Water Management)	Natomas Central Mutual Water Company.	Sacramento and Sutter Counties.	Pump existing wells, monitoring and analyzing results after one season.
Water Management Project (Water Management) ...	Pleasant Grove Verona Mutual Water Company.	Sutter County	Installation of extraction wells.
Re-operation of the Middle Fork Project (Reservoir Re-operation).	Placer County Water Agency.	Placer County	Re-operate primary storage reservoirs.
Yolo Sub-basin:			
Conjunctive Use Project Feasibility Study for Expanding Surface Water Supplies to the Yolo-Zamora Water District (Surface Water/Groundwater Planning and System Improvement).	Yolo County Flood Control and Water Conservation District.	Yolo County	Feasibility study for expanding surface water supplies to Yolo Zamora.
Conjunctive Use Project Feasibility Study for Expanding Surface Water Supplies to Agricultural Water Users in Areas (Surface Water/Groundwater Planning and System Improvement).	Yolo County Flood Control and Water Conservation District.	Yolo County	Feasibility study for expanding surface water supplies to Agricultural areas northwest of Woodland.
Groundwater Quality Monitoring Program (Surface Water/Groundwater Planning).	Yolo County Flood Control and Water Conservation District.	Yolo County	Development of a groundwater-quality monitoring program.
Delta Sub-basin:			
Conjunctive Use Proposal (Water Management)	RD 2068	Yolo County	Develop a single production well to determine conjunctive use potential.
Sacramento Valley:			
Sub-basin-level Water Measurement (Surface Water/Groundwater Planning).	Participants in the Basin wide Management Plan.	Sacramento Valley—Various Counties.	Feasibility study, design and construction of water measurement facilities.

*The effects analysis in the Programmatic EIS/EIR would not be limited to these projects, and would include all short-term projects and actions that could be proposed under the Sacramento Valley Water Management Program.

This Programmatic EIS/EIR is expected to analyze the adverse and beneficial effects of implementing the Short-term Program on these environmental resources: surface water, water quality, fisheries, wildlife, vegetation, special-status species, land-use, cultural resources, air quality, noise, recreation, energy, visual impacts, and socioeconomic conditions. Analysis presented in the Programmatic EIS/EIR will also determine if environmental justice issues are associated with the Short-term Program. Although there are Indian Trust Assets (ITAs) in the counties where these projects are proposed, any association between these ITAs and the proposed projects and actions is unknown at this time. The following is a list of tribal trust land, per county where these projects are proposed:

- Shasta County—Redding Rancheria
- Butte County—Berry Creek Rancheria, Enterprise Rancheria, Mooretown Rancheria
- Glenn County—Grindstone Rancheria
- Colusa County—Colusa Rancheria, Cortina Rancheria

It is Reclamation's practice to make comments on a Notice of Intent, including names and home addresses of respondents, available for public review. Individual respondents may request that we withhold their home address from public disclosure, which we will honor to the extent allowable by law. There may also be circumstances in which we would withhold a respondent's identity from public disclosure, as allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public disclosure in their entirety.

Dated: July 30, 2003.

Robert Eckart,

Chief, Environmental Compliance Branch, Mid-Pacific Region.

[FR Doc. 03–19841 Filed 8–4–03; 8:45 am]

BILLING CODE 4310–MN–P

INTERNATIONAL TRADE COMMISSION

[Investigation 332–454]

Remediation and Nature and Landscape Protection Services: An Overview of U.S. and Foreign Markets

AGENCY: United States International Trade Commission.

ACTION: Institution of Investigation and scheduling of public hearing.

EFFECTIVE DATE: July 22, 2003.

SUMMARY: Following receipt of a request on July 1, 2003 from the United States Trade Representative (USTR), the Commission instituted Investigation No. 332–454, Remediation and Nature and Landscape Protection Services: An Examination of U.S. and Foreign Markets, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)).

FOR FURTHER INFORMATION CONTACT: Information specific to this investigation may be obtained from Jennifer Baumert, Project Leader (202–502–3450; *jbaumert@usitc.gov*), or Richard Brown, Chief, Services and Investment Division

(202–205–3438; *rbrown@usitc.gov*), Office of Industries, U.S. International Trade Commission, Washington, DC, 20436. For information on the legal aspects of this investigation, contact William Gearhart of the Office of the General Counsel (202–205–3091; *wgearhart@usitc.gov*). Hearing impaired individuals are advised that information on this matter can be obtained by contacting the TDD terminal on (202) 205–1810.

Background: As requested by the USTR, the Commission's report will, to the extent possible, (1) Provide an overview of foreign and domestic markets for remediation and nature and landscape protection services; (2) examine trade and investment in remediation and nature and landscape protection services markets, including barriers affecting such trade and investment, if any; and (3) if possible, discuss existing regulatory practices. USTR has requested that the Commission's study include examples from both developed and developing country markets. As requested by USTR, the range of services to be investigated in this study will be determined upon further consultation between USTR and ITC staff. The USTR asked that the Commission furnish its report by October 1, 2004, and that the Commission make the report available to the public in its entirety.

The USTR letter also requests an investigation on solid and hazardous waste services. In response, the Commission has instituted Investigation No. 332–455, Solid and Hazardous Waste Services: An Examination of U.S. and Foreign Markets, which is due to the USTR on April 1, 2004.

Public Hearing: A public hearing in connection with the investigation will be held at the U.S. International Trade Commission Building, 500 E Street SW., Washington, DC, beginning at 9:30 a.m. on March 17, 2004. All persons shall have the right to appear, by counsel or in person, to present information and to be heard. Requests to appear at the public hearing should be filed with the Secretary, United States International Trade Commission, 500 E Street SW., Washington, DC 20436, no later than 5:15 p.m., March 3, 2004. Any prehearing briefs (original and 14 copies) should be filed not later than 5:15 p.m., March 5, 2004; the deadline for filing post-hearing briefs or statements is 5:15 p.m., March 31, 2004. In the event that, as of the close of business on March 3, 2004, no witnesses are scheduled to appear at the hearing, the hearing will be canceled. Any person interested in attending the hearing as an observer or non-participant may call the Secretary of the Commission (202–205–1816) after March 3, 2004, for information concerning whether the hearing will be held.

Written Submissions: In lieu of or in addition to participating in the hearing, interested parties are invited to submit written statements (original and 14 copies) concerning the matters to be addressed by the Commission in its report on this investigation. Commercial or financial information that a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of section 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). All written submissions, except for confidential business information, will be made available in the Office of the Secretary to the Commission for inspection by interested parties. The Commission will not include any confidential business information in the report it sends to the USTR. To be assured of consideration by the Commission, written statements relating to the Commission's report should be submitted to the Commission at the earliest practical date and should be received no later than the close of business on March 31, 2004. All submissions should be addressed to the Secretary, United States International Trade Commission, 500 E Street SW., Washington, DC 20436. The Commission's rules do not authorize filing submissions with the Secretary by facsimile or electronic means, except to the extent permitted by 201.8 of the Commission's Rules (19 CFR 201.18) (see Handbook for Electronic Filing Procedures, *ftp://ftp.usitc.gov/pub/reports/electronic_filing_handbood.pdf*).

Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202–205–2000. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*).

List of Subjects

WTO, GATS, remediation and nature and landscape protection services.

Issued: July 30, 2003.

By order of the Commission.

Marilyn R. Abbott,

Secretary to the Commission.

[FR Doc. 03–19818 Filed 8–4–03; 8:45 am]

BILLING CODE 7020–02–P

INTERNATIONAL TRADE COMMISSION

[Investigation 332–455]

Solid and Hazardous Waste Services: An Overview of U.S. and Foreign Markets

AGENCY: United States International Trade Commission.

ACTION: Institution of investigation and scheduling of public hearing.

EFFECTIVE DATE: July 29, 2003.

SUMMARY: Following receipt of a request on July 1, 2003 from the United States Trade Representative (USTR), the Commission instituted investigation No. 332–455, Solid and Hazardous Waste Services: An Examination of U.S. and Foreign Markets, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)).

FOR FURTHER INFORMATION CONTACT: Information specific to this investigation may be obtained from Jennifer Baumert, Project Leader (202–205–3450; *jbaumert@usitc.gov*), or Richard Brown, Chief, Services and Investment Division (202–205–3438; *rbrown@usitc.gov*), Office of Industries, U.S. International Trade Commission, Washington, DC, 20436. For information on the legal aspects of this investigation, contact William Gearhart of the Office of the General Counsel (202–205–3091; *wgearhart@usitc.gov*). Hearing impaired individuals are advised that information on this matter can be obtained by contacting the TDD terminal on (202) 205–1810.

Background: As requested by the USTR, the Commission's report will, to the extent possible, (1) Provide an overview of foreign and domestic markets for solid and hazardous waste services; (2) examine trade and investment in solid and hazardous waste services markets, including barriers affecting such trade and investment, if any; and (3) if possible, discuss existing regulatory practices. USTR has requested that the Commission's study include examples from both developed- and developing-country markets. For the purpose of this study, solid and hazardous waste management services are defined to include the collection of solid and hazardous waste from households and industry; the treatment and disposal of solid and hazardous waste by various means; the collection, separation, and sorting of recyclable materials; waste compacting; waste reduction services; and incidental services.

The USTR asked that the Commission furnish its report by April 1, 2004, and

APPENDIX C
INSURANCE AND LIABILITY ISSUES AS DRIVERS OF THE REMEDIATION MARKET

Introduction

In preparation for the current round of negotiations under the General Agreement for Trade in Services (GATS), several member countries submitted papers to the World Trade Organization (WTO) Secretariat outlining issues that they hoped to address as part of negotiations on the environmental services sector.[1] In papers submitted by Australia, Canada, the European Communities, Switzerland, and the United States,[2] member countries indicated, *inter alia*, that the current WTO classification of the environmental services industry was outdated, and proposed the development of a new classification system that more accurately captures the modern environmental services industry. As part of this classification issue, these countries also indicated that there were several services activities– such as architecture, construction, and research and development– which are not classified in the environmental services sector, but which may be integral to the provision of environmental services. As such, these services could be addressed through a "check list" or "cluster" negotiation, which would cover those sectors in which market access and national treatment may be necessary in order to realize the benefits of liberalization in core environmental services industries. Although not mentioned in the proposals submitted to the WTO, industry representatives indicate that access to environmental insurance services may be integral to private-sector demand for remediation services.[3]

The primary driver of the remediation services market, both in the United States and abroad, has been the creation and enforcement of environmental regulations that incorporate the "polluter pays" principal.[4] The liability obligations of polluters in the United States have been established by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as the Superfund law), passed in 1980, and the Resource Conservation and Recovery Act (RCRA), passed in 1976. In 1986, the insurance industry specifically began to exclude the coverage of environmental pollution and remediation from its model general liability policy, and started insuring pollution and other environmental risks through separate environmental insurance policies, specifically aimed at managing risks related to environmental liabilities. This specialized insurance has become an integral part of an overall risk management strategy for many corporations, and plays an important role in real estate transactions and mergers and acquisitions (M&A) in which environmental risk may be a factor.

[1] For a more thorough discussion of the environmental services proposals submitted to the World Trade Organization (WTO), see appendix D.

[2] WTO, "Communication from Australia, Negotiating Proposal for Environmental Services," S/CSS/W/112, Oct. 1, 2001; "Communication from Canada, Initial Negotiating Proposal on Environmental Services," S/CSS/W/51, Mar. 14, 2001; "Communication from the European Communities and their Member States, GATS 2000: Environmental Services," S/CSS/W/38, Dec. 22, 2000; "Communication from Switzerland, GATS 2000: Environmental Services," S/CSS/W/76, May 4, 2001; and "Communication from the United States, Environmental Services," S/CSS/W/25, Dec. 18, 2000, all found at *http://www.wto.org/*, retrieved June 20, 2003.

[3] Industry representatives, interviews by USITC staff, Pennsylvania, May 11-12.

[4] Industry representatives, interviews by USITC staff, California, May 12-14, and Virginia, June 14, 2004.

Types of Environmental Insurance

Environmental insurance is available in several principal categories: pollution legal liability (PLL) insurance, including property transfer insurance; cleanup cost cap/stop loss insurance; contractors' and consultants' environmental liability insurance; and lenders' insurance (table C-1), although the categories have experienced some changes over the last several years as the market has developed.[5] PLL insurance is the most common form of environmental coverage and is directed at property owners. Policies are designed to insure against pollution-related losses due to "cleanup costs of unknown, pre-existing, or new conditions," and third-party claims on property that the insured owns or operates.[6] This type of insurance protects against remediation costs and other costs arising from past and future use of a property. For instance, such insurance might provide coverage for a current property owner who finds that he is liable for environmental damage stemming from use by a previous property owner, due to RCRA liability rules.[7] PLL insurance can also be used to solve liability issues in regard to a real estate or M&A transaction, by assuring the buyer that unexpected environmental liabilities will be covered by insurance. In many cases in which environmental insurance is not used or available, unknown environmental liabilities might discourage parties from concluding a real estate transaction.

Cleanup cost cap/stop loss insurance protects against cleanup costs on a particular project, such as a brownfields site, that run significantly over the projected budget, including cost overruns due to regulatory changes. Under such a policy, the property owner or the insurer contracts a site assessment, which generates an estimate of expected remediation costs. The policy trigger is set at a small level above the expected cost of remediation (generally a 10 percent buffer is used). If remediation costs exceed the trigger level, the insurer pays the remainder of the costs, up to an agreed limit. As is the case for PLL insurance, cost cap insurance permits investors to achieve greater certainty regarding the total extent of their liabilities, and can greatly improve a property owner's ability to sell a property with known

[5] Terminology regarding the different types of policies tends to vary by source, but the listed categories are found in most sources. See, for example, U.S. Environmental Protection Agency (EPA), "Potential Insurance Products for Brownfields Cleanup and Redevelopment," EPA 500-F-97-106, Apr. 1997, found at *http://www.epa.gov/,* retrieved June 2, 2004; Gregg A. Nathanson, Esq., "Environmental Contamination and Pollution Insurance," found at *http://www.couzens.com/pubs/insurance.shtml,* retrieved June 2, 2004; and "Environmental Insurance and M&A," *Environmental Risk,* Spring 2004, found at *http://www.willis.com/,* retrieved June 16, 2004.

[6] EPA, "Potential Insurance Products for Brownfields Cleanup and Redevelopment," EPA 500-F-97-106, Apr. 1997, found at *http://www.epa.gov/,* retrieved June 2, 2004; and George B. Flanigan, "Insurance Coverage for Environmental Claims," *Risk Management Magazine,* found at *http://www.rmmag.com/Magazine/PrintTemplate.dfm?AID=2225,* retrieved Jan. 29, 2004.

[7] George B. Flanigan, "Insurance Coverage for Environmental Claims," *Risk Management Magazine,* found at *http://www.rmmag.com/Magazine/PrintTemplate.dfm?AID=2225,* retrieved Jan. 29, 2004.

Table C-1
Types of environmental insurance available in the U.S. market

Type of insurance	Explanation
Pollution legal liability (PLL) insurance	The largest share of environmental insurance premiums. Protects the property owner from unexpected environmental cleanup costs, for a specified policy term, up to a specified monetary value. Designed to fill the gap created by the absolute pollution exclusion inserted in general liability insurance forms as of 1986.
Cost cap/stop loss insurance	Insures against cost overruns on a known environmental cleanup site. Claims are paid when remediation costs exceed an agreed upon target amount, which is generally set at 10 percent above the expected cleanup costs
Contractors/consultants liability insurance	Insures contractors and environmental consultants against further environmental damage caused by the contractor during a remediation project. Insurance may be project-specific, or cover a contracting firm and its employees for all projects undertaken during a specific time period.
Secured creditor insurance/Lenders environmental protection insurance	Protects lenders against a borrower's default on a loan due to unexpected environmental problems at a property site. In most cases, this type of policy pays claims directly to the lender, equal to the lesser of the cleanup costs or the balance of the loan.

Sources: Environmental Protection Agency, Environmental Risk Resources Association, and industry representatives.

environmental problems.[8] In one survey of remediation executives, 50 percent ranked the availability of cost-cap insurance coverage as "crucial" or "very important" to their business.[9]

Insurance is also available for environmental remediation contractors and professionals such as architects, engineers, or construction managers, to insure against environmental damage that results from the actions of these parties or others involved in the remediation project. Such insurance is purchased either in connection with a particular remediation project, or by a contracting company to provide insurance over a specified time period. For instance,

[8] Industry representative, interview by USITC staff, Virginia, June 14, 2004.

[9] Environmental Business International, Inc. (EBI), "EBJ's 2003 Remediation Survey Results," *Environmental Business Journal,* vol. XV, No. 9/10, 2003, p. 5. EBI reports data on remediation and industrial services, which it defines to include the clean up of groundwater, soil, operating facilities, and contaminated buildings and sites. Thus, EBI's remediation services segment seems to include many of the activities performed by the remediation service segment as defined for the purposes of this report. In terms of project type, EBI data on this industry segment cover both privately-funded and government projects, including the clean up of military facilities and radioactive substances. However, the information presented in this study focuses on non-military, non-nuclear remediation projects, as such activities are excluded from coverage in the GATS due to national security concerns. For more information regarding the way in which EBI develops its data on this industry segment, see chapter 1.

contractors' environmental liability insurance is particularly useful in the case of a firm which performs asbestos removal at a number of different sites, where the insurance covers the risk that a contractor's actions will result in dispersal of asbestos into the atmosphere. The policy would generally cover the firm and all of its employees.[10]

Bank lenders and others with a secured interest in a property can purchase coverage which pays claims in the event of a devaluation of the property due to the discovery of previously unknown environmental damage, or in case the borrower defaults on a loan due to previously unforeseen environmental remediation costs. Under most of these policies, benefits are paid equal to the lesser of the cost of environmental remediation or the balance of the loan as of the date of the claim.[11] Under Massachusetts' brownfields revitalization program, lenders purchasing such environmental insurance are eligible for a state subsidy of the lesser of 25 percent of the insurance premium, or $25,000.[12] However, industry representatives report a decline in the popularity of these policies, with at least one underwriter leaving the market altogether, due to concerns about a lender's liability in case of foreclosure on a loan.[13] Insurers are now offering to combine these and other types of insurance into packages to suit the particular circumstances of their clients.[14]

Environmental insurance provides several specific benefits. First, property owners receive increased certainty as to their total environmental liability costs, either for a specific site or for the corporation as a whole, including concerns regarding cost overruns. Corporations are able to assure their shareholders that liabilities identified on a corporation's balance sheet represent the entire potential liability, including any potential for future third-party claims related to environmental concerns. Environmental insurance may also create potential balance sheet benefits by turning environmental liabilities into insurance assets.[15] Such benefits can help to pave the way for real estate transactions or mergers and acquisitions involving polluted sites, or financing of brownfields redevelopment by replacing the potentially open-ended costs of environmental liabilities with fixed insurance premiums.[16]

Environmental liability insurance has played a particularly important role in creating economic incentives to spur the redevelopment of "brownfields" sites. Local and State Governments may provide developers with contacts to insurance brokers that handle environmental insurance, or may even subsidize the cost of such policies as an incentive to

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[10] EPA, "Potential Insurance Products for Brownfields Cleanup and Redevelopment," EPA 500-F-97-106, Apr. 1997, found at *http://www.epa.gov/,* retrieved June 2, 2004; and industry representative, interview by USITC staff, Virginia, June 14, 2004.

[11] Flanigan, George B., "Insurance Coverage for Environmental Claims," *Risk Management Magazine*, found at *http://www.rmmag.com/Magazine/PrintTemplate.dfm?AID=2225,* retrieved Jan. 29, 2004; and William Seuch, "Environmental Insurance To Protect the Interest of Lenders," *Environmental Risk Resources Association, Environmental Insurance Newsletter,* Summer 2003, found at *http://www.erraonline.org/summer2003newsletter.pdf,* retrieved June 3, 2004.

[12] William Seuch, "Environmental Insurance To Protect the Interest of Lenders," *Environmental Risk Resources Association, Environmental Insurance Newsletter,* Summer 2003, found at *http://www.erraonline.org/summer2003newsletter.pdf,* retrieved June 3, 2004.

[13] Industry representative, interview by USITC staff, Virginia, June 14, 2004.

[14] Industry representative, interview by USITC staff, Virginia, June 14, 2004.

[15] Kenneth E. Anderson and Donna Ferrara, "Disclosing Environmental Liabilities: Director, Officer and Insurance Issues," Sept. 19, 2003, found at *http://www.erraonline.org/disclosing.pdf,* retrieved June 2, 2004.

[16] See "Environmental Insurance and M&A," Environmental Risk, Spring 2004, p. 1, found at *http://www.willis.com/,* retrieved June 16, 2004.

developers interested in brownfields sites.[17] In Massachusetts, properties which qualify under the state brownfields redevelopment program are eligible for a subsidy of 50 percent of the environmental insurance premium.[18]

The U.S. Environmental Insurance Market

Industry estimates placed the size of the U.S. market for environmental insurance in the range of $1.7 billion to $2.0 billion in premiums in 2003.[19] Eight large firms[20] provide the bulk of the coverage, with AIG reportedly underwriting more than half of the market.[21] This is a substantial increase over the 1999 premium estimate of $400 million.[22] Premium volume has been increasing at an annual rate of 20-25 percent in recent years, and observers expect that rate of growth to continue, as corporations and the real estate market develop a greater understanding of the deal-facilitation benefits of environmental insurance.[23] However, according to some observers, the market for PLL insurance may have matured along with the overall market for remediation services, as many of the highly polluted Superfund sites have been cleaned up, and improved environmental practices, including the introduction of environmental management programs such as ISO 14000, have reduced the number of new industrial sites in need of remediation. In the future, this trend may lead U.S. environmental insurers to pursue opportunities in foreign markets.[24] At the same time, the market for environmental insurance shows signs of becoming increasingly competitive, as more insurance firms enter the market and develop standardized insurance forms, which contribute to ease of use.[25] However, one insurer reports that his firm turns away close to 50 percent of

[17] EPA, "Environmental Insurance Helps Ensure Redevelopment," EPA 500-F-03-232, July 2003, found at *http://www.epa.gov/,* retrieved June 2, 2004.

[18] Andrew Steneri, "Managing Brownfield Redevelopment With Environmental Insurance," *Environmental Risk Resources Association, Environmental Insurance Newsletter,* Winter 2003, found at *http://www.erraonline.org/publications.htm#anchor2,* retrieved June 3, 2004.

[19] Kenneth E. Anderson and Donna Ferrara, "Disclosing Environmental Liabilities: Director, Officer and Insurance Issues," Sept. 19, 2003, found at *http://www.erraonline.org/disclosing.pdf,* retrieved June 2, 2004; and industry representative, interview by USITC staff, Virginia, June 14, 2004.

[20] The firms are AIG, Chubb, XL, Zurich, ACE, Gulf, Arch, and Liberty. Kenneth E. Anderson and Donna Ferrara, "Disclosing Environmental Liabilities: Director, Officer and Insurance Issues," Sept. 19, 2003, found at *http://www.erraonline.org/disclosing.pdf,* retrieved June 2, 2004.

[21] Quanta Capital Holdings, formed in Bermuda in September 2003, has also begun to offer environmental insurance. Industry representative, interview by USITC staff, Virginia, June 14, 2004.

[22] David J. Dybdahl, "A Users' Guide to Real Environmental Insurance," found at *http://www.erraonline.org/realenvins.html/,* retrieved June 2, 2004.

[23] Alan Bressler, "Navigating the U.S. Environmental Liability Market (Part 1)," Mar. 2002, found at *http://www.irmi.com/Expert/Articles/2002/Bressler03a.aspx,* retrieved June 2, 2004.

[24] Industry representatives, interviews by USITC staff, California, May 12-14, and Virginia, June 14, 2004.

[25] For example, the number of firms offering contractor's pollution liability insurance almost doubled, to 15, during 1999-2003, and the average price of premiums dropped by 25 percent. Jeff Slivka, "Contractor's Pollution Liability Insurance: More Available Today Than Ever!" *Environmental Risk Resources Association, Environmental Insurance Newsletter,* Winter 2003, found at *http://www.erraonline.org/publications.htm#anchor2,* retrieved June 3, 2004.

environmental insurance applications that they receive, as the remediation sites involved are perceived to be too risky to insure.[26]

Developments in the U.S. Market

An important development in the environmental insurance field is the emerging concept of "risk-based decision making" in remediation projects. Under this concept, the goal of an environmental cleanup project should be to reduce the level of pollutants at each site to an acceptable level of risk of adverse consequences, such as a threat to human health. The acceptable level is to be decided depending on the particular pollutants involved and the future expected use of the site. If the site is intended for future industrial use, remediation requirements would be less strict than if the site were planned for residential use. After a site is remediated to an acceptable level for industrial use, it would likely be sold with a deed restriction identifying prohibited uses due to environmental contamination. This is in contrast to earlier standards, under which pollutants were required to be cleaned up to a "nondetect" level, regardless of the circumstances surrounding the pollutants or the type of redevelopment planned for the site.[27] This new risk assessment approach by regulators has encouraged sellers and buyers to consider redeveloping brownfields sites that were once considered hopelessly contaminated.

Cost-cap policies, as described above, are essential in the brownfields redevelopment process in as much as they provide a clear cap to the financial risks borne by environmental contractors and property owners.[28] Without regulators' increasing acceptance of risk-based decision making policies, it would not be possible for the property owner or the insurer to definitively understand their liability limits. For this reason, the new risk-based decision making process, and the risk-transfer insurance policies that have grown out of it, are seen as essential elements in the growth of the private-sector brownfields remediation market.[29]

The passage of the Sarbanes-Oxley Act in 2002 has contributed to the development of the environmental insurance market by encouraging corporations to better assess and publicly disclose the full range of their liabilities, including environmental liabilities. In particular, under the provisions of Sarbanes-Oxley, failure to publicly disclose environmental (or other) liabilities may lead to personal liability on the part of a company's officers and directors, exposing them to lawsuits brought by shareholders. Moreover, most directors and officers (D&O) liability insurance excludes coverage of environment-related claims. This new emphasis on full reporting of corporate environmental liabilities has in many cases encouraged corporations to deal with such liabilities by transferring much of their risk to insurance companies, through policies aimed specifically at environmental liability.[30]

An emerging strategy available for the transfer of environmental risk is a liability transfer or buyout. In contrast to a standard PLL policy, under which an insurer agrees to accept an environmental risk up to an agreed policy limit, a liability transfer allows the original

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[26] Industry representative, interview by USITC staff, Virginia, June 14, 2004.

[27] Industry representatives, interviews with USITC staff, California, May 12-14, 2004; and EBI, *Environmental Business Journal,* vol. XV, No. 7/8, 2003, pp. 9-10.

[28] EBI, *Environmental Business Journal,* vol. XV, No. 7/8, 2003, pp. 9-10.

[29] EBI, *Environmental Business Journal,* vol. XV, No. 7/8, 2003, pp. 9-10.

[30] Kenneth E. Anderson and Donna Ferrara, "Disclosing Environmental Liabilities: Director, Officer and Insurance Issues," Sept. 19, 2003, found at *http://www.erraonline.org/disclosing.pdf,* retrieved June 2, 2004.

property owner to entirely remove the risk from its balance sheet by transferring it to a third party for a one-time fee. The third party then arranges its own environmental insurance to manage the risk. Such a transaction requires regulatory approval, which is generally contingent on the third party proving to regulators that it has the financial capacity to fund any needed environmental remediation. Such assurances may be accomplished through the buyer's posting a bond or acquiring an environmental insurance policy from a well funded insurance company.[31] This type of liability transfer allows corporations to reduce their overall liabilities for a fixed price, thus improving their balance sheets. Liability transfer may also yield significant benefits in an M&A situation, where the acquiring company is unwilling to take on an environmental liability, even when the site has been insured.[32]

Historically, one of the largest sources of environmental insurance claims has been asbestos. During 1993-2002, the insurance industry paid out $1.7 billion per year, on average, in asbestos-related claims.[33] While asbestos remains an ongoing issue, other environmental concerns are also rising in importance. Chief among these is toxic mold, which shows signs of becoming the "new asbestos" in terms of cost to the industry and increasing significance. The increase of toxic mold problems in the United States has led to expensive remediation and correspondingly expensive lawsuits. One of the most expensive examples of remediation linked to mold is the $55 million remediation effort at the Hilton Kalia Tower in Honolulu, which was closed in 2002, a year after opening, due to extensive mold problems.[34] Hilton sued its architects and 18 other contractors in an effort to recoup its costs.[35] The lawsuit has not yet been resolved. Mold claims have been excluded from most general liability policies, and there is an emerging consensus that toxic mold fits the definition of an environmental pollutant under standard environmental liability policies.[36] As of 2003, insurers in 35 States have received regulatory approval to exclude mold coverage from their standard property insurance forms, instead offering coverage through separate environmental insurance policies.[37] Bioterrorism has also surfaced as a particular concern for

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[31] Industry representative, interview by USITC staff, Virginia, June 14, 2004.

[32] Michael Balmer and Adrianne Cronas, "Environmental Insurance Market Review 2004," *Environmental Risk,* Winter 2004, p. 2; and "Environmental Insurance and M&A," *Environmental Risk,* Spring 2004, p. 2.

[33] Insurance Information Institute (III), *The I.I.I. Insurance Fact Book 2004,* (New York: III, 2004), p. 114.

[34] "Hilton Sues 18 Companies Over Mold Remediation Costs at a Hawaiian Hotel," *Honolulu Advisor,* Apr. 22, 2003, found at *http://healthandenergy.com/air_pressure_and_mold.htm,* retrieved June 16, 2004. After the initial discovery of the problem, the remediation effort was expected to cost $10 million, considered high at the time. "Hilton begins Kalia Tower mold removal," *Honolulu Star-Bulletin,* Sept. 12, 2002, found at *http://starbulletin.com/2002/09/12/business/story2.html,* retrieved June 16, 2004.

[35] Rick Fedrizzi, "Mold Insurance and Litigation," found at *http://healthandenergy.com/mold_insurance_and_litigation.htm/,* retrieved June 16, 2004; and Andrew Gomes, "Hilton Kalia Tower mold lawsuit grows in complexity," *Honolulu Advertiser,* July 6, 2003, found at *http://thehonoluluadvertiser.com/article/2003/Jul/06/bz/bz10a.html/,* retrieved June 16, 2004.

[36] Alan Bressler, "Navigating the U.S. Environmental Liability Market (Part 2)," Mar. 2002, found at *http://www.irmi.com/Expert/Articles/2002/Bressler03b.aspx,* retrieved June 2, 2004; and Michael Balmer and Adrianne Cronas, "Environmental Insurance Market Review 2004," *Environmental Risk,* Winter 2004, p. 2.

[37] Bennett Voyles, "Mold on Hold," *National Real Estate Investor,* Mar. 1, 2003, found at *http://nreionline.com/ar/real_estate_mold_hold/index.htm,* retrieved June 16, 2004.

environmental insurers, as anthrax or other such biological agents may fall within the definition of pollution. Insurers have inserted exclusionary language related to bioterrorism in most terrorism-specific policies, and site-specific environmental liability policies have stepped in to fill the gap.[38]

International Markets

The environmental insurance market was created in the United States, largely as a response to the CERCLA and RCRA laws, and this country remains the center of the market. As noted above, the U.S. market is estimated at $2 billion, accounting for a greater share of insured environmental risks than any other country. However, the passage of environmental regulations in other countries, particularly Europe and Australia, has led to the formation of environmental insurance markets in those countries as well.[39] According to one industry estimate, total global environmental premiums reached $2.3 billion in 2003, with expected premium growth of 15 to 20 percent in 2004.[40] U.S. observers estimate that the development of the environmental insurance markets in Europe and other areas may be 10 to 15 years behind that of the United States.[41]

Italy, Switzerland, and Portugal all have passed environmental laws with liability obligations similar to those of the United States. In Italy, environmental laws impose compulsory cleanup orders backed by criminal sanctions. However, court rulings based on these laws have been few and the rulings have been contradictory, leaving a high level of legal uncertainty surrounding the enforcement of environmental laws. Environmental insurance coverage in Italy is correspondingly difficult to obtain, although the standard policy forms are in the process of being reworked, which should help to improve the situation.[42] Germany's environmental laws embody a somewhat different view of polluter liability, and environmental insurance coverage is mandatory for certain high-risk activities in Germany, with policies tailored to fit each individual situation.[43] In the United Kingdom, environmental laws exist, but enforcement is reportedly uneven, limiting the demand for environmental insurance.[44]

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[38] Alan Bressler, "Navigating the U.S. Environmental Liability Market (Part 2)," Mar. 2002, found at *http://www.irmi.com/Expert/Articles/2002/Bressler03b.aspx,* retrieved June 2, 2004; and Michael Balmer and Adrianne Cronas, "Environmental Insurance Market Review 2004," *Environmental Risk,* Winter 2004, p. 2.

[39] Alan Bressler, "Navigating the U.S. Environmental Liability Market (Part 1)," Mar. 2002, found at *http://www.irmi.com/Expert/Articles/2002/Bressler03a.aspx,* retrieved June 2, 2004.

[40] Michael Balmer and Adrianne Cronas, "Environmental Insurance Market Review 2004," *Environmental Risk,* Winter 2004, p. 2.

[41] Industry representatives, interviews with USITC staff, California, May 12, and Virginia, June 14, 2004.

[42] Organization for Economic Cooperation and Development (OECD), *Environmental Risks and Insurance: A Comparative Analysis of the Role of Insurance in the Management of Environment-Related Risks,* Policy Issues in Insurance No. 6 (Paris: OECD, 2003), p. 33.

[43] OECD, *Environmental Risks and Insurance: A Comparative Analysis of the Role of Insurance in the Management of Environment-Related Risks*, Policy Issues in Insurance No. 6 (Paris: OECD, 2003), pp. 26 and 31.

[44] Industry representative, interview by USITC staff, Virginia, June 14, 2004.

There is a proposed EU Directive on environmental liability with regard to the prevention and remedying of environmental damage [(COM92002) 17 final], proposed in January 2002. The proposed directive defines environmental damage as damage to water, soil, or biodiversity. The latter is a departure from existing environmental legislation elsewhere, which principally targets water and soil remediation. The directive would follow the generally accepted "polluter pays" principle, with the polluter responsible for the costs of remedying environmental damage. However, the directive does not cover damages that are not directly related to environmental damage, including bodily injuries, property damage and economic loss. These would continue to be covered by national laws.[45] Under the proposed directive, it is the responsibility of public authorities to initiate proceedings requiring environmental cleanup or assessment for damages. Lawsuits could not be initiated by private parties.[46] If the directive is implemented, the most important change to existing member country laws would be the provisions extending damage claims to biodiversity and compensation for interim losses. Most other environmental problems covered by the directive, including soil, water, and waste disposal problems, are already adequately covered by existing member country laws.[47]

In France, Italy, Spain, and the Netherlands, insurers and reinsurers have formed national insurance pools to aggregate capacity and share resources related to actuarial information and the development of new products. The pools are, respectively, Assurpol, Pool RC Inquinamento, Pool Espanol de Riesgos Medioambientales, and Nederlandse Milieupool.[48] These pools involve most primary insurers and reinsurers in each market, forming quasi-monopolies that effectively eliminate competition. For example, the European Commission has granted Assurpol an exemption from antitrust rules.[49] Unlike in the United States, the pools in both Spain and France work together with public authorities on solutions for accident prevention and cleanup operations.[50] In Spain, the pool uses its own risk assessment tools. Financial capacity has kept pace with the growing demand for environmental insurance coverage. In France, Assurpol covers claims for quantifiable damages of up to FRF 200 million which result from accidents within insured sites, and which can be attributed to insured activities.[51]

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[45] OECD, *Environmental Risks and Insurance: A Comparative Analysis of the Role of Insurance in the Management of Environment-Related Risks,* Policy Issues in Insurance No. 6 (Paris: OECD, 2003), pp. 34-35.

[46] Swiss Re, "The Insurability of Ecological Damage," found at *http://www.swissre.com/INTERNET/pwsfilpr.nsf/vwFilebyIDKEYLu/ESTR-5SMHEA/$FILE/Eco_Damage_en.pdf,* retrieved June 15, 2004.

[47] Swiss Re, "The Insurability of Ecological Damage," found at *http://www.swissre.com/INTERNET/pwsfilpr.nsf/vwFilebyIDKEYLu/ESTR-5SMHEA/$FILE/Eco_Damage_en.pdf,* retrieved June 15, 2004.

[48] OECD, *Environmental Risks and Insurance: A Comparative Analysis of the Role of Insurance in the Management of Environment-Related Risks,* Policy Issues in Insurance No. 6 (Paris: OECD, 2003), p. 46.

[49] Practical Law Company website, found at *http://corporate.practicallaw.com/jsp/article.jsp?item=6512,* retrieved June 15, 2004.

[50] SCOR website, "Toxic Waste at Doñana: An Ecological Catastrophe," found at *http://astre.scor.com/astrehelp/en/Qualif/env/NATF01ES.htm,* retrieved June 15, 2004.

[51] SCOR website, "Toxic Waste at Doñana: An Ecological Catastrophe," found at *http://astre.scor.com/astrehelp/en/Qualif/env/NATF01ES.htm,* retrieved June 15, 2004.

APPENDIX D
NATURE AND LANDSCAPE PROTECTION (NLP) SERVICES IN THE GENERAL AGREEMENT ON TRADE IN SERVICES (GATS)

Introduction

The General Agreement on Trade in Services (GATS) was signed in April of 1994 and entered into force in January of 1995. The GATS is the first multilateral, legally enforceable agreement covering trade and investment in the service sector. Modeled after the agreement on goods, the GATS is a "positive-list" agreement[1] which binds signatories to provide foreign firms with market access and nondiscriminatory treatment, subject to defined exemptions. The primary purpose of the agreement is to reduce or eliminate measures that prevent services from being provided across borders or that discriminate against locally-established service providers with foreign ownership. The agreement is organized in four parts: the main text containing general principles and obligations; annexes dealing with rules for specific sectors; individual countries' specific commitments; and lists indicating temporary exemptions from the most-favored nation principle of non-discrimination.

Country-Specific Commitments

Country-specific commitments typically are organized based on the Services Sectoral Classification List,[2] which organizes services industries into twelve broad sectoral categories and provides corresponding numbers from the United Nations Provisional Central Product Classification (CPC). Under this classification scheme, the environmental services sector includes four subsectors: sewage services (CPC 9401); refuse disposal services (CPC 9402); sanitation and similar services (CPC 9403); and other environmental services, which are generally presumed to include cleaning of exhaust gasses (CPC 9404), noise abatement (CPC 9405), NLP services (CPC 9406) and other environmental services (CPC 9409).

Fifty-one countries have scheduled specific commitments in the environmental services sector, and 37 of these countries have scheduled commitments on NLP services. Of these, 9 countries have scheduled commitments granting full market access and national treatment to foreign service suppliers that provide NLP services through cross-border supply (mode 1),[3] consumption abroad (mode 2),[4] and commercial presence (mode 3)[5] (table D-1). Limitations

[1] Under a "positive-list" agreement, members are only bound by those commitments that they specifically list within their Schedules, which comprise part of the agreement. By contrast, a "negative-list" agreement binds member countries to all provisions covered by the agreement unless otherwise specified.

[2] World Trade Organization (WTO), "Services Sectoral Classification List," MTN.GNS/W/120, July 10, 1991.

[3] One of four possible modes of delivering services to foreign consumers, whereby the service is transported beyond the home country of the service supplier to the foreign consumer. Cross-border supply may entail transportation by mail, telecommunications, or the physical movement of merchandise embodying a service (e.g., a diskette storing information) from one country to another. The mode is "cross-border" when the service supplier is not present within the territory where the service is delivered.

[4] One of four possible modes of delivering services to foreign consumers, whereby the consumer, or the consumer's property, receives a service outside the territory of his/her home country, either by moving or being situated abroad.

[5] One of four possible modes of delivering services to foreign consumers, whereby a service supplier establishes any type of business or professional establishment in the foreign market. Commercial presence comprises entities such as corporations, trusts, joint ventures, partnerships, sole proprietorships, associations, representative offices, and branches

listed by the remaining 28 countries include, *inter alia*, licensing restrictions, provisions requiring approval for the establishment of a commercial presence, a provision requiring foreign firms to form a joint venture (listed in China's schedule), and a measure limiting foreign equity participation in the NLP sector to 49 percent (listed in Thailand's schedule). Several member countries have not scheduled bindings on NLP services provided through cross-border supply as they consider such transactions technically infeasible. Most measures regarding the supply of services through the presence of natural persons (mode 4)[6] are addressed in each member country's horizontal commitments.

With regard to scope, 22 countries have scheduled commitments that cover the full range of services in the NLP sector. Among the countries that committed to partial coverage of the sector, six countries include an overall exemption limiting their NLP commitments to services supplied and/or purchased by private entities. In addition, ten countries include provisions which limit the range of activities covered under NLP commitments. For example, both Lesotho and South Africa indicate that their NLP commitments apply only to consultancy services.

Current GATS Negotiations

In keeping with Article XIX of the GATS,[7] a new round of services negotiations began in January 2000. In preparation for the negotiations, WTO member economies submitted over 100 negotiating proposals to the GATS Council for Trade in Services.[8] In these proposals, member economies outlined their positions regarding specific service sectors and various issues that affect multiple service sectors, such as transparency and autonomous liberalization. The negotiations themselves, which are currently underway, are being conducted through a request-offer approach. Under this approach, WTO member economies have submitted initial requests, formally asking other WTO members to make specific changes to their schedules of commitments. Following the receipt of these requests, WTO members submitted initial offers. These nonbinding offers are presented in redline-strikeout format, illustrating the changes that member economies may be willing to make in their schedules of commitments in response to other members' requests.

[6] One of four possible modes of delivering services to foreign consumers, whereby an individual, acting alone or as an employee of a service supplier, provides a service by traveling to a foreign market.

[7] Article XIX of the GATS requires WTO member economies to initiate a new round of services negotiations no later than five years after the entry into force of the WTO agreement.

[8] WTO, "List of 2000 Service Proposals," found at *http://www.wto.org/english/tratop_e/serv_e/s_propnewnegs_e.htm/*, retrieved July 14, 2003.

Table D-1
Nature of GATS commitments on nature and landscape protection (NLP) services

Member country	Do commitments apply to all or part of the sector?	Did the member country schedule full or partial commitments?[1]	Nature of limitations listed in GATS schedule
Armenia	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Austria	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility. Commercial presence is required for the provision of services through the presence of natural persons (mode 4).
Bulgaria	Part	Full	Commitments do not cover environmental services supplied in the exercise of governmental authority, which includes regulatory, administrative, and control services by government and municipal bodies related to environmental issues. Additionally, commitments do not apply to services related to the collection, transportation, storage, secondary use, recycling, restoration, use in the production of energy and materials, and disposal of dangerous waste, refuse, and substances. The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Canada	All	Full	--
China	Part	Partial	Commitments exclude quality monitoring and pollution source inspection. Additionally, foreign firms are granted market access through a commercial presence (mode 3) only in the form of joint ventures, although foreign majority ownership is permitted. Environmental consultation is the only cross-border (mode 1) service covered by these commitments.
Croatia	All	Partial	Commercial presence is required for provision of services through cross-border supply (mode 1).
Ecuador	All	Full	--
El Salvador	All	Partial	Commitments only cover market access for provision of services through a commercial presence (mode 3). There are no commitments on national treatment.
Estonia	All	Full	--
EU	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.

See footnotes at end of table.

Table D-1 – *Continued*
Nature of GATS commitments on nature and landscape protection (NLP) services

Member country	Do commitments apply to all or part of the sector?	Did the member country schedule full or partial commitments?[1]	Nature of limitations listed in GATS schedule
Finland	All	Full	--
FYR Macedonia	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Georgia	Part	Full	Commitments on cross-border supply (mode 1) apply only to consulting and advisory services.
Iceland[2]	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility. An environmental operating license is required for market access through commercial presence (mode 3) and presence of natural persons (mode 4).
Japan	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Korea	Part	Partial	Commitments on NLP services cover only environmental impact assessment services. Establishment of a commercial presence (mode 3) is subject to an economic needs test.
Kyrgyz Republic[2]	All	Full	--
Latvia	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Lesotho	Part	Full	Commitments cover consultancy services only.
Liechtenstein	Part	Full	Commitments do not apply to public works functions, whether owned and operated by municipalities or the Liechtenstein Government or contracted out by them. The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Lithuania	Part	Full	Commitments exclude the provision of services for national parks. The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Moldova	All	Full	--

See footnotes at end of table.

Table D-1 – *Continued*
Nature of GATS commitments on nature and landscape protection (NLP) services

Member country	Do commitments apply to all or part of the sector?	Did the member country schedule full or partial commitments?[1]	Nature of limitations listed in GATS schedule
Morocco[3]	All	Partial	Reserves the right to limit market access through cross-border supply (mode 1) and consumption abroad (mode 2).
Norway	Part	Full	Commitments do not cover public service functions whether owned and operated or contracted out by the local, regional, or central government. The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Oman	All	Full	--
Panama	Part	Partial	Commitments apply exclusively to services for conducting studies on the relation between the environment and climate, including the evaluation of natural disasters and the reduction of their consequences. These commitments do not grant national treatment for the provision of services through cross-border supply (mode 1) and commercial presence (mode 3).
Qatar[4]	All	Partial	Reserves the right to limit the provision of NLP services through cross-border supply (mode 1) and consumption abroad (mode 2).
Romania[2]	All	Full	–
Sierra Leone[2]	All	Partial	Reserves the right to limit the provision of NLP services through cross-border supply (mode 1) and consumption abroad (mode 2).
Slovenia	Part	Partial	Public utilities exist, but concession rights can be granted to private operators established in the Republic of Slovenia. The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
South Africa	Part	Full	Commitments apply to consultancy services only.
Sweden	Part	Partial	Commitments do not cover public works functions whether owned and operated by municipalities, state, or federal governments or contracted out by them. The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.

See footnotes at end of table.

Table D-1 – *Continued*
Nature of GATS commitments on nature and landscape protection (NLP) services

Member country	Do commitments apply to all or part of the sector?	Did the member country schedule full or partial commitments?[1]	Nature of limitations listed in GATS schedule
Switzerland	Part	Partial	Commitments do not cover public works functions whether owned and operated by municipalities, cantons, or the Federal Government, or contracted out by them. The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility.
Taiwan	Part	Full	Commitments apply only to consulting services incidental to NLP.
Thailand	All	Partial	The provision of services through cross-border supply (mode 1) is unbound due to technical infeasibility. There are no limitations on national treatment for the supply of services through a commercial presence (mode 3), as long as foreign equity participation does not exceed 49 percent.
United Arab Emirates[2]	All	Full	--
United States	Part	Full	Commitments are limited to the following activities: implementation and installation of new or existing systems for environmental cleanup, remediation, prevention, and monitoring; implementation of environmental quality control and pollution reduction services; maintenance and repair of environment-related systems and facilities not already covered by the US commitments on maintenance and repair of equipment; on-site environmental investigation, evaluation, and monitoring; sample collection services; training on site or at the facility; and consulting related to these areas.

[1] Most measures regarding the supply of services through the presence of natural persons (mode 4) are addressed in a member country's horizontal commitments. Thus, for the purposes of this table, a full commitment is any commitment that grants full market access or national treatment to foreign individuals or firms that provide NLP services through cross-border supply (mode 1), consumption abroad (mode 2), and commercial presence (mode 3).

[2] Commitments include Other Environmental Services but do not specifically identify NLP Services or CPC 9406.

[3] Does not specifically identify NLP Services or CPC 9406, but uses the broader CPC 940 category -- which includes NLP Services -- to define the scope of the sector covered by these commitments.

[4] Does not identify specific environmental service categories, but rather treats the entire sector as a whole.

Source: Compiled by the U.S. International Trade Commission.

The environmental services sector, including the NLP services segment, is one of many industries under discussion in the ongoing WTO services negotiations. The following section discusses environmental services proposals submitted to the WTO, provides an overview of initial requests and offers that specifically address the NLP services segment, and presents a general overview of the current status of WTO services negotiations.

Environmental Services Submissions

Australia, Canada, Colombia, Cuba, the European Union (EU), Switzerland, and the United States submitted negotiating proposals on environmental services during 2000-2001, at the beginning of the Doha Round.[9] These proposals focus primarily on the environmental services sector as a whole, though NLP services (a subset of the "protection of biodiversity and landscape" segment under the proposed EU classification system) are specifically mentioned in certain proposals with respect to classification issues. With regard to such issues, six proposals[10] suggest that the current WTO classification of the environmental services sector does not adequately cover all activities of the industry. Nearly identical proposals from the EU and Switzerland include modifications to the current environmental services classification, as well as the addition of a specific list of related services - such as construction, engineering, and research and development. Australia endorses the EU/Switzerland approach, but does not specifically list services that should be addressed within these negotiations. Colombia also favors the EU classification and proposes that environmental impact assessment, monitoring and auditing, and the design of environmental technologies be included in the environmental services sector. The United States and Canada propose the consideration of both core environmental services, consisting primarily of those activities that are currently classified as environmental services under the W/120, and environmentally related services, although neither proposes a specific list of such related services.

The principal objective of the proposals submitted by Australia, Canada, the EU, Switzerland, and the United States is the reduction and removal of barriers to trade in environmental services. Each paper supports the liberalization of a similar list of trade impediments, including restrictions on the provision of services through a foreign-invested commercial presence (mentioned in all five papers), limitations on the temporary entry and stay of foreign personnel (included in papers submitted by Canada, the EU, Switzerland, and the United States), and a lack of regulatory transparency (included in papers submitted by Australia, Canada, the EU, and the United States). The EU and Switzerland also propose the liberalization of barriers related to the provision of environmental services through cross-border supply or consumption abroad. Each of these papers recognizes that some of these objectives, such as increased transparency and the reduction of certain restrictions on commercial presence, will require liberalization of those trade measures which apply to service providers in all industry sectors.

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[9] WTO, "Communication from Australia, Negotiating Proposal for Environmental Services," S/CSS/W/112, Oct. 1, 2001; "Communication from Canada, Initial Negotiating Proposal on Environmental Services," S/CSS/W/51, Mar. 14, 2001; "Communication from Colombia: Environmental Services," S/CSS/W/12, Nov. 27, 2001; "Communication from Cuba: Negotiating Proposal on Environmental Services,: S/CSS/2/142, Mar. 22, 2001; "Communication from the European Communities and their Member States, GATS 2000: Environmental Services," S/CSS/W/38, Dec. 22, 2000; "Communication from Switzerland, GATS 2000: Environmental Services," S/CSS/W/76, May 4, 2001; and "Communication from the United States, Environmental Services," S/CSS/W/25, Dec. 18, 2000, all found at *http://www.wto.org/*, retrieved June 20, 2003.

[10] The proposal submitted by Cuba does not address classification issues.

The proposal from Colombia indicates that the commercial presence of foreign enterprises in the environmental services sector may be beneficial for developing countries, and that commitments should be evaluated based on the member country's level of economic development. In addition, the paper proposes that member countries evaluate the professional qualification of foreign service providers using the same criteria applied to domestic service providers. The proposal submitted by Cuba also focuses on the interests of developing countries, indicating that such countries should be able to engage in environmental services trade liberalization on terms that will enable them to realize the benefits of such liberalization.

Requests for Commitments on Nature and Landscape Protection Services

Paragraph 15 of the Doha Development Agenda established a schedule for the initial request-offer phase of the services negotiations. According to this schedule, WTO member countries were asked to submit their first specific requests of other member countries by June 30, 2002. These requests are not publically available. However, summaries issued by several countries indicate that there have been a number of requests related to the environmental services sector as a whole, and NLP services specifically. For example, the European Union states that it has requested the elimination of restrictive and discriminatory measures facing EU providers of environmental services. The EU summary also indicates that EU requests are modeled after the environmental services classification included in its proposal (see above), which lists NLP services under the broader category of "protection of biodiversity and landscape services."[11] A summary of the U.S. requests indicates that the United States has asked other WTO member countries to liberalize a number of environmental services segments, including biodiversity and protection of landscape services.[12] Canada defines the environmental services sector to include several activities, including NLP services, and indicates that it has requested the elimination of local partnership and licensing requirements.[13] Further, Japan's summary states that it has made requests on all environmental services sub-sectors.[14]

Offers Regarding Nature and Landscape Protection Services

Paragraph 15 of the Doha Development Agenda established March 31, 2003 as the due date for the submission of initial services offers. As of February 2004, 40 member countries had submitted services offers to the WTO,[15] and 12 of these offers had been derestricted and made available to the public. Among the twelve economies that have submitted derestricted offers, only a small number have proposed substantial changes to their commitments on NLP services (table D-2), largely due to the fact that many of these economies had already undertaken substantial bindings on environmental services, including NLP services, during the Uruguay

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[11] European Commission (EC), "Summary of the EC's Initial Requests to Third Countries in the GATS Negotiations," July 1, 2002, found *at http://europa.eu.int/*, retrieved Jan. 28, 2004.

[12] United States Trade Representative (USTR), "U.S. Proposals for Liberalizing Trade in Services: Executive Summary," press release, July 1, 2002, found at *http://www.ustr.gov/*, retrieved Oct. 23, 2003.

[13] "Description of Requests Presented by Canada to its WTO Partners," Mar. 31, 2003, found at *http://strategis.ic.gc.ca/,* retrieved Jan. 28, 2004.

[14] Ministry of Foreign Affairs (MOFA), "WTO Services Trade Negotiations Submission of Initial Requests," June 2002, found at *http://www.mofa.go.jp/*, retrieved Jan. 28, 2004.

[15] WTO, "Services: Negotiations, The New Negotiations," found at *http://www.wto.org/*, retrieved Nov. 17, 2003.

Round.

Several of the publically-available offers include changes affecting the classification of the definition of the environmental services covered by their commitments. Six member economies chose to recast their Uruguay Round commitments using the classification scheme outlined in the EU proposal. Australia's offer includes full commitments[16] on "treatment, remediation of contaminated/polluted soil and water, and "nature and landscape protection services," while New Zealand is proposing to schedule full commitments on consultancy services related to NLP. In its new offer, Iceland has added CPC codes to its environmental services schedule, identifying the "other environmental services" segment as CPC 9409, which excludes NLP services, covered under CPC 9406. This adds clarity to Iceland's Uruguay Round commitments on "other environmental services,"[17] but clearly indicates that NLP services would not be covered under Iceland's offer.

Few of the publically available offers include changes affecting the content of the commitments themselves, as seven of the economies that submitted publically available offers already maintain full commitments on the provision of NLP services through modes 2 and 3. However, two countries that did not schedule commitments on NLP services during the Uruguay Round – Australia and New Zealand – have offered to undertake bindings in this service segment. Two of the publically-available offers propose some measure of liberalization on the provision of NLP services through mode 1. Specifically, Norway is offering to change its mode 1 commitments on NLP services from "unbound" to "none," and the European Union is offering to remove all restrictions on mode 1 for advisory services related to NLP. Neither Chile nor Turkey had scheduled Uruguay Round commitments on NLP services, and this did not change in their new offers.

Minutes from recent meetings of the WTO Council for Trade in Services suggest that at least two additional countries– Mexico and the Slovak Republic– have submitted offers on the environmental services sector.[18] However, the minutes do not provide any details regarding the content of these offers and thus, they cannot be compared to the publically available offers that are discussed above.

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[16] Except for mode 1, which is listed as "unbound due to technical feasibility."

[17] "Nature and landscape protection services" are included in the W/120 definition of "other environmental services," but not in the definition of "other environmental services" used in the provisional CPC classification. This makes it difficult to determine the scope of Iceland's Uruguay Round commitments.

[18] WTO, "Report of the Meeting Held on 19-22 May 2003," June 30, 2003, p. 30, and "Report of the Meeting Held on 4 and 10 July and 3 September 2003," Sept. 29, 2003, p. 40, found at *http://www.wto.org/,* retrieved Nov. 18, 2003.

Table D-2
Publically-available offers submitted by WTO members on nature and landscape protection (NLP) services

WTO Member	Basis of Environmental Services Classification	Changes to Scope of Uruguay Round Commitments	Changes to content of Uruguay Round commitments
Australia	EU proposal	Uruguay Round commitments do not cover nature and landscape protection services. In the new offer, Australia proposes to include commitments on "treatment, remediation of contaminated/polluted soil and water" and "nature and landscape protection services."	Uruguay Round commitments do not cover NLP services. Australia's offer includes full commitments for parts of CPC 9406, except for mode 1, which is unbound due to technical infeasibility.
Canada	W/120	None- Uruguay Round commitments cover the entire industry segment, including both NLP services (CPC 9406) and other environmental services (CPC 9409).	None- Uruguay Round schedule includes full commitments on this industry segment.
Chile	None used	None- There would continue to be no commitments on this industry segment, or on environmental services more generally.	None- There would continue to be no commitments on this industry segment, or on environmental services more generally.
European Union	EU Proposal	None- Uruguay Round commitments for most EU member countries cover the entire industry segment. Sweden would continue to exclude public works functions from its environmental services commitments.	The EU is offering to make some minor changes, making its mode 4 commitments on this industry segment compatible with its new horizontal commitments on mode 4, and removing restrictions on the provision of advisory services through mode 1. Finland would continue to maintain no mode 1 restrictions.
Iceland	W/120	Iceland's Uruguay Round commitments cover "other environmental services," which is not defined by a CPC number. Under the new offer, that segment is specifically identified as CPC 9409, and no commitments on NLP services (CPC 9406) are included.	For the industry segments that are covered under the offer, Iceland is proposing to eliminate the provision requiring an environmental operating license for the supply of refuse disposal services through mode 4. Iceland would continue to require such licenses for the provision of services through mode 3. The provision of services through mode 1 would remain unbound due to technical infeasibility.
Japan	EU proposal	None- Uruguay Round commitments cover the entire industry segment.	None- Commitments on mode 1 would remain unbound due to technical infeasibility.

Table D-2—*Continued*
Publically-available offers submitted by WTO members on nature and landscape protection (NLP) services

WTO Member	Basis of Environmental Services Classification	Changes to Scope of Uruguay Round Commitments	Changes to content of Uruguay Round commitments
Liechtenstein	W/120	None- Commitments on this industry segment would continue to exclude public works functions.	None- The provision of services through mode 1 would remain unbound due to technical infeasibility.
New Zealand	EU proposal	New Zealand's Uruguay Round commitments do not cover any environmental services, including NLP services. In its new offer, New Zealand proposes commitments that would cover consultancy services related to the provision of NLP services.	New Zealand, which previously had no commitments on NLP services, is offering to schedule full commitments relating to consultancy services in this industry segment.
Norway	EU proposal	None- Commitments on this industry segment would continue to exclude public service functions.	Norway is offering to remove the only limitation included in its Uruguay Round commitments on this industry segment, by changing mode 1 commitments from unbound to none.
Slovenia	W/120	None- Slovenia would continue to limit the scope of these commitments by indicating that concession rights for the operation of public utilities can be granted to private firms established in Slovenia.	None- Slovenia's Uruguay Round schedule includes full commitments on this industry segment except for the provision of services through mode 1, which will remain unbound due to technical infeasibility.
Turkey	W/120	None- Neither the Uruguay Round commitments nor the new offer cover this industry segment.	None- Neither the Uruguay Round commitments nor the new offer cover this industry segment.
United States	EU proposal	None- Commitments on NLP services would continue to be limited to a specific list of activities.	None- Uruguay Round commitments include full commitments on NLP services.

Source: Compiled by the Commission.

Current Status of Services Negotiations

WTO member economies continue to conduct services negotiations through the Council for Trade and Services, which met several times during 2003, and through bilateral consultations.[19] To date, the WTO has not established any further interim deadlines for these negotiations. The current round of services negotiations is scheduled to conclude by January 1, 2005.[20]

[19] WTO, "Report of the Meeting Held on 19-22 May 2003," June 30, 2003, and "Report of the Meeting Held on 4 and 10 July and 3 September 2003," Sept. 29, 2003, found at *http://www.wto.org*/, retrieved Nov. 18, 2003.

[20] WTO, "Services: Negotiations, The New Negotiations," found at *http://www.wto.org/*, retrieved Nov. 17, 2003.

APPENDIX E
GLOSSARY

Acidification: A process through which chemical compounds that are found in contaminated air or water leave metal deposits or become increasingly acidic.

Air sparging: The process of inserting air into the ground below the water table.

Aquifer: An underground geological formation that contains water.

Biochemical oxygen demand (BOD): A measure of the amount of oxygen that would be consumed if all of the organic substances in one liter of water were oxidized by microorganisms.

Biodiversity: The extent of the variability among flora and fauna, and the ecosystems in which they are found.

Bioremediation: A decontamination method that cleans a site by using microorganisms to transform potentially harmful material into less harmful substances.

Bioventing: The process of inserting air into the ground above the water table.

Brownfield: Abandoned, underutilized, or unused sites at which the presence, or perceived possibility, of low-level contamination may complicate reuse or redevelopment.

Commercial presence (mode 3): A service supplier establishes a type of business or professional enterprise in a foreign market.

Consumption abroad (mode 2): A consumer, or the consumer's property, receives a service outside the territory of the consumer's country.

Cradle-to-grave: Term used to describe a tracking system that records the generation, transportation, and disposal of hazardous material.

Cross-border supply (mode 1): A service is transported beyond the country of the service supplier to a foreign consumer (the service supplier is not present within the territory of the consumer).

Dispersed sources (nonpoint sources): Runoff from farms, roads, and construction projects.

Electrodialysis: A process through which an electrical current is used to remove minerals from water.

Eutrophication: The condition of a body of water in which high concentrations of nutrients induce accelerated growth of algae (algal blooms). Some eutrophication occurs naturally, but it can also be caused by human introduction of plant nutrients into water. The negative ecological consequences of algal blooms are twofold. First, reduced sunlight at the floor of the body of water causes die-off of underwater grasses, removing both food and habitat for floor-dwelling species. Second, the accelerated metabolic processes of the algae consume oxygen, which reduces the supply available for other organisms.

Ex situ: Term used to describe remediation methods in which contaminated soils or water are removed from its original location for the purposes of treatment or disposal.

Ground water: Fresh water found underground, typically in aquifers, which supplies springs and wells.

Hydrocarbons: Organic substances that contain only carbon and hydrogen atoms (i.e., methane, propane, octane, etc.).

In situ: Term used to describe remediation methods in which contaminated soils or water are treated in place.

Leachate: Liquids which leak from the lower stratum of a landfill into soil or groundwater..

Manufactured-gas plants (MGPs) (also known as "town-gas plants"): Factories that produced combustible gases from coal and oil from approximately 1850 to 1950. These plants have left a legacy of thousands of urban brownfield sites requiring remediation in the United States.

PCBs (**Polychlorinated Biphenyls):** Toxic man-made chemical compound used in industry. The use of PCBs were banned in 1977.

Persistent bioaccumulative toxins (PBTs): Toxic chemicals that filter into and accumulate food chains through various modes (i.e. air, water, and land). These pollutants pose serious health risks to humans as well as damage to the environment.

Phase I, II, and III: Terms used to describe the stages of a remediation project. Specifically: I-Site assessment, II-Testing, and III-Execution of actual plan.

Point sources: A single factory or plant which releases effluent through a pipe.

Presence of natural persons (mode 4): One individual, acting alone or as an employee of a service provider, provides a service while present in a foreign market.

Radioactive substances: Materials that release ionizing radiation.

Revegetation: The process of growing new vegetation on a previously unusable piece of land.

Slag: Partially fused or vitrified nonmetallic material released and formed by chemical action at high temperatures during the smelting and refining of metals.

Soil washing: Process through which water, or water containing an additive to enhance contaminant solubility, is applied to the soil or injected into the ground water to raise the water table into the contaminated soil zone. Contaminants are then leached into the groundwater, which is then extracted and treated.

Superfund: The Superfund program began in 1980 upon enactment of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. The law provided for a trust fund, financed by a tax on chemical and petroleum industries, for clean-up of abandoned or uncontrolled hazardous waste sites, and authorized direct response to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Surface water: Water open to the atmosphere (lakes, rivers, streams, etc.).

Thermal treatment: Methods through which high temperatures are used to treat hazardous wastes.

Underground storage tanks (USTs): Storage tanks which are located completely or partially underground.

Volatile organic compound: An organic compound that can contribute to air pollution and harmful ground level ozone when transformed into a vapor.

Waste plume: The geometric pattern formed by the downstream flow of a pollutant.

Watershed: A region encompassing a body of water and the area of land whose run-off supplies that body of water.

Wetlands: Lowlands that are imbued with moisture.