

BROWNFIELDS: HAZMAT CLEANUP, BUT MORE

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INTRODUCTION

For more than 40 years, the disposal of hazardous waste at landfills, industrial plants, military bases, and other locations across the country has contaminated tens of thousands of sites and nearby communities. Since 1980, when the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was passed, public attention to hazardous waste sites has often been associated with the federal Superfund law. While many hazardous waste sites require federal attention and funds, many more do not meet either the criteria for placement on the National Priorities List (NPL) or for emergency removal of contamination, which would also require federal involvement.

The scope of environmental and public health risks identified at Superfund and other hazardous waste sites ranges from contaminated soil and air to hazardous exposures through the food chain. Cleaning up the nation's hazardous waste sites is an enormous undertaking, requiring the efforts of millions of workers and hundreds of billions of dollars. Recently, though, there has been a new surge of cleanup activities, which some assume are less intensive. These activities take place at what are being called Brownfield sites.

Brownfield sites involve more than just the cleanup of hazardous waste. They represent the coming together of many factors -- environmental, economic, community empowerment, and environmental justice among them. The President's Economic Empowerment Act as part of a larger community empowerment agenda, the Executive Order on Environmental Justice, the President's Council on Sustainable Development, and a stronger market for urban land are all critical factors in Brownfields development.

This paper explains what Brownfields are and how, though the path taken to remediate them differs from other sites, they are, in many basic, and obvious ways, quite similar to many hazardous waste sites. It then goes on to discuss the scope of interest being generated by Brownfields, from communities to the federal government, and private industry. Finally, the paper considers the impact of Brownfields initiatives on communities and how best to assure that impacted communities benefit from the redevelopment efforts, not only in terms of a nicer environment, but in terms of opportunities for personal growth, leading to continuous employment.

What Is A Brownfield Site?

As defined by the U.S. Environmental Protection Agency (EPA), Brownfield sites are "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination."¹ They are called Brownfields in an effort to distinguish them from undeveloped, pristine land in areas outside of the city (often called greenfields). In June 1995, the U.S. General Accounting Office (GAO) estimated that there were between 130,000 and 450,000 Brownfield sites whose cleanup

¹ U.S. EPA, Office of Solid Waste and Emergency Response, Brownfields Glossary of Terms, <http://www.epa.gov/swerosps/bf/glossary.htm#brow>, as viewed December 23, 1997.

would cost more than \$650 billion.² Others have estimated that there are currently 500,000 or more Brownfield sites across the United States and that the cost to clean up these sites is \$600 billion.³

This broad definition of Brownfields often suggests relatively small sites that have become eyesores to the cities where they are located. This describes only some Brownfield sites. Some are small; some are large. Some have one contaminant; some have multiple contaminants. The level of contamination at these sites varies greatly. In some cases the contamination is simple to remove or remediate (soil removal); other sites call for more complicated and costly remediation strategies including multiple steps and processes (pump and treat or capping). Examples of Brownfield sites include abandoned industrial sites; gas stations/service stations; dry cleaners; military bases/federal facilities; railroads' truck terminals; and auto-recycling facilities. Until recently, the uncertainty of contamination levels on many of these properties has led developers away from investing in them. In the past few years, however, EPA has provided funds to several localities so that they may perform site investigations to determine just how much contamination is present.

Brownfields: What's New?

There is significant overlap between other designated hazardous waste cleanup programs and the Brownfields program. Though the term "Brownfield" is relatively new (being coined by the Northeast/Midwest Institute in 1992 at a conference on "New Life for Old Buildings"), the concept of Brownfields -- to remediate and reuse land that has been contaminated or abandoned or stood idle for a period of time -- is not new. Offices of economic development and urban renewal are present in most cities. The goals of these offices include helping businesses in the cities grow and expand; attracting new business to the cities; maintaining the momentum of urban development and redevelopment. Other Brownfields and economic development goals include improving employment opportunities; expanding small business development, especially businesses owned by minorities and women, and increasing the number of people living and working downtown. To accomplish these goals, cities have encouraged redevelopment of abandoned properties whenever possible.

One reason a number of these sites are just coming to the attention of states and cities, is that for many years the extent of environmental damage to these sites and the extent of the threat to public health from the contamination was not well understood. These sites stood abandoned and idle like so many blighted areas in urban America, but had the additional burden of uncertain remediation costs and liabilities.

What most distinguishes Brownfields cleanup from other hazardous materials cleanup efforts is the process being used to start the cleanup and redevelopment. Public policy has dictated that now, more than ever, cleanup projects include the involvement of multiple stakeholders working together from the onset. The Clinton Administration has used an innovative approach for

² U.S. General Accounting Office, Community Development: Reuse of Urban Industrial Sites, RCED-95-172, June 1995.

³ Craig A. Moyer and Gregory D. Trimarche, Brownfields: A Practical Guide to the Cleanup, Transfer and Redevelopment of Contaminated Property, Foresthill, CA: Argent Communications Group, 1997, p. 30.

redevelopment of Brownfields in bringing together various Federal departments and agencies to help develop a strategy for furthering the redevelopment of communities. (See section on Federal Initiatives.) The way in which Federal, state, and local governments are partners in the Brownfields process -- along with community representatives and private sector entrepreneurs -- has built a new momentum.

Continued neglect of Brownfields would clearly encourage urban sprawl to persist, luring investment and job development still farther away from city centers and inner suburbs. In an effort to combat this problem, in 1993, EPA took the lead in promoting the redevelopment of Brownfield sites. It was during 1993 that EPA awarded its first Brownfield Assessment Demonstration Pilot to Cleveland, Ohio so that state and local officials could create a model for redeveloping Brownfields across the country. Since fiscal year 1995, when EPA actively began giving grants for pilot projects, it has provided funding to 121 states, cities, towns, counties, and Tribes for Brownfields Assessment Pilots.⁴ (See Map 1 and Tables 1 and 2.) The pilots, each funded at up to \$200,000 over two years, test redevelopment models, direct special efforts toward removing regulatory barriers without sacrificing protectiveness, and facilitate coordinated site assessment, environmental cleanup and redevelopment efforts at the Federal, State, and local levels. Funds generate interest by bringing together community groups, investors, lenders, developers, and other affected parties to address the issues of cleaning up sites contaminated with hazardous substances and returning them to appropriate, productive use. The pilots serve as vehicles to explore a series of models for States and localities struggling with such efforts.⁵

The funding provided by EPA is not for the actual cleanup and remediation of the sites. That money must be found elsewhere. The money is seed money, primarily used to assess the level of contamination, if any, at the pilot sites. In many cases, it is through these pilots that potential investors learn the extent of contamination on a site, and are then able to make an informed decision about the economics and risk of development.

There is an enormous amount of hope invested in the Brownfields Initiative. There is hope that the Brownfields Initiative will provide an opportunity to:⁶

- stem the ecologically untenable, environmentally damaging, socially costly, and racially divisive phenomenon of urban sprawl and Greenfields development;
- provide focus to a problem which by its very nature is inextricably linked to environmental justice, for example, the physical deterioration of the nation's urban areas;
- allow communities to offer their vision of what redevelopment should look like;

⁴ Of these 121 Pilots, 64 are National Pilots, selected and funded through Headquarters, and 57 are Regional Pilots selected and funded through the 10 Regional offices (as of December 1997).

⁵ U.S. EPA, Office of Solid Waste and Emergency Response, Brownfields Pilots, <http://www.epa.gov/swerosps/bf/pilot.htm>, as viewed December 23, 1997.

⁶ National Environmental Justice Advisory Council Waste and Facility Siting Subcommittee, A Federal Advisory Committee to the U.S. Environmental Protection Agency, Environmental Justice, Urban Revitalization, and Brownfields: The Search for Authentic Signs of Hope, A Report on the "Public Dialogues on Urban Revitalization and Brownfields: Envisioning Health and Sustainable Communities." EPA 500-R-96-002, December 1996, p. es-i.

- apply environmental justice principles to the development of a new generation of environmental policy capable of meeting complex challenges such as Brownfields and the existence of severe crisis in urban America; and
- bring greater awareness and opportunities for building partnerships between EPA and communities and other stakeholders.

Environmental justice issues came to the forefront following President Clinton's issuance of an Executive Order on Environmental Justice in the beginning of 1994. Since then, agencies to which the Order applies, are required to "...make environmental justice part of their mission by identifying and addressing disproportionately high and adverse human health or environmental effects on minority populations and low-income populations."⁷ Indeed a great number of Brownfields sites are located in communities of minority and low-income populations.

Environmental justice and Brownfields are inextricably linked. The issue of Brownfields requires the consideration of environmental justice and urban revitalization. The environmental justice perspective calls for the acknowledgement that the physical environment is connected to the overall economic, social, human, cultural/spiritual health of a community. The vision of environmental justice is the development of a paradigm to achieve socially equitable, environmentally healthy, economically secure, psychologically vital, spiritually whole, and ecologically sustainable communities. To this end, Brownfields redevelopment needs to be linked to this broader set of community needs and goals.⁸

As a result, there are pressing initiatives to find new and creative ways to make the development of Brownfields sites at least as attractive as development of greenfields. In an effort to make this so, at least 43 states have designed legislation or programs to "...promote the remediation of contaminated properties by establishing clear and achievable cleanup standards that are protective of human health and the environment, and provide for liability protection, which ... encourage[s] businesses to locate on the former industrial sites ("Brownfields") instead of on virgin "greenfields" or in other states."⁹ (See Table 4.)

The Administration recently passed a Brownfields legislative package, which includes a tax incentive to encourage Brownfields redevelopment. This \$2 billion tax incentive is expected to leverage \$10 billion in private resources. To date, hundreds of millions of Federal dollars have been spent on (or allocated for) the Brownfields Initiative. (\$24 million for Brownfields Assessment Pilots, \$300 million via the National Partnership Action Agenda, \$165 million in loan guarantees, \$150 million for EPA cooperative agreements for site assessment and capitalization of revolving loan funds for cleanup, \$30 million for funding State voluntary cleanup infrastructure, and \$20 million for Brownfields-related job training).

⁷ U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, OSWER Environmental Justice Task Force Draft Final Report, EPA540/R-94/003, Washington, DC, April 25, 1994, p.2.

⁸ National Environmental Justice Advisory Council Waste and Facility Siting Subcommittee, p.es-ii.

⁹ John J. Matviya and Charles A. Duritsa, "Pennsylvania's Ground-Breaking Land Recycling Program," HazWaste World Superfund XVIII, Conference Proceedings, December 2-4, 1997, p.183.

General Similarities among Hazardous Waste Sites

While not every property with contamination is a Brownfield, within most existing cleanup programs, there are a number of sites that will be redeveloped and reused, emphasizing the overlap between Brownfields and other cleanup programs. For example, there are millions of underground storage tanks (UST) containing petroleum products or hazardous chemicals across the country and at least 165,000 are in need of cleanup.¹⁰ "Many of the ... Brownfield sites in the U.S. involve USTs. For example, Illinois estimates that half of the state's Brownfield sites are former UST/Leaking Underground Storage Tank (LUST) sites. EPA's Office of Underground Storage Tanks (OUST) assists in cleaning up and reusing commercial and industrial sites with USTs and working to prevent future UST Brownfields. In a related effort, OUST provided \$50,000 to EPA Region 10 to support a regional Brownfields pilot with the Duwamish Coalition in Seattle, Washington, to develop new methods for assessing total petroleum hydrocarbon levels at leaking UST sites."¹¹

Further, 24,000 sites previously part of the Federal Inventory of Superfund sites, have been archived. This means that "to the best of EPA's knowledge, Superfund has completed its assessment at a site and has determined that no further steps will be taken to list this site on the NPL"¹² unless new information about the site is brought to EPA's attention. These sites, though not as toxic as once thought, are still contaminated and may become part of a Brownfields program.

Although Federal departments and agencies are subject to the authority of Superfund, and while their contaminated properties may impact communities in similar ways to Brownfields, they are not considered Brownfields by EPA. Nonetheless, they are addressed in the National Brownfields Partnership, because of their impact on communities.¹³ (See section on Federal Initiatives.) These may include sites belonging to the Departments of Energy, Defense, Commerce, and Interior.

The following sections discuss the specific areas in which Brownfields and other hazardous waste cleanup programs overlap.

Barriers to and Concerns Associated with Cleanup / Redevelopment

Stakeholders have identified the following issues as those needing attention and resolution in order to more successfully attract developers and the business community in the redevelopment of Brownfield sites:¹⁴

¹⁰ U.S. Environmental Protection Agency, Solid Waste and Emergency Response, Cleaning Up the Nation's Waste Sites: Markets and Technology Trends, 1996 Edition, EPA 542-R-96-005, April 1997, pp.5-1 - 5-5.

¹¹ U.S. Environmental Protection Agency, OSWER, Office of Underground Storage Tank Sites, Fact Sheet, Brownfields Initiative, as downloaded from <http://www.epa.gov/swerust1/brwnfeld.htm> January 5, 1998.

¹² U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "CERLIS Archive Information," found at <http://www.epa.gov/superfund/oerr/imprm/products/arcsites/asiteinf.htm>.

¹³ U.S. Environmental Protection Agency, The Preamble to the Brownfields National Partnership Action Agenda, May 1997.

¹⁴ Congress of the United States, Office of Technology Assessment, State of the States: Programs for Cleanup and Reuse of Contaminated Sites, June 1995, p. 5.

- Technical issues related to remediation,
- Liability concerns associated with contamination,
- Financial barriers to cleanup and reuse,
- Community concerns, and
- Prospects for redevelopment.

These issues are similar to those faced by other sites, albeit in some cases to a lesser extent. Nearly every site grapples with technical issues related to remediation. This is the sole purpose for the Record of Decision in many programs. In some cases this decision is complicated by the question of potential liability and/or reuse. How clean is clean, often depends on what the site will be used for next; i.e., parkland, housing, industrial use, or a hospital. Superfund sites face financial barriers to cleanup in terms of litigation. Each party, in its interest to avoid cleanup costs and the threat of future liability, pushes responsibility for contamination to the next. Of course in some cases, the government simply pays. Nearly every hazardous waste site in the nation is subject to community concerns. Anyone living near a hazardous waste site has an interest in its expedient cleanup, done in a thorough manner that will be sure to protect their health and the health of their families for as long as they live there. For some sites, the issues may be defined in slightly different ways, but the basic issues still exist. Though some hazardous waste sites may be immune to some of the five issues, no hazardous waste site is immune to all of them.

Another issue, not mentioned above, but applicable to all hazardous waste sites, is environmental justice, especially related to the sites' reuse upon cleanup. Communities must not be forced to endure additional hazardous materials in their communities. They must be afforded the opportunity to live in a community free from such risks.

Variation in Size

Brownfield sites, like all hazardous waste sites, vary greatly in size. For example, designated Superfund sites, which are generally assumed to be large, actually range in size from 15 acres to 1500 acres. Lipari Landfill, one of the Nation's most highly contaminated Superfund sites, located in New Jersey, was only 15 acres, and just six were actually used for landfilling. Moyer Landfill, a Superfund site in Pennsylvania, was a 45-acre landfill. The former K-25 Gaseous Diffusion Plant (now called the East Tennessee Technology Park - ETTP) on the Department of Energy's Oak Ridge Reservation in Tennessee was also listed on the NPL and occupies a 1500-acre area.¹⁵

Brownfield sites also vary in size. In Danbury, Connecticut a one-half-acre property is targeted for Brownfield cleanup; in Bellevue, Washington there is a 50-acre Brownfield site; in Concord, New Hampshire a 440-acre corridor of old industrial sites is targeted for cleanup.¹⁶ In Richmond, California, the Harbor 11-A Redevelopment Project involved redeveloping 964 acres of land along the waterfront. The GM Clark Avenue Project in Detroit, Michigan, was on what

¹⁵ The reindustrialization of the former K-25 Plant was highlighted in the February 1998 issue of *Brownfield News*.

¹⁶ U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Brownfields Regional Pilots, as downloaded from <http://www.epa.gov/swerosps/bf/htm#dan>, December 5, 1997.

was originally a 2.1 million square foot (48-acre) complex when it was built in 1919. Additions of 500,000 square feet (11 acres) of production space and 5 million square feet (115 acres) of buildings on 120 acres of land were made in the 1960s and 1970s respectively. The National and regional Brownfield pilot sites span the gamut in size, (see Tables 1 and 2), many larger than the average Superfund site.

The Cleanup Process

The process of cleaning up contaminated sites is often complex and time consuming. Much time and money are spent on site investigations and feasibility studies, costing out each remedy and listing the advantages and disadvantages of each potential treatment plan -- often taking years before any actual cleanup begins.

For the most part, the many different cleanup programs (Superfund, Underground Storage Tanks, State and Private Sites, and Department of Defense, Department of Energy, and Brownfields) address the cleanup process in a similar manner.¹⁷ The main difference seems to be in the terminology used by each program. For example, "Investigation" versus "Site Screening and Assessment" and "Interim Action" versus "Early Action." Using the Superfund cleanup process as an example, a typical cleanup may progress as follows:

Upon first notification of an incident or potentially hazardous site, the appropriate regulatory body performs a preliminary assessment (PA) to determine whether action is necessary. If the PA indicates an emergency requiring immediate or short-term action to reduce risk to the public, a removal action is conducted to stabilize or clean up the site. After the removal action, if a hazard remains, a site inspection is conducted to determine if a site warrants scoring under EPA's Hazard Ranking System (HRS) -- a system that scores sites on the potential effects from contamination on human health and the environment. Sites which score 28.5 and higher are proposed for the EPA's National Priorities List (NPL) -- EPA's national list of sites with the worst contamination problems. Inclusion on the list means that the cost of site cleanup can be paid for by the Superfund Trust Fund. (The rate at which sites have been placed on the NPL has diminished since the 1980s, when sites were being proposed and listed in blocks of more than 100 at a time, to September 1997 when six general sites were finalized and 9 general sites were proposed for listing.)¹⁸

If a site is placed on the NPL, an in-depth planning and investigation phase -- called remedial investigation (RI) / feasibility study (FS) -- takes place. The results of the RI/FS and the rationale for selecting a remedy are required by EPA and are documented in a Record of Decision (ROD). In some instances, several RI/FSs and RODs are needed for different portions of the site which require separate cleanup actions. RODs specify the technology type deemed to be the appropriate remedy for a site.

¹⁷ It should be noted that even though the actual remediation processes are similar, the details of contracting differ between the federal remediation projects and state and local remediation projects. Access to the specifics regarding the cleanup is much easier to obtain in a federal project.

¹⁸ U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "Supplementary Materials: National Priorities List, Proposed Rule and Final Rule," Publication 9320.7-061, NPL-U23-6-2, September 1997, pp.25-29.

Using the ROD, detailed engineering specifications for the selected cleanup alternative are developed. These designs are then used to solicit bids for remedial action (RA). Operations and maintenance (O&M) activities, if necessary, begin at the conclusion of the remedial action. O&M activities include groundwater monitoring, periodic site inspection, and other activities designed to ensure continued effectiveness of the remedial action(s). Sites which do not rank high enough on the HRS still need to be cleaned up, but are typically addressed through state programs (perhaps Brownfields), which follow similar steps.

Although new steps are being taken to make the cleanup process more expedient, the process is still, more often than not, lengthy and arduous. In 1992 EPA introduced the Superfund Accelerated Cleanup Model (SACM). It was not fully assimilated into EPA's regional offices until 1995.¹⁹ In the SACM the cleanup process consists of Site Screening and Assessment (which includes Preliminary Assessment, Site Inspections, Expanded Site Inspections, and Remedial Investigation), Regional Team Decision, Early Action, Long Term Hazard Ranking, Long Term Action, Long Term Action Complete, and Deletion.²⁰

While there is no set cleanup process that exists for Brownfield sites in the same way they exist for cleanup programs controlled by the federal government, examples show that the cleanup process used for Brownfields seems to be markedly similar to those of other programs. (See Appendix for Case Study on redevelopment of Marina Bay, Richmond, California.)

General Motors Corporation (GM) has a systematic approach for property reuse/development -- including its Clark Avenue Redevelopment Project described below. The process involves the following three stages: 1) Redevelopment Strategy, 2) Building Decommissioning, and 3) Environmental Site Assessment/Remediation. The Environmental Site Assessment/Remediation involves six phases:²¹

Phase I	Environmental Site Assessment
Phase II	Environmental Site Investigation
Phase III	Expanded Environmental Site Investigation
Phase IV	Feasibility Study
Phase V	Remediation
Phase VI	Operation and Maintenance

The process used by GM shows distinct similarities to the processes discussed above. The Superfund process consists of Site Screening and Assessment (which includes Preliminary Assessment, Site Inspections, Expanded Site Inspections, and Remedial Investigation), Regional Team Decision, Early Action, Long Term Hazard Ranking, and Long Term Action the DOD process consists of Investigation, Interim Action, Design, and Cleanup. Similarly, more than one

¹⁹ U.S. General Accounting Office, Superfund: Integrated Site Assessments May Expedite Cleanups, GAO/RCED-97-181, July 1997, p.1.

²⁰ U.S. EPA, Solid Waste and Emergency Response, Cleaning Up the Nation's Waste Sites: Markets and Technology Trends, 1996 Edition, EPA 542-R-96-005, April 1997, pp.2-2 - 2-3.

²¹ G. Keith West, M.S., CHMM, General Motors Corporation, World Wide Facilities Group, "Site Reuse/Brownfield Redevelopment in the Detroit Empowerment Zone," HazWaste World Superfund XVIII Conference Proceedings, December 2-4, 1997, p.196.

organization's Brownfields process consists of site assessment, investigation, feasibility studies, and remediation. The Marina Bay project in Richmond, CA is just one other example of a Brownfield site that involved assessments, preliminary investigations, further investigations, and remediation. (See Table A in the Appendix for a time-lined example of the process.) All programs implement operation and maintenance activities to the extent necessary following cleanup.

Regardless of the technology chosen to clean up the site, the process of preliminary assessment, site investigation, and feasibility studies, which determine the technology and ultimate cleanup plan, are similar across most hazardous waste sites.

Contaminants and Risk

The levels of contamination found on Brownfield sites vary greatly from site to site. Contamination encountered at a 15-acre inactive Brownfield manufacturing site in Massachusetts²² included uranium, metals, and PCBs. The heavy metal contamination involved primarily cadmium dusts from historical plating and metal-working operations and was found on interior surfaces and building roofs. Oils were present in sumps and underground storage tanks from metal treatment building heating activities.²³ The same kinds of conditions have been found at numerous UST sites and Defense Department sites.

Because there are so many specific contaminants apt to be encountered, lenders and other investors now are likely to categorize contaminants according to the varying degree of risk presented:

- Least risk - fuel hydrocarbons, degradable alcohols, asbestos;
- Moderate risk - chlorinated solvents, ethers, less-toxic heavy metals;
- Significant risk - PCBs, more-toxic heavy metals;
- Most risk - radioactive waste, dioxins, wood treating wastes."²⁴

Brownfields proponents are pursuing sites with all these contaminants, but not surprisingly, sites with less-risky contaminants, as well as those located on prime property, such as waterfronts, tend to receive the most attention from investors, lenders, and others in the market.²⁵

The Marina Bay Redevelopment Project in Richmond, CA, which is presented as a case study in the Appendix, is one such example. The contaminants found at the site would be classified as "least risk" to "moderate risk" contaminants and the site is prime waterfront property on San Francisco Bay.

²² Name of site not disclosed by Foster Wheeler Environmental Corporation.

²³ Stephen Graham, P.E., LSP, Foster Wheeler Environmental Corporation, "Industrial Brownsfield Case Studies Under Multiple Federal Regulations and the Massachusetts MCP," HazWaste World Superfund XVIII Conference Proceedings, December 2-4, 1997, p.167.

²⁴ Craig A. Moyer and Gregory D. Trimarche, Brownfields: A Practical Guide to the Cleanup, Transfer and Redevelopment of Contaminated Property, Foresthill, CA: Argent Communications Group, 1997, p.26.

²⁵ Moyer and Trimarche, p. 27.

Remediation Activities

Remediation activities, which have been implemented across hazardous waste cleanup programs, are another point of similarity. Processes from capping, to pump and treat, to general dirt moving and decontamination of buildings have been implemented at Superfund sites, at DOD sites, DOE sites, and now at Brownfield sites. Remediation activities involved in the 15-acre inactive Brownfield manufacturing site in Massachusetts mentioned previously included:

- Installing galvanized steel perimeter fences;
- Installing bedrock wells, conducting pump tests;
- Designing and constructing a pump and treat plant;
- Capping in place and/or excavation and removal of metal-contaminated soils;
- Removing source of roof runoff contamination metals via demolition activities;
- Decontamination of oily sumps; and
- Decontamination and demolition of 50,000 square feet of uranium-contaminated buildings.

At other, less contaminated sites, cleanup may only involve moving contaminated soils off-site and replacing it with clean fill. For example, the J&J Kastings site in Minnesota -- a former railroad main terminal and then a fiberglass company -- was contaminated with lead, polychlorinated biphenyls (PCB), and polycyclic aromatic hydrocarbons (PAH). Removal and off-site transport of these materials were the only remediation tasks implemented.²⁶ At GM's Clark Avenue Redevelopment Project, a Brownfield site in the Detroit Empowerment Zone, cleanup activities performed included soil excavation and off-site disposal (for soil contaminated with inorganic constituents), as well as excavation and on-site treatment of soil (for soil contamination with VOCs).²⁷

At the Marina Bay Redevelopment Project in Richmond, cleanup tasks included excavation of contaminated soils, disposal of these soils at landfills, soil aeration, UST removal, and more. (See Table A in Appendix.) These cleanup tasks, and the others described above, parallel ones used countless times at numerous hazardous waste sites across the nation whether they belong to the Superfund program, the nuclear weapons complex, or the Defense Department's Defense Environmental Restoration Program.

Initiatives

There are many components to the Federal and State Brownfields initiatives taking place across the country. These include EPA administrative policies; other federal agency Brownfields initiatives, such as those of the Department of Housing and Urban Development, the Department of Defense, and the Department of Commerce; Congressional Brownfields initiatives; non-

²⁶ Correspondence with Sophie Baj, U.S. Army Corps of Engineers, Buffalo District, December 10, 1997.

²⁷ G. Keith West, M.S., CHMM, General Motors Corporation, World Wide Facilities Group, " Site Reuse/Brownfield Redevelopment in the Detroit Empowerment Zone," HazWaste World Superfund XVIII Conference Proceedings, December 2-4, 1997, p.197.

enforceable agency memoranda of agreements; private certification by environmental professionals; and state financial assistance programs for site investigations and cleanups.²⁸

In addition, many communities are actively involved in activities surrounding Brownfields sites, including community planning, pushing legislation for cleaner air, and participation in job training programs.

Federal Government Initiatives

Initiatives taken by the Clinton Administration have been the stimulus for Brownfield redevelopment. (See Table 3 for a timeline of Federal initiatives.) In May 1993, the Administration announced the passage of the Economic Empowerment Act of 1993. From this initiative came Empowerment Zones and Enterprise Communities. This proposal gave local communities the incentives, deregulation, and flexibility needed to work with the private sector to develop complete economic strategies that would generate business, create jobs, improve neighborhood safety, and empower people to move forward. It provided 110 zones (ten empowerment zones and 100 enterprise communities) across the country with empowerment tax incentives, as well as special priority for Community Development Banks, Community Policing, and education reform. The ten empowerment zones also qualified for additional tax incentives, including employment and training credits for businesses that employ people who live within the zones.

Formed in 1993, the President's Council on Sustainable Development has also been involved with issues related to Brownfields. The Council advocated for "...all levels of government to work in partnership with community residents, environmental organizations, community development corporations, industry, and businesses to redevelop or stabilize Brownfield sites by eliminating barriers and creating incentives for environmental cleanup and by reorienting existing state and federal economic development funding and programs to include these sites."²⁹

In February of 1994, the President issued an Executive Order on Environmental Justice. The Order requires specific agencies to make environmental justice part of their mission by addressing disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. This is important because the Brownfields issue obligates us to look critically at development patterns across the U.S., which historically have placed a disproportionately high number of hazardous facilities in minority and poor communities.

On August 5, 1997, President Clinton signed the Taxpayer Relief Act (HR 2014/PL 105-34), including a new tax incentive to spur the cleanup and redevelopment of Brownfields in distressed urban and rural areas. The Brownfields Tax Incentive builds on the momentum of the Clinton

²⁸ American Bar Association, Section of Natural Resources, Energy and Environmental Law, Presidential Showcase Program: Brownfields Redevelopment: Making Brownfields Transaction Work – A Key to Urban Revitalization and Environmental Stewardship, August 2-5, 1997, ABA Annual Meeting, Jennifer L. Hernandez and Katherine B. Reilly, Tab 1 pp.4-5.

²⁹ The President's Council on Sustainable Development, Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future, Chapter 4, Strengthening Communities, Policy Recommendation 9, Action 1, March 1996.

Administration's Brownfields National Partnership Action Agenda, announced in May 1997. The Brownfields Tax Incentive is designed to help bring thousands of abandoned and under-used industrial sites back into productive use, providing the foundation for neighborhood revitalization, job creation, and the restoration of hope in the nation's cities and distressed rural areas.

EPA's Brownfields Economic Redevelopment Initiative (Brownfields Initiative)

Brownfields Initiative strategies include: funding pilot programs and other research efforts, clarifying liability issues, entering into partnerships, conducting outreach activities, developing job training programs, and addressing environmental justice concerns. The Initial Brownfield Action Agenda, announced January 1995, outlined four key activities for returning Brownfields to productive reuse:

1. Awarding Brownfields Assessment Demonstration Pilots;
2. Clarifying liability and cleanup issues;
3. Building partnerships to all Brownfields stakeholders; and
4. Fostering local workforce development and job initiatives.

(The Initiative was actually launched in November 1993 when EPA gave a \$200,000 grant to Cleveland, Ohio so that state and local officials could create a model for redeveloping Brownfields across the country, though it was not fully implemented until 1995. The commitments made in the 1995 action agenda had all been met by mid-1996.)

The Federal Interagency Working Group on Brownfields was established July 1996 as a forum for Federal agencies to exchange information on Brownfields related activities and to develop a coordinated national action agenda for addressing Brownfields. Currently, seventeen federal agencies participate in the Interagency Working Group.³⁰

The Interagency Working Group developed the *Brownfields National Partnership Action Agenda*, released May 1997.

Examples of federal efforts taking place as part of the Brownfields National Partnership Action Agenda include:³¹

- The United States Department of Agriculture provides technical advice on urban and community forestry and water quality to pilot communities.
- The Department of Commerce's Economic Development Administration provides technical assistance to EPA on the development of its Revolving Loan Funds and Brownfield pilot sites, and will share its "area economic data" with Brownfield pilots.

³⁰ Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Housing and Urban Development, Interior, Justice, Labor, Transportation, Treasury, and Veterans Affairs; Environmental Protection Agency; Federal Deposit Insurance Corporation; General Services Administration; and Small Business Administration.

³¹ "Brownfields National Partnership Agenda," May 1997, found at <http://www.epa.gov/swerosps/bf/html-doc/97aabre.htm#assess>.

- The Department of Labor informs State and local Job Training Partnership Act stakeholders about the Brownfields Initiative and related job training activities to enhance local collaboration. This effort focuses on job training and employment opportunities related to the Brownfields Initiative for local youths and adults.
- The General Service Administration is providing \$1 million to fund environmental assessments on Federal properties to expedite potential Brownfields redevelopment.
- The Department of Health and Human Services (HHS)/National Institute of Environmental Health Sciences (NIEHS) links its basic research programs on hazardous substances, exposure assessments and remediation technologies to all pilot projects.
- HHS/NIEHS increases communication and collaboration among Brownfield pilots, seven minority worker training programs grantees, 20 EPA worker training grantees, and Environmental Justice Partnership to strengthen all four programs.

The members of the Federal Interagency Working Group are also collaborating on the selection of ten Brownfields Showcase Communities. The Showcase Communities provide an opportunity to concentrate Federal, state, and local efforts around Brownfields to produce environmental cleanup, stimulate economic development, and revitalize communities. The Showcase Communities will serve as models for cooperative efforts to support local Brownfields initiatives.

Several legislative proposals to promote Brownfields cleanup and redevelopment have been enacted in the 105th Congress. The Clinton Administration's Brownfield Tax Incentive was signed into law on August 5, 1997, as part of the budget agreement. It was originally introduced in the Senate as S. 235 on January 30, 1997 and in the House as H.R. 5050 on February 4. The Brownfield Tax Incentive uses the tax code to encourage site reuse by permitting non-responsible parties to fully expense their cleanup costs. It authorizes \$1.5 billion in incentives for cleanups undertaken by December 31, 2000. The Federal Incentive is available for sites in the following targeted geographic areas:

- A federal Empowerment Zone or Enterprise Community
- Census tracts with a poverty rate of at least 20 percent
- Census tracts with less than 2,000 residents, zoned 75 percent industrial or commercial, that adjoin qualifying poverty areas
- EPA Brownfield pilot sites announced prior to February 1997

Other proposals are still pending. These proposals include provisions for tax incentives, capital attraction incentives, and liability and process-related initiatives. As of January 26, 1998, there were three proposals introduced by the Senate and fifteen proposals introduced by the House of Representatives.

State and Local Government Initiatives

During a 1995 study of state Superfund programs, EPA found that 34 states had implemented Voluntary Cleanup Programs (VCPs) and 15 had Brownfields Programs.³² Since then, another 13 states have introduced VCPs and 10 have implemented Brownfields Programs.³³ (See Table 4.)

These state programs make it easier for land-owners and/or potential purchasers to identify and clean up sites; to use less cumbersome administrative procedures; and to obtain some relief from future state liability for past contamination. Without such agreements, these sites might not be cleaned up and returned to the tax rolls due to their relatively low priority, and because they are too numerous for other State or Federal cleanup programs to address within a reasonable timeframe. State-established VCPs allow private parties to initiate and proceed with cleanup with varying levels of State oversight and enforcement conditions.

State voluntary cleanup programs are an alternative to the conventional state Superfund-type enforcement approach to cleaning up contaminated sites. The main components to a VCP include: established authority; investigative and remedial procedures; cleanup targets appropriate to sites; State sign-off conditions and procedures; and liability provisions.³⁴ Various forms of liability protection include, but are not limited to, covenants not to sue; no further action letters; and certificates of completion.

Another type of state program, known as Brownfields programs, provide incentives for developers and owners to clean up and redevelop properties that are, or are thought to be, contaminated. Typically, Brownfield programs offer liability protection to prospective purchasers, lenders, and real estate developers. This liability protection is contingent upon no further contamination being found or created at the site. It should be noted that liability protection does not always protect private parties from federal liability requirements.

Community Participation

Not only are community residents concerned about contamination at nearby sites, they are also concerned about whether or not the land, once remediated, is redeveloped for further use, what that use will be, and what economic opportunities may be available as a result.

Brownfield redevelopment is not just an environmental concern, but also an economic, job development, and community rebuilding concern. Brownfield redevelopment is the concern of

³² U.S. EPA, Office of Emergency and Remedial Response, An Analysis of State Superfund Programs: 50-State Study, 1995 Update, July 1996.

³³ The primary difference between the two types of programs is that while the primary purpose of VCPs is to offer liability protection, the primary purpose of the Brownfields Programs is to offer incentives for redevelopment. Brownfields programs may also offer liability protection, as part of the incentive. Additionally, the names of these programs will vary from state to state so that if one called California to ask if they had a Brownfields Program in place, they may say no, when actually, under the Mello-Roos designation property tax abatements are allowed.

³⁴ U.S. Environmental Protection Agency, OSWER Directive, Draft Guidance for Developing Superfund Memoranda of Agreement (MOA) Language Concerning State Voluntary Cleanup Programs, July 31, 1997, p.3.

government, businesses, financiers, developers, and community groups. All play a part in any Brownfield project. Below is the story of how one city is revitalizing itself.

CHATTANOOGA: A CITY REMAKING ITSELF³⁵

Chattanooga's story of the last 30 years is not unusual. Suburban sprawl beginning after World War II drained the downtown area of much of its retail and almost all of its residential development. The economic base collapsed as traditional manufacturing jobs moved elsewhere, and many local companies laid off workers, were sold to outside interests, or closed down. Racial conflicts, poor schools, and an eroding infrastructure all signaled urban decline. Further manifestation of this decline came in 1969, when Chattanooga was dubbed the "worst polluted city" in America.

The second part of the Chattanooga story is all too rare among American cities. In recent years, concerted efforts by government, business, community organizations, and citizens have resulted not only in cleaner air but also in a willingness to undertake bold initiatives conceived within a shared vision, integrating Chattanooga's economic, environmental, and social aspirations. During the Council's January 1995 visit to Chattanooga, community leaders shared lessons learned in their quest to become an "environmental city," where everyone works together to generate a strong economic base, nurture social institutions, and enhance the natural and human-made landscape.

Today, public-private partnerships are the norm in Chattanooga. Collaborative efforts have generated the capital resources, political commitment, and civic momentum to tackle such complex problems as affordable housing; public education; transportation alternatives; urban design; air and water pollution; recycling; job training; human relations; downtown and riverfront development, neighborhood revitalization; and conservation of natural areas, parks, and greenways. Community involvement in the planning of these efforts has been a key factor in the efforts' success.

Since 1984, in a series of planning projects, the city has invited all members of the community to envision what they want for the future. This process has paid off handsomely. In 1990, when the U.S. Environmental Protection Agency recognized Chattanooga for meeting its clean air requirements, the city was designated on Earth Day as the nation's best environmental turnaround story. An article in *Sports Illustrated* described Chattanooga as "not a miracle, but a nuts-and-bolts model of how tough government, cooperative businessmen, and a very alarmed public can make a dirty world clean again."

Chattanooga today sees itself as a living laboratory where ideas can be explored, learning is ongoing, and both people and nature can prosper. The Chattanooga story is not finished: it is only just beginning. As a new city slogan says, "It takes all of us ... It takes forever."

Without the cleanup and redevelopment of Brownfields, outlying areas will continue to lure investment and job development still farther away from city centers and inner suburbs. City residents have an interest in protecting their communities. And recognizing that communities are the foundation of a healthy society, the U.S. Government has begun to engage communities in dialogues on Brownfields. In 1995, the National Environmental Justice Advisory Council

³⁵ Extracted from Sustainable America: A New Consensus for Prosperity, Opportunity, and a Health Environment for the Future, The President's Council on Sustainable Development, March 1996, Chapter 4, p. 14.

(NEJAC) Waste and Facility Siting Subcommittee and the U.S. EPA co-sponsored a series of five public hearings entitled, "Public Dialogues on Urban Revitalization and Brownfields: Envisioning Healthy and Sustainable Communities." The purpose of these dialogues was to provide an opportunity for environmental justice advocates and residents of impacted communities to give input regarding issues related to EPA's Brownfields Economic Redevelopment Initiative, which had just been released.

Community groups across the nation have participated in redevelopment efforts within their communities. Two examples demonstrate more than just peripheral involvement by community members:

- Metropolitan areas like Portland, Oregon and states like Minnesota, have begun to use broad-based goal-setting and benchmarking projects in planning their collective future and measuring their progress.
- In Seattle, a local citizen's group spearheaded an effort to measure the progress or decline of key social, economic, and environmental indicators that were identified by the community as priorities.³⁶

Encouraging communities to offer their vision of what redevelopment should entail is an essential piece of the Brownfields equation.

Workers, Jobs, and Training

Those who work to remediate hazardous waste sites risk exposure to a host of hazardous materials. Workers can encounter asbestos, lead, PCBs, volatile organic compounds (VOCs), metals, and more. Many chemicals can explode or combust. In order to protect workers at hazardous waste sites, OSHA implemented the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, otherwise known as 1910.120. Before anyone can work on a hazardous waste site -- according to OSHA's 1910.120 standard -- he/she must receive and successfully complete hazardous waste operations and emergency response training. This ensures that workers are aware of the hazards they may face and that they know how to protect themselves and others from exposure to hazardous materials. Workers are entitled to be informed, by their employers, of the hazardous materials with which they are working. And further, it is required that employers provide their employees with information on how to protect themselves from being harmed by any of these materials. OSHA's 1910.120 applies to: initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained; clean-up operations required by a governmental body, whether federal, state, local, or other, involving hazardous substances that are conducted at uncontrolled hazardous waste sites; and voluntary clean-up operations at sites recognized by federal, state, local or other governmental bodies as uncontrolled hazardous waste sites.³⁷

³⁶ Sustainable America, Chapter 4.

³⁷ U.S. Department of Labor, Occupational Safety and Health Administration, 1910.120 - Hazardous waste operations and emergency response, Subpart H, Hazardous Materials.

Among other things, the general requirements of 1910.120 mandate that:

- Each employer develop a safety and health program designed to identify, evaluate, and control safety and health hazards, and provide for emergency response
- A preliminary evaluation of the site's characteristics be performed by a trained person prior to the entry of worker onto the site.
- A site control program is implemented to protect employees against hazardous contamination. This program must include a site map, site work zones, site communications, safe work practices, identification of the nearest medical assistance, and use of the buddy system in particularly hazardous situations.
- Employers provide employees with training before they are allowed to engage in hazardous waste operations or emergency response.

The HAZWOPER standard clearly applies not only at Superfund sites, but at virtually all hazardous waste sites, including Brownfield sites. With the application of 1910.120 comes much responsibility on the part of the employer. It is necessary that all those who work at hazardous waste sites have full knowledge of the standard and how it applies to them so that they, as well as their employers, can ensure safety.

Workers

One aspect of the cleanup that often escapes public policy discussion is planning and training for the work force involved in the actual cleanup activities. Little would be accomplished if many thousands of crafts people and industrial workers were not coming to work each day, willing to perform the jobs they do in hazardous surroundings. Laborers, carpenters, operating engineers, chemical workers, iron workers, and many other skilled workers clean up hazardous waste sites. The work they perform at hazardous waste sites is similar to other work they have performed before. What is different is the environment in which they are performing it, and what they have to do in order to protect themselves from exposure to situations that might threaten their life and health. The law mandates that adequate hazardous materials training programs are provided to workers.

As cleanup proceeds, workers from many different crafts are needed on-site for the complex array of activities which occur over the course of cleanup. Generally numerous tasks are performed simultaneously. For instance, at Lipari Landfill work that was being performed in March 1990 included excavation, foundation building, and concrete work for buildings and tanks. Work on the tanks lasted through October 1990, while in June of that year work began on the plant plumbing and lasted through mid-September. Also in July, work began on heating, ventilation, and air conditioning duct work for the plant, and in August outside tanks were erected. In addition to the main contractor, there was major work done by the Army Corps of Engineers and at least twenty-two subcontractors. More than a dozen labor crafts were involved.

Overlap of tasks also occurs at Brownfields sites. For instance, at the Marina Bay site in Richmond, California, multiple tasks were ongoing during several months of the operation, especially during 1989, 1990 and 1991. During these years, not only were remediation tasks

being performed, but also investigations and construction activity. For example, during 1990 the following activities took place:

- Preliminary endangerment assessment on Parcels L, SA, and M;
- Initial investigation of Parcel E;
- Demolition of a building, and UST removal on Parcel SA;
- Discovery and removal of a UST from Parcel BB, followed by soil excavation, remediation and disposal
- Soil excavation from parcel CC and disposal
- TPH - and lead-contaminated soil from Parcel W excavated and disposed of at a Class I landfill.
- TPH soil encountered adjacent to Parcel DD and EE. Soil excavated and stockpiled.
- Excavation and physical screening of soil containing TPH and construction debris at Parcel U. Screened soil relocated to Parcel V. Excavation and stockpiling (on Parcel M) of alkali pond sediments from three South Shore areas.

See Table A in Appendix for a complete chronology of the activities at Marina Bay.

Jobs and Training

Members of every community want meaningful employment. Those who have borne the burden of living in contaminated neighborhoods deserve to benefit from the economic opportunities created by cleanup. Well paying, safe jobs with career opportunities, within ones own community, are particularly treasured. While cleanup at Superfund and other hazardous waste sites typically employ many residents from nearby communities (generally within 25 miles of a site),³⁸ the nature of Brownfields breeds heightened expectation of community employment in the cleanup and redevelopment of the sites and then in the renewed development.

The heart of any economic development program is bringing new businesses and jobs to the regenerated community. Frequently the development of these sites is tied to neighborhood renewal and all of the problems and hopes that go with these major efforts at urban change. Ultimately, the effort should be to create an urban setting that will attract new businesses, whether manufacturing, service, commercial, or a mix.

In the case of Brownfields redevelopment, there are a number of initiatives aimed at job creation. The approach is tied to creating a new urban environment, while protecting the viability of the existing community, and providing the existing community with an opportunity to participate in the redevelopment program. Community residents must have: a voice in the choice of industry which is attracted to the area, an opportunity to participate in the financial and ownership rewards which come from such infusion of new life, and a chance to ensure that there are opportunities to share in a significant portion of the jobs that are created by this economic redevelopment.

³⁸ Ruttenberg, et al. Labor Market Study of Hazardous Waste Workers and Associated Emergency Responders, September 1996, p.16.

The efforts to secure community participation in employment opportunities -- beginning with the initial environmental cleanup and demolition, through new construction, and finally to the permanent work force in the new industry -- are what differentiate the jobs programs related to Brownfields from prior environmental cleanup models. It is easy to see that this continuum of job activity is complicated, expensive, and requires a substantial support system to assure that the community receives a fair share of the work that will be generated by these projects.

Identifying the jobs that will be available, the sequencing of the work, and the training required is a complex problem. As a practical matter the cleanup process alone at many sites will proceed over several years. The construction of the new industry, residential or commercial properties, may extend for several years beyond that, and the ultimate permanent service, manufacturing, or commercial employment is often five or more years in the future.

It is important, therefore, not to promulgate plans which have the effect of raising community expectations of new job opportunities that will happen long in the future, and, in many instances, will not be as numerous or as long-lived as may first be anticipated. On the other hand, it is also important that these plans offer hope to community residents that many of the members of the community will be able to participate in the economic benefits to come from the Brownfields initiative.

In performing labor market studies for the Brownfields projects, it is important to look at a number of different factors. These include the various types of employment that might be generated from the project, the numbers of jobs and skills required, the duration of each job type, and the time line for developing the project to where the projected jobs will actually be available.

The first employment opportunities can usually be found in the site investigation, industrial cleanup, and demolition phase of the Brownfields project. The jobs themselves are relatively high paying, but do not necessarily present themselves in large numbers, nor are they likely to last for more than a few months, perhaps as much as a year. These jobs are usually the most visible to the community and ones which rightfully are coveted as symbolic of the community's stake in the Brownfields activity. To be truly meaningful they should be linked to other remediation jobs in the region that may become available following Brownfield redevelopment.

Jobs associated with cleanup require significant training in construction as well as environmental remediation, and safety and health, and most frequently are initially available to community members without prior experience as apprenticeship positions (if dealing with union contractors). Because these jobs require fairly specific training in construction as well as environmental remediation techniques there may not be a ready pool of trained applicants in the community. Providing the community with access to these jobs may require an extensive program of outreach, life-skills training, skills training, and/or safety and health training such as under the lead, asbestos or HAZWOPER regulations of OSHA. The NIEHS Minority Worker Training Program is the ongoing model for such training intensive programs.

Construction skills training generally is provided through apprenticeship and training programs which are registered with the Department of Labor and which are jointly operated by unions and contractors. An apprenticeship program can run one to four years depending on the craft. For

non-union work, individuals can gain experience and some on-the-job training, but advancement may be slower and follow-up jobs more intermittent.

For those members of the community who are interested and who are able to obtain, or already possess, the requisite training, these jobs can be fairly high paying. The benefit to the community is achieved by the completion of the training, and, hopefully, entry into actual work. The reality is that it is very difficult to coordinate training and employment, and so many workers who are trained and certified become disillusioned waiting for the funds to be provided that will actually undertake the community environmental cleanup program. It is important when creating these cleanup job programs to make sure, insofar as possible, that the actual cleanup programs will be funded and begin when these new workers are ready. Alternatively, it is important to secure commitment from the union and contractors sponsoring the apprenticeship program to provide other employment; e.g., a different cleanup site, or a construction project, pending the start of the community cleanup project.

This approach is additionally important because it provides a track for community members who obtain these new skills to take them to different areas for employment, and to actually enter into a legitimate career path.

For those parties engaged in a Brownfields project, it is also important to stress with contractors the intention of the project managers that contractors hire from the community insofar as possible. Whether contractual requirements or incentives can be provided to assure significant community hiring is a question that must be considered. When it is the land owner, the city of St. Paul, Minnesota requires of contractors "that on an annual basis during the term of [the] Agreement it will make a good faith effort to ensure that at least seventy percent of all new full-time equivalent employees who are hired, will, on their first day of the Project, be residents of the City of Saint Paul."³⁹ Other cities are beginning to implement similar policies.

Environmental cleanup and site demolition, are a subset of construction work and, as such, cleanup work may well involve a different workforce than the normal construction crew. Construction will most likely involve a different contractor, which means that many of the workers engaged in the cleanup activity will have to clear additional hurdles of employment and training requirements to participate in the actual construction of the new economic entities. The advantage of the construction apprenticeship programs is the provision of training for new skills which may then provide an opportunity for a wider array of employment opportunities in the community when the actual construction begins.

The important point is to secure training and employment for the community members. To receive this training and employment for the specific project inside the community remains a matter of some contention, as one can argue that significant achievement will only be secure employment without too much concern about whether that employment is on his or her community project. Of course, in any community, there will be those members who are less interested in environmental work and more concerned with construction activities. In this regard, it is important that community recruitment efforts, noted above with respect to cleanup, are maintained as the construction phase begins.

³⁹ Saint Paul Port Authority, sample contract, February 5, 1998, received from Jon Young.

Finally, there is the employment expectation for the ultimate project; i.e., a manufacturer, service provider, merchant, or shopping mall. It is this employment which will provide economic stability and long term viability to the community. It is this employment which will provide the larger numbers of workers and the longer term of employment. It is also the employment that is frequently so far on the horizon that many members of the community never look to it and instead focus on the cleanup or construction work that can be grasped at the time rather than in a decade. Entering into employment in environmental remediation or construction does not necessarily preclude employment in the newly established manufacturing, commercial, or retail facilities. However, the practical tract for those clean-up trained community members who have acquired these new skills and seniority is to acknowledge their newly found opportunity to continue in environmental remediation or construction activities even though not in their immediate community.

It is also worthwhile noting that in many urban communities there is a mix of community projects that may be underway at any given time. For example, in the same community as a Brownfields site, there could well be housing that is targeted for rehabilitation or demolition; or, a military installation that is part of or adjacent to the Brownfields site which may involve an existing work force that needs transition and retraining. Skill-building related to Brownfield redevelopment may only provide workers a greater opportunity to be employed -- both within the community and elsewhere.

Components Necessary for Creating a Sustainable Workforce

Unfortunately, simply training people from an impacted community to safely work among hazardous materials is not enough to give them life long earning power. Many other factors play into a person's ability to consistently earn a living. Contracting firms want their workers to be trained, or easy to train, and to show up on time and be ready to work. There is no incentive for contractors to hire local workers if those workers cannot meet the basic requirements of the contractor. In most cases, this means that they must be trained beyond the requirements of 1910.120.

The Minority Worker Training Program (MWTP), administered by the National Institute of Environmental Health Sciences and funded by EPA, recognizes that a successful training program has more than just technical elements. The MWTP was established to provide a series of national pilot programs to test a range of strategies for the recruitment and training of young persons, who live near hazardous waste sites or in communities at risk of exposure to contaminated properties, for work in the environmental field. The pilot program represents a broad-based geographic spread and reaches urban populations in high risk contaminated areas. (See Table 5.) The goal is stable career-oriented employment and not just short-term, dead end jobs.

During the first two years of the MWTP, 678 participants received training. Of those, 439 (65 percent) were placed in jobs (184 in environmental jobs, and 147 in construction jobs). In addition several participants went on to get their GEDs or enter community colleges -- both steps that will increase their future earning power.

These environmental career-oriented programs have been developed within the context of other social and health needs of the community. The seven consortia (comprised of more than thirty-five different organizations) provide pre-employment job training including literacy; life skills; environmental preparation and other related courses; construction skills training; environmental worker training, including hazardous waste, asbestos, and lead abatement training; and safety and health training. Some training also includes enrollment in apprenticeship programs for construction and environmental remediation worker training. Particular focus is placed on establishing a program of mentoring. The programs enhance the participants' problem solving skills, understanding of self-esteem, and teamwork in the application of technical knowledge to environmental and related problems. A broad and comprehensive array of necessary services support an individual through the training and job placement process.

In addition, the program promotes partnerships with academic institutions -- with a particular focus on historically black colleges and universities, public schools and community based organizations -- located in or nearby the impacted area. These organizations provide pre-math, science, or other related education to program participants prior to or concurrent with entry into the program. Some trainees complete GED work or begin college-based technical training.

Each individual program is designed to provide comprehensive training to disadvantaged minority youths (individuals between the ages of 18-25), who live in areas designated as environmental-impacted communities. The training is focussed on preparing them for employment in the environmental restoration and hazardous materials fields.

The MWTP has several important components that positively contribute to the sustainable development of currently impoverished communities. These components recognize that the youths in these communities are not ready to simply receive training and go to work. The majority of these youths have not previously held down a full time job; many have not completed their high school education. Many issues need to be addressed before sending them off to work. These are basic life skills issues that most people take for granted; i.e., the need to report to work on time and with the proper attitude. Other issues, which need to be addressed, are transportation to and from the job site, child care, and basic math and reading skills. It is futile to invest in training people if they do not have the basic skills that will allow them to implement what they are being taught in an effective manner. Therefore, each of the MWTPs is designed to enhance the capabilities of its participants so that they may become part of a sustainable workforce.

It takes many people and organizations to accomplish such a great task. One example of the collaborative programs sponsored by NIEHS is the United Brotherhood of Carpenters and Joiners Health and Safety Fund's MWTP. This program combines the efforts of various community-based organizations, local unions, union signatory contractors, small and minority contractors, historically black college and universities, religious organizations, local elected officials, and locally represented state and federal agencies. These organizations form a partnership to establish support and commitment toward implementing the MWTP. Community-based organizations work together to create greater opportunities for minority youth and to

prepare them to embark upon life-long careers in the construction industry, while at the same time educating and involving them in the clean up of their environment.

As summarized above, each of the NIEHS Minority Worker Training programs has a multifaceted curriculum that integrates a life skills component with other basic skills and technical information. For example, the Deep South Center for Environmental Justice at Xavier University of Louisiana, in conjunction with Clark Atlanta University and the Laborers-AGC, provides students with information and/or exercises on:

- study skills;
- environmental justice;
- mathematics;
- hazardous materials;
- life skills;
- physical fitness; and
- counseling.

Specific issues which make up the life skills components of the classes include building self esteem, positive conflict resolution, tools for securing employment, money management, enhancing interpersonal skills, and goal setting (including time and stress management). It is vital that this population get this specific training, as it is the first time most, if not all, have been exposed to such issues. A counseling component provides participants with assistance to a wide range of social services -- including transportation and child care -- that will aid them in achieving their educational and vocational goals.

Participants in many programs work with mentors who help them with anything from understanding a math problem to raising their confidence level. The mentors involved with the Alice Hamilton program are graduate students in social work at a historically black college and university. The mentors help participants to develop their life skills, which may involve teaching them to use and balance a checkbook or working with them on their problem solving abilities. At Jackson State University, the mentors provide, or help students find, transportation to and from job interviews. Mentors are able to impress upon the trainees the need to arrive to work on time and return to work on time continuously. Additionally, the mentors are available for students both in and out of the classroom.

In an effort to provide students with a first hand look at what they are being prepared for, the Clark Atlanta/Xavier/Laborers program incorporates field trips into its program. Participants may visit a waste-water treatment plant, construction site, or union hall. In addition, participants visit a nature center where they engage in a Real Outdoor and Personal Experience (ROPES) training course. This course teaches participants team building skills and is a great bonding experience for the training class.

Another component instrumental to the success of such training programs is a mechanism to employ the participants as they complete their training. Having a community full of skilled workers is meaningless, if they have nowhere to use their skills. The MWTP awardees work

with labor unions, community groups, and the business community in order to be able to place students in jobs upon graduation from the program.

The Carpenters MWTP provides students with pre-apprenticeship training in painting, carpentry or some other building trades skill. By the time they complete the six to twelve weeks of construction skills training, they have either made a commitment to their new trade or dropped out. Using this pre-apprenticeship time allows the Carpenters program to assure contractors that they are hiring someone who is dedicated, reliable, and has more experience than a normal first year apprentice.

Training staffs provide participants with both job placement and career development assistance. Additionally, information libraries are available to participants so that they may keep abreast of safety-related issues and potential career opportunities.

After engaging in weeks of life skills training, trainees face numerous hours of technical training in the environmental safety and health and construction fields. The Clark Atlanta/Xavier/Laborer's program involves 80 hours of hazardous waste worker training, 40 hours of asbestos abatement training, 40 hours of lead abatement, and 80 hours of basic construction skills training. After successfully completing 240 hours of technical training, participants receive certifications in each area. All technical training provided by the NIEHS MWTPs meets or exceeds EPA and OSHA requirements as well as any state requirements necessary.

A final unique component of the NIEHS MWTP is the requirement that programs track their students upon completion of the program. Tracking their graduates allows staff to understand the impact of their programs. Are graduates find themselves new jobs after the first or second one ends? If not, why? What can they do differently during the next class?

CONCLUSION

In terms of their basic physical composition and cleanup and redevelopment, Brownfield sites are quite similar, if not the same, as other sites in the various hazardous waste cleanup programs. However, in terms of policy, Brownfield sites are unique. Never before has a hazardous waste cleanup program combined the efforts and interests of so many different parties. And never before has an Administration invested so much in the rebirth of the nation's urban communities.

It is still unclear just how many jobs are being created as a result of the Brownfields Initiative -- particularly unclear is the number of remediation jobs being created. As more Brownfield projects get underway, and the EPA pilots move to the cleanup stage, more will be learned about the extent of employment opportunities available to residents of the impacted communities. What is clear is that in order to place people from impacted communities into these jobs, intensive training must take place. Certain elements must be integrated into the training programs in order to properly prepare trainees for the world of work. These elements -- life skills and mentoring among them -- are what makes the difference between training programs with successful placement rates, and those that artificially raise the hopes of its participants.

**TABLE 1
Brownfields National Pilots (64)**

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Size	Date web page updated	Contact
Baltimore, MD	-	September 1995	\$200,000	-	Inventory potential sites underway	-	-	-	May 1997	Evans Paul, City of Baltimore, 410 396-4367
Birmingham, AL	N. Birmingham Industrial Redevelopment Project, a 900-acre zone contaminated from old iron foundries & Blast furnaces	September 1995	\$200,000	Iron foundries & blast furnaces	Preliminary phase	-	-	-	May 1997	John Gremml, City of Birmingham, 205 254-2872
Bridgeport, CT	Planned inventory 205 sites	September 1995	\$200,000	-	Phase I assessments completed on 6 sites	Electric plant produced circuit breakers and power panels	Light industry business park	4 acres, 205 sites	May 1997	Eileen Carey, City of Bridgeport, 203 576-7087
Bucks County, PA	3 sq. miles underused property	April 1997	\$200,000	-	Preliminary phase	-	-	3 sq. mi.	April 1997	Robert White, Bucks County Redevelopment Authority, 215 860-3313
Burlington, VT	40 acres near city center	September 1996	\$200,000	-	Brownfield tour being conducted	-	-	40 acres	May 1997	Nick Warner, Community & Economic Development Office, 802 865-7144
Cape Charles, Northampton City, VA	Former city dump, dockside, railyard & abandoned industries,	September 1995	\$200,000	-	Assessment contamination former 155-acre dump & railyard underway	City dump, dockside, railyard & abandoned industries	National Eco-Industrial Park w/wetlands, tertiary treatment facility	155 acres	May 1997	Timothy Hayes, Town of Cape Charles, City of Northampton, 757 678-0477
Charlotte, NC	-	September 1996	\$200,000	-	Completing assessments & remediations 2 or more sites; inventory other sites underway	-	-	-	May 1997	Tom Warshauer & Donna North, Charlotte Economic Development Division, 704 336-3955
Chicopee, MA	1.85 acre Bay State Wire Site	September 1996	\$59,000	-	Asbestos drums removed; soil contamination suspected; at least 3 other sites to be assessed	-	-	185 acres	May 1997	Thomas Haberlin, City of Community Development, 413 594-4711
Chippewa County/Kinross Township, MI	-	-	-	-	-	-	-	-	-	-

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Size	Date web page updated	Contact
Cowpens, SC	228-sq. ft. abandoned textile facility on 70 acres; groundwater, soil & building contamination	April 1997	\$200,000	-	Preliminary phase; pilot will install 10-20 groundwater wells to define & monitor contaminated plumes in two aquifers	Abandoned textile facility	-	228 sq. ft.	April 1997	Elizabeth Belenchia, Town of Cowpens, 864 542-1854
Dade County, FL	Approximately 30-acre Poinciana Industrial Property	April 1997	\$200,000	-	Preliminary phase	-	-	30 acres	April 1997	Doug Yoder, Department Environmental Restoration Management of Dade County, 305 372-6766
Detroit, MI	Produce manual & video on brownfields development	September 1995	\$200,000	-	-	-	-	-	May 1997	Wills Williams, Sarah Lile, City of Detroit, 313 237-3091
Elmira, NY	Four-eight sites selected as potential targets, including ex-dry cleaners, railway, foundry	April 1997	\$200,000	-	Preliminary phase	Drycleaners, railway, foundry	-	4-8 sites	April 1997	Cheryl Schneider, Department of Business & Housing Development, 607 737-5691
Emerville, CA	10 brownfields sites identified; contaminated groundwater & soil; over 180 acres	May 1996	\$200,000	-	-	-	-	10 sites on 180 acres	May 1997	Ignacio Dayrit, Economic Redevelopment Agency, 510 596-4350
Fayetteville, NC	3 areas in downtown Fayetteville	April 1997	\$200,000	-	Preliminary stage	-	-	3000 acres	April 1997	Roger Stancil, City of Fayetteville, 910 433-1990
Greenfield, MA	Abandoned 145,000-sq. ft. machine tool manufacturing plant	April 1997	\$125,000	Open containers, & hazardous materials	Preliminary stage	Machine tool manufacturing plant	-	145,000 sq. ft.	April 1997	Teri Anderson, Office of Planning & Community Development, 413 772-1548
Hartford, CT	Sites in 3 neighborhoods: Sheldon/Charter Oak, Upper Albany, Clay Arsenal	April 1997	\$200,000	-	-	-	Industrial & commercial development	-	April 1997	Madelyn Colon, Hartford Redevelopment Agency, 860 543-8655
High Point, NC	Revitalize West Macedonia area, southeast of its downtown	April 1997	\$200,000	-	-	Furniture & textile production	-	-	April 1997	H. Lewis Price, City of High Point, 910 883-3289
Houston, TX	8 sites in inner city	March 1996	\$200,000	-	Collection environmental & wellwater reports on 7 properties underway	-	-	8 sites	May 1997	Jimmie Schinderwolf, Houston Department Public Works & Engineering, 713 247-2200
Indianapolis, IN	Several sites in Martin Luther King Corridor	September 1995	\$200,000	-	Phase II assessment completed on portion of Corridor	-	-	-	May 1997	May Beth Schumucker, City of Indianapolis, 317 327-7860, or Gabrielle Hauer, Indiana Department of Environmental Management, 317 233-6429

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Size	Date web page updated	Contact
Jacksonville, IN	Over 100 sites w/known or suspected groundwater & soil contamination, Talleyrand Redevelopment Area	April 1997	\$200,000	Petroleum and paper products industries	-	Agriculture, petroleum & paper products industries	-	Over 100 sites	April 1997	Eric Lindstrom, Downtown Development Authority, 904 630-1913
Jersey City, NJ	Former industrial & rail areas	April 1997	\$200,000	-	Preliminary state	Industrial & rail areas	-	-	April 1997	Paul Hamilton, Jersey City Redevelopment Agency, 201 547-4799
Kansas City, KS & MO	4-6 sites	September 1996	\$200,000	-	Phase I and II assessments underway	-	-	4-6 sites	May 1997	Scott Cahill, Kansas City Office of Environmental Management, 816 274-2585
Ketchikan Gateway Borough, AK	Ward Cove Pulp Mill	April 1997	\$200,000	-	Preliminary stage	Paper mill	-	-	April 1997	Bob Bright, Department of Planning & Commercial Development, 907 228-6610
Knoxville, TN	266 acres in downtown Knoxville, to be redeveloped to attract recycling facilities	September 1995	\$200,000	-	Investigation underway of sites believed to be contaminated	-	Recycling facilities	266 acres	May 1997	Scott Goodrich, City of Knoxville, 423 215-2174
Laredo, TX	Brownfields on U.S.-Mexico border, especially waterfront property owned by Texas-Mexican Railway	September 1995	\$200,000	-	Inventory underway	-	-	-	May 1997	Keith Selman, City of Laredo, 210 791-7441
Lawrence, MA	Three sites along Merrimack River, including former textile mills, landfills & paper mills in Lawrence Gateway Project area	June 1996	\$200,000	-	Inventory underway	Textile mills, landfills & paper mills	Gateway project area	3 sites	May 1997	Suzanne Lamoureux, ENSR, 508 393-6779
Lima, OH	200 acres industrial park, including 65-acre Lima Locomotive Works	September 1996	\$200,000	-	Phase I assessment of Locomotive Works underway	Industrial park, including 65 acre Lima Locomotive Works	-	200 acres	May 1997	Gary Sheely, Lima Utilities Department, 419 228-5462
Louisville, KY	Over 5 acres heavy industry property	September 1995	\$200,000	-	Database created, 13 wells installed to sample aquifers	-	-	5 acres	May 1997	Bonnie Biemer, City of Louisville, Office of Health and Environment, 502 574-3271
Lowell, MA	Industrial area near Merrimack River, including ex-ash dump, gas station, vehicle maintenance facility & textile mills	September 1996	\$200,000	-	Two Phase II assessments completed; Phase I assessments underway at 10 sites; Phase II assessments underway at 4 sites	Ex-ash dump, gas station, vehicle maintenance facility & textile mills	-	-	May 1997	Carolyn Britt, City of Lowell Division of Planning & Development, 508 970-4276
State of Maine	Revitalize 85 towns & cities through brownfields development	April 1997	\$199,017	-	Preliminary state	-	-	-	April 1997	Fran Rudolf, Maine State Planning Office, 207 287-3262

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Size	Date web page updated	Contact
Memphis, TN	N. Memphis Enterprise Community	April 1997	\$200,000	-	Preliminary stage	Tire manufacturing plant	-	88 acres	April 1997	Corky Neale, Division Housing & Community Development, 901 576-7450
Navajo Nation, AZ	10.5 acres Navajo Forest Products timber mill site, contaminated w/PCBs, acids, solvents, batteries	September 1997	\$200,000	-	Site remediation plan being prepared	Forest Products timber mill site	-	10.5 acres	May 1997	Loirenda Joe, Acting Director Navajo Nation, 520 871-7692
New Bedford, MA	Convert former mill & fishing operations into productive aquaculture site	April 1997	\$172,000	-	Preliminary stage	Mill & fishing operations	Acquaculture site	-	April 1997	Gary Gomes, City of New Bedford Grants & Administration, 508 979-1466
New Orleans, LA	Prepare brownfield inventory	September 1995	\$200,000	-	Top 10 brownfields inventory	-	-	-	May 1997	Lisa Maack, City of New Orleans, 504 565-8114
New York	Five demonstration sites to be chosen from 4,000 acres vacant New York City industrial property	1997	\$200,000	-	Preliminary	-	-	4,000 acres	May 1997	Annette Barbaccia, Mayor's Office of Environmental Coordination, 212 788-2937
Newark, NJ	Four sites contaminated from industrial & manufacturing: 140 Thomas St., Albert Steel Drum/Prentiss Drug & Pierson Creek, Pitt/Consol Dupont, White Chemical	September 1996	\$200,000	-	Assessments underway	-	-	4 sites	May 1997	Joel Freiser, Newark Economic Development Corporation, 201 643-2790
Niagara Falls, NY	Four sites w/soil or groundwater contamination	April 1997	\$195,250	-	Preliminary stage	-	-	4 sites	April 1997	Dan Gagliardo, Department Environmental Services, 716 286-4460
Northwest WI	Six sites w/known contamination, including ex-charcoal factory & grain elevator on City of Superior waterfront	April 1997	\$195,510	-	Preliminary	Charcoal factory & grain elevator	-	6 sites on 75 acres	April 1997	Dale Cardwell, Northwest Regional Planning Commission, 715 635-2197
Oregon Mill Sites	Nine sites covering over 500 acres in 7 rural communities	September 1995	\$200,000	Chemicals, transformers, asbestos	Phase I & II assessments underway at 7 mill sites	-	-	500 acres	May 1997	Dana Peck, Mill Site Conversion Coordinator, 503 236-0270
Perth Amboy, NJ	877 acres heavy industry vacant land	April 1997	\$200,000	-	Preliminary stage	Heavy industry vacant land	-	877 acres	April 1997	Melvin Ramos, City of Perth Amboy, 908 828-0920
Phoenixville, AZ		Negotiations w/borough in progress	\$200,000	-	Preliminary stage	-	-	-	May 1997	Joe Pantano, Borough of Phoenixville, 610 933-8801
Portland, OR	Several hundred abandoned or underused sites in Enterprise Community & on waterfront	March 1996	\$200,000	-	-	-	-	-	May 1997	Douglas MacCourt, Office of Transportation, 503 823-7052
Puerto Rico Industrial Development Company, PR	Three sites targeted, including ex-electroplating facility	April 1997	\$200,000	-	Preliminary	Electroplating facility	Recycling center	-		Jose Perez-Hernandez, Puerto Rico Industrial Development Company, 809 754-7546

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Size	Date web page updated	Contact
State of Rhode Island	Communities in watersheds of Woonasquatucket & Blackstone Rivers	June 1996	\$200,000	-	Fifty Phase I assessments & two Phase II assessments completed	-	-	-	May 1997	Terence Gray or Tim Regan, Rhode Island Department Environmental Management, 401 277-3872
Richmond, CA	900-acre tract of North Richmond Shoreline Contaminated by aging heavy industry & waste disposal facilities	September 1996	\$200,000	Volatile organic compounds, polychlorinated biphenyls, metals. Aging heavy industry & waste disposal facilities	Several preliminary assessments underway	-	-	900 acres	May 1997	Nancy Kaufman, Planning Department, 510 620-6706
Richmond, VA	Five Brownfields identified	September 1994	\$200,000	-	Phase I & II assessments completed at 3 sites	-	-	5 sites	May 1997	Edward Miller, Richmond Department of Economic Development, 804 780-5653
Rochester, NY	15.5 acre portion of Erie Canal Industrial Park and other areas	September 1995	\$200,000	-	Inventory large brownfields completed	-	-	15.5 acres	May 1997	Mark D. Gregor, City of Rochester, 716 428-5978
Rome, NY	200-acre industrial are w/subsurface & groundwater contamination	September 1996	\$200,000	Ex-metal plating, pickling, printing & machine plants	One Phase I assessment completed	-	Light industrial park	200 acres	May 1997	Brian Thomas, City of Rome, Department of Planning & Commercial Development, 315 339-7792
Sacramento, CA	Two former railyards & two former military bases	September 1995	\$200,000	-	-	Two former railyards & two former military bases	-	-	May 1997	Wendy Saunders, City of Sacramento, 916 264-8196
St. Louis, MO	Cleanup 26-acre Dr. Martin Luther King Business Park	September 1995	\$200,000	-	-	-	-	26 acres	May 1997	Eric Klipach, Planned Industrial Expansion Authority, City of St. Louis, 314 622-3400
St. Paul, MN	Up to 6 sites	April 1997	\$146,000	-	Preliminary	-	-	Up to 6 sites	April 1997	Lorrie Louder, St. Paul Port Authority, 612 224-5686
Santa Barbara County	Goleta Old Town (consists of up to 50 Brownfields)	April 1997	\$200,000	-	Preliminary	-	-	-	April 1997	Daniel Gira, Santa Barbara Planning & Development, 805 568-2068
Stockton, CA	Revitalize waterfront	March 1996	\$200,000	-	Planning full assessment 4-5 sites & preliminary assessment of 20 acres other property	-	Revitalize waterfront	-	May 1997	Garrett Toy, Department of Housing & Redevelopment, 209 937-8075
Tacoma, WA	27 acres of Thea Foss Waterway	March 1996	\$200,000	-	-	-	-	27 acres	May 1997	William Pugh, Public Works Department, 206 591-5525

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Size	Date web page updated	Contact
Tallahassee, FL	73 sites across Gaines Street/Cascade Corridor	April 1997	\$191,000	Chemical warehousing, petroleum distribution centers, light industry, animal stockyards, coal gasification facility & dump	Preliminary stage	-	-	450 acres	April 1997	Craig Diamond, Tallahassee-Leon Planning Department, 904 891-8621
Trenton, NJ	Over 600 acres potential brownfields	September 1995	\$200,000	Manufacture of paper, wood, cotton, bricks & pottery	Environmental assessments begun at 15 sites; preliminary assessments & site inspections completed at 4	-	-	600 acres	May 1997	Karen Waldron, City of Trenton, 609 989-3504
Tucson, AZ	Aviation Parkway Corridor	April 1997	\$200,000	Contamination of soil & groundwater caused by aviation, milling & railroad operations	Preliminary assessments 4 sites in Warehouse District/Barranza	Warehouses, roadways	-	80 acres	April 1997	Kendall Bert, City of Tucson, 520 791-5093
Wellston, MO	Wagner Electric Company	April 1997	\$200,000	-	Preliminary	Wagner Electric Company, manufacturer of electrical transformers, electric motor & brake linings	Light manufacturing technology park	100 acres	April 1997	Dennis G. Coleman, Land Clearance Authority, 314 889-7663
West Central Municipal Conference	Four brownfields in suburban Cook County	September 1995	\$200,000	-	-	-	-	4 sites	May 1997	Steve Colantino, Illinois EPA, 217 783-3497
Wilmington, DE	Contaminated & underused property along Brandywine & Christina Rivers	April 1997	\$200,000	-	Preliminary	-	-	1750 acres	April 1997	Emery C. Graham Jr., City/County Building, 302 571-4130
Worcester, MA	200 sites in heavily industrialized area	June 1996	\$200,000	-	Three sites targeted for assessment	Heavy industrialized area	-	200 sites	May 1997	Chris Pierpan, Central Massachusetts Development Authority, 508 799-1400

Source: U.S. EPA, Office of Solid Waste and Emergency Response, Brownfields Homepage, Brownfields Pilots as viewed January 1998, <<http://www.epa.gov/swerosps/bf/pilot.htm>>

**TABLE 2
Brownfields Regional Pilots (57)**

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Jobs	Size	Date web page updated	Contact
Atlanta, GA	10 verified and 36 potential sites	September 1996	\$100,000	Waste and toxic chemicals	Environmental assessments begun at targeted sites	-	-	-	-	May 1997	Den Cohen, Atlanta Department of Planning & Development, 404 330-6899, Barbara Dick, EPA Reg. 4, 404 562-8923
Baltimore County, MD	Vacant, under-used lots in SE industrial corridor	April 1997	\$200,000	-	Site selection underway	-	-	-	-	April 1997	Sharon Klotz, Baltimore City Department of Economic Development 410 887-8023, Tom Stolle, EPA Region 3, 215 566-3129
Bellingham, WA	50 acre-area in core of waterfront. Cap over Roeder Ave. landfill for leachate and methane gas control.	September 1996	\$100,000	-	Data compiled, costs of environmental cap calculated	-	Build 200,000 sq. ft. warehouse to retain 900 pulp & paper mill jobs	-	50 acres	May 1997	Fred Seeger, Port of Bellingham, 360 676-2500, Lori Cohen, EPA Region 10, 206 553-6523
Bonne Terre, MO	-	September 1996	\$100,000	Mining waste, esp. fine lead tailings	Environmental assessment underway	-	Develop 140-acre commercial, retail and industrial park near - not on - Superfund mine waste properties	-	-	May 1997	Jeff Blue, Bonne Terre City Manager, 573 358-2254, Susan Klein, EPA Region 7, 913 551-7786
Boston, MA	1.5 sq. mi., w/approx. 1,300 vacant lots (5 site total)	September 1995	\$200,000	Lead paint	One site assessment completed of ex-circuit electroplating plant	-	-	100 jobs	1.5 sq.	May 1997	Jacqueline Ritchie, Boston Brownfields Coordinator, Boston City Hall, 617 635-2518, Lynne Jennings, EPA Region 1, 617 573-9634
Buffalo, NY	60 plus contaminated sites in city	September 1995	\$200,000	-	Six assessments completed	-	-	-	60 plus sites	-	Jim Smith, Office of the Environment, City of Buffalo, 716 851-5608, Larry D'Andrea, EPA Region 2, 212 637-4314
Camden, NJ	Development two industrial parks	September 1996	\$200,000	-	Inventory now being compiled	-	-	-	-	May 1997	Edward Williams, Office of the Mayor, 609 757-7214
Chicago, IL	Three major sites; 5 sites cleaned up for \$1 million in related project (Brownfield Sites Program)(EPA?)	April 1997	\$41,000	-	Cooperative agreement not yet negotiated	-	-	-	-	April 1997	Jessica Rio, City of Chicago, Department of the Environment, 312 744-7606, Mary Beth Tuohy, EPA Region 5, 312 886-7596
Cincinnati, OH	500 acres including Vine St. Dump and other sites in Mill Creek Valley watershed	September 1996	\$100,000	-	Vine St. Dump site assessment completed (10.5 acres)	-	-	-	500 acres	May 1997	Antoinette Selvey-Maddox, Department of Economic Development, 513 352-3784, Ted Smith, EPA Region 5, 312 353-6571

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Jobs	Size	Date web page updated	Contact
Clearwater, FL	Former car dealership and auto repair shop to become grocery store w/200 jobs	September 1996	\$100,000	-	Site assessment underway	Former car dealership and auto repair shop	To become grocery store	200 jobs	-	May 1997	Alan Ferri, Clearwater Department of Economic Development, (phone disconnected), Barbara Dick, EPA Region 4, 404 562-8923
Concord, MA	60 plus old industrial sites, vacant lots, abandoned buildings	September 1996	\$90,000	-	Completed level I assessment in north area corridor	-	-	2,500 jobs	60 plus sites	May 1997	Steve Henninger, Planning Department, City of Concord, 603 225-8570, Dianne Kelley, EPA Region 1, 617 573-9672
Dallas, TX	200 potential sites identified	August 1995	\$200,000	-	Phase I and II environmental assessments begun at one 2.64-acre site	-	-	-	200 sites	May 1997	Beverly Negri, EPA Brownfields Liaison, 214 670-1690, Stan Hitt, EPA Region 6, 214 665-6735.
Danbury, CT	0.5 acre site of ex-hat manufacturer	July 1997	\$45,000	Hat felt wastes, mercury, petroleum hydrocarbons, volatile organic compounds, lead	Environmental assessment underway	Ex-hat manufacturer	-	-	0.5 acre	September 1997	Bob Cianciarulo, EPA Region 1, 617 573-5778, Jack Kozuchowski, Danbury Department of Health & Housing, 203 797-4625
Des Moines, IA	1,200- acre tract w/suspected contamination from lead, chromium, volatile organic compounds, PCBs	September 1997	\$100,000	Lead, chromium, volatile organic compounds, PCBs	Preliminary assessments for development future Des Moines Agribusiness Park	-	Des Moines Agribusiness Park	-	1200 acres	October 1997	Ellen Walkowiak, City of Des Moines, 515 237-1351, Susan Klein, EPA Region 7, 913 551-7786
Downriver Community Conference, MI	-	September 1996	\$75,000	Lead, copper, chromium and other heavy metals	Conducting baseline environmental assessments, producing remediation and development plans	-	-	-	-	May 1997	Jim Tischler, City of Monroe, 313 243-0700, Stephen Van Every, Downriver Community Conference, 313 281-0700
Duwamish Coalition, WA	-	September 1995	\$183,000	Total petroleum hydrocarbons	Planning, risk assessment and remedy selection; EPA awarded another \$33,000 in September 1996.	-	-	-	-	May 1997	Craig McCormack, Washington Dept. of Ecology, 360 407-7193, Tom Boydell, Duwamish Coalition, 206 684-8086
East Palo Alto, CA	59 lots used for agricultural, residential and commercial activities	April 1995	\$125,000	-	Phase II site investigation completed 12/96 in Ravenswood Industrial Properties	Industrial	-	-	130-acres	April 1997	Sherry Nikzat, Office of the City Manager, City of East Palo Alto, 415 853-3122, Steve Sachs, U.S. Housing and Urban Development Agency, 415 436-6597
East St. Louis, IL	220-acre former Alcoa Aluminum site; recovery & re-use gypsum and red-clay tailings; creation secondary materials manufacturing district	September 1996	\$200,000	-	Preliminary phase	Alcoa Aluminum site	-	-	220 acres	May 1997	Michael Cordes, City of East St. Louis, 618 482-6634

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Jobs	Size	Date web page updated	Contact
Elizabeth, NJ	Pilot to identify and assess 5 marketable sites	June 1997	\$200,000	-	Preliminary phase	-	-	-	5 sites	July 1997	Mary Krupinski, City of Elizabeth, 908 820-4019
Englewood, CO	General Iron Works & Thomas Plating	April 1997	\$200,000	-	Establishing site assessment revolving loan fund to aid voluntary clean-up by owners	Foundry (General Iron Works) & plating plant (Thomas Plating)	-	-	-	April 1997	Mark Graham, City of Englewood, 303 762-2353
Gainesville, FL	East Gainesville Sprout Project	April 1997	\$100,000	-	Preliminary stage	-	Stormwater Park	-	20 acres	April 1997	Stewart Pearson, City of Gainesville Public Works Dept., 352 334-2051
Glen Cove, NY	1.1 mile waterfront channel contaminated with radioactive waste, methane, organic solvents	June 1997	\$50,000	Radioactive waste, methane, organic solvents	Preliminary stage	-	-	-	1.1 mile	July 1997	Robert Van Ruby, Glen Cove Community Development Agency, 516 676-1625
State of Illinois	7-10 acres including ex-steel fabrication plant, textile mill, stockyard, car works, to become recycling center, park marina	May 1995	\$150,000	-	17 sites selected; 11 assessments completed; 6 assessments underway	Ex-steel fabrication plant, textile mill, stockyard, car works	To become recycling center park marina	-	7-10 acres	May 1997	Larry Eastep and Tom Crause, Illinois EPA, 217 782-6760
Northwest Indiana Cities, IN	Includes cities of Gray, E. Chicago, Hammond, sites occupied by iron and steel manufactures	July 1996	\$200,000	-	1 site selected in each community; site assessments underway	-	-	-	-	May 1997	Kay Nelson, Indiana Department of Environmental Management, Northwest Office, 219 881-6712
State of Indiana	12 sites of approx. 10 acres each, formerly sites of heavy industries	May 1995	\$150,000	-	Assessment begun on 12 sites, conclude on 6 sites, with help of EPA mobile lab	-	-	-	-	May 1997	Dana Reed Wise, Indiana Dept. of Environmental Management, 317 308-3048
Kalamazoo, MI	Prevent future brownfields	August 1996	\$100,000	-	Inventory completed city-owned brownfields	-	-	-	-	May 1997	Barbara Gordon, Kalamazoo Development Services Dept., 616 337-8801
Lynn, MA	Former dry cleaners, tannery, landfill and utility on waterfront	April 1997	\$200,000	-	Preliminary stage	Dry cleaners, tannery, landfill and utility	Residential, industrial and recreational use	-	-	April 1997	Peter M. DeVeau, Economic Development & Industry Corp., 617 581-9399
Miami, FL	Wynwood neighborhood,	September 1996	\$100,000	underground storage tanks, sewer pipes, industrial chemicals	Phase I and II assessments completed at one pilot site	-	-	-	-	May 1997	Bob Schwarzreich, City of Miami, Community Planning & Revitalization, 305 416-1418
Milwaukee City, WI	Leaking underground storage tanks in 5-mile segment of active rail line	February 1997	\$500,000	-	Now assessing sites and preparing remedial action plans	Leaking underground storage tanks	-	-	5 miles	May 1997	Leonard Jackson, Milwaukee City Dept. of Economic Development, 414 278-4905

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Jobs	Size	Date web page updated	Contact
State of Minnesota	Turn coal gasification facilities and municipal landfills into composting facility, new coal gasification facility and new city hall	May 1995	\$200,000	-	Remediation begun or completed at 13 sites	Coal gasification facilities and municipal landfills	New coal gasification facility and new city hall	-	-	May 1997	Joe Otte or Deb DeLuca, Minnesota Pollution Control Agency, 612 296-8411
Murray City, UT	141-acre former Murray smelter site, contaminated w/suspected lead and arsenic; to become extension of Murray main street	September 1996	\$178,500	Lead and arsenic	Preliminary stage	Murray smelter site	To become extension of Murray main street	-	141 acres	May 1997	Dennis Hamblin, Murray City, 801 264-2623
Naugatuck Valley, CT	2 or 3 contaminated sites out of a total of over 168	September 1996	\$90,000	-	Establishing site criteria	-	-	-	-	May 1997	Richard Eigen, Valley Regional Planning Agency, 203 735-8688
New Haven, CT	3-4 sites of abandoned factories	September 1996	\$120,000	-	One phase I assessment completed	Abandoned factories	-	-	3 to 4 sites	May 1997	Helen Rosenberg, Office of Business Development, 203 946-5889
North Stapleton, CO	2.5-acre former airport and 640-acre Rocky Mountain Arsenal contaminated w/chlorinated solvents in groundwater	August 1996	\$200,000	Chlorinated solvents	Preliminary stage	Airport and 640 acre Rocky Mountain Arsenal	-	-	2.5 acres	September 1997	Myles Carter, City and County of Denver, Department of Aviation, 303 342-2200
Oakland, CA	Additional funding \$100,000 in April 1997 from EPA, HUD, HHS, & DOT	September 1996	\$200,000	-	Now completing assessments 2 sites	-	-	-	-	May 1997	Jeffrey Chew, Oakland Office of Economic Development & Employment, 510 238-3629
Ogden City, UT	3 central business districts	April 1997	\$200,000	-	Preliminary	Railyards, tannery & warehouses, iron works	Baseball stadium	-	3 sites	April 1997	Jon Ruiz, Public Works Department, 801 629-8970
Panhandle Health District, ID	Towns of Kellogg, Pinehurst, Smelterville & Wardner; contains nation's 3rd largest Superfund site ("Bunker Hill"); 21 sq. mi.	September 1996	\$98,000	soil, streams and groundwater with heavy metals	\$210 million cleanup underway	-	-	-	21 sq. mile	May 1997	Jerry Cobb, Panhandle Health District 1, 208 783-0707
Philadelphia, PA	Approximately 45 acres including former water purification plant	April 1996	\$200,000	-	Phase I assessments initiated at 5 sites	Water purification plant	-	-	45 acres	May 1997	Mary Soffer, City of Philadelphia, 215 686-2945
Phoenix, AZ	13 sq. mile Rio Salgado community, including deteriorating homes & abandoned industrial property	September 1997	\$100,000	-	Assisting private owners & developers in overcoming brownfields obstacles	Deteriorating homes and abandoned industrial property	-	-	13 sq. miles	October 1997	Donn Stoltzfus, City of Phoenix, Office of Environmental Programs, 602 256-5669

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Jobs	Size	Date web page updated	Contact
Pittsburgh, PA	Nine-Mile Dump, also known as Nine-Mile Run, a 238-acre former landfill, & Lectromelt Steel, a former electroplating plant	February 1995	\$200,000	-	Two sites assessed	Landfill & Lectromelt Steel, a former electroplating plant	-	-	238 acres	May 1997	Edward Henry, Urban Redevelopment Authority of Pittsburgh, 412 255-6658
Pomona, CA	Brownfields in 11 acres and parts of Los Angeles Revitalization Zone	September 1997	\$100,000	-	City to conduct analysis all vacant & under-used property		-	-	11 acres	October 1997	Cruz Esparza, Pomona Dept. of Economic Development, 909 620-2050
Portland, ME	Marginal Way, includes former scrap metal yard, railyard repair facility, foundry	September 1996	\$90,000	-	Now preparing remediation plan	Scrap metal yard, railyard repair facility, foundry	-	-	-	May 1997	Rick Knowland, Portland Dept. Planning & Urban Development, 207 874-8300
Prichard, AL	Whistler Historic District, East Prichard & Eight Mile	September 1996	\$100,000	Metals and volatile & semi-volatile organic compounds in soil and groundwater	6 brownfields selected for assessment	-	-	-	86 acres	May 1997	Clyde Chatman, Alabama Dept. of Economic and Community Affairs, 334 242-5504
Provo, UT	Ironton, 338-acre site of former steel mill, contaminated w/heavy metal, polycyclic aromatic hydrocarbons	September 1996	\$200,000	Heavy metals, polycyclic aromatic hydrocarbons	Completed site investigation	Steel mill	-	-	338 acres	May 1997	Robert West, Provo City, Utah, 801 379-6140
Puyallup Tribe of Tacoma, WA	Construct large marine terminal out of Reichhold Property, on 167 acres of tribal land	September 1996	\$100,000	-	Soil contamination analysis underway	-	Construct large marine terminal	-	167 acres	May 1997	James J. May, Executive Director, Puyallup Tribe International Inc., Puyallup Tribe of Indians, 206 383-2820
St. Petersburg, FL	-	April 1997	\$200,000	-	Preliminary phase	-	-	-	-	May 1997	Charles Ray, City of St. Petersburg, 813 893-7100
Salt Lake City, UT	Abandoned industrial area, "Gateway District," to be redeveloped for Winter Olympic Games in 2002	September 1996	\$200,000	-	Inventory completed; field sampling underway	Abandoned industrial area	Gateway District to be redeveloped for Winter Olympics Games in 2002	-	-	May 1997	Alice Steiner & Lois Young, Redevelopment Agency of Salt Lake City, 801 535-7240
Sand Creek Corridor, CO	3 sites in northeast Denver where water quality has been negatively impacted by industry	September 1994	\$175,000	-		-	-	-	3 sites	May 1997	Tom Stauch, City of Denver, 303 436-7305

Name of Site	Specific Location	Date Designated	Level of EPA Funding	Contaminants	Timeframe	Former use of site	Future use of site	Jobs	Size	Date web page updated	Contact
San Diego, CA	Chemical storage & manufacturing, metal plating, have negatively impacted neighborhood of Barrio Logan	September 1997	\$100,000	-	Preliminary stage	Chemical storage & manufacturing metal plating	-	-	-	October 1997	Sara Ruiz, City of San Diego Redevelopment Agency, 619 236-6925
San Francisco, CA	S. Bayshore community w/120 known brownfields sites in 3 mile area, including 13 hazardous waste sites, 58 leaking underground storage tanks	August 1996	\$100,000	-	Development area-wide soil & groundwater cleanup strategy underway	Hazardous waste sites, 58 leaking underground storage tanks	-	-	3 miles	May 1997	Martha Walters, Brownfields Coordinator, San Francisco Redevelopment Agency, 415 749-2474
Shreveport, LA	Hundreds of acres abandoned industrial sites	July 1996	\$200,000	-	Phase I assessments underway	Abandoned industrial sites	-	-	-	May 1997	Candace Higgenbotham, Department of Economic Development, 318 673-7506
Sioux Falls, SD	Big Sioux River Corridor	September 1996	\$200,000	-	Phase I & II assessments 20 acres underway	Big Sioux River Corridor	-	-	20 acres	May 1997	Steve Methi, Department of Planning & Building Services, 605 367-7130
Somerville, MA	Soil contamination; 3 demonstration sites to be remediated	September 1996	\$100,000	-	Assessment underway		-	-	-	May 1997	Mary Jo Bohart, Office of Housing & Community Development, 617 625-6600, ext. 2500
Tulsa, OK	46 potential brownfields in northwestern Tulsa	April 1997	\$200,000	-	Ten assessments to be conducted	Electroplating, transformer repair, electrical equipment & chemical manufacturing	-	-	-	April 1997	Mickey Thompson, Tulsa Industrial Authority, 918 585-1201
West Jordan, UT	Mining, smelting, dump area bordering Bingham Creek & Jordan River	September 1995	\$200,000	-	Developing master plan brownfield sites; one Phase I survey completed	Mining, smelting, and dump area	-	-	-	May 1997	Bob Davis, West Jordan, Utah, 801 565-5070
Westfield, MA	Former boiler manufacturer with 29 buildings	April 1997	\$197,000	-	Preliminary stage	Boiler manufacturer	-	-	6.25 acres	April 1997	James Boardman, Department Community Development, 413 572-6246
Wisconsin Department National Resources	Provide free assessments to municipalities at 12 sites over 210 acres throughout State	February 1997	\$200,000	-	Phase I & II assessments underway		-	-	210 acres	May 1997	Darsi Foss, Wisconsin Department of National Resources, 608 267-6713

Source: U.S. EPA, Office of Solid Waste and Emergency Response, Brownfields Homepage, Brownfields Pilots as viewed January 1998, <<http://www.epa.gov/swerosps/bf/pilot.htm>>

TABLE 3
Timeline of Federal Initiatives Related to Brownfields Redevelopment

May 1993	Clinton Administration introduced the Economic Empowerment Act of 1993
June 1993	Federal Council on Sustainable Development formed
November 1993	EPA awards the first Brownfield Assessment Demonstration Pilot grant to Cleveland, OH in an effort to create a national model for redeveloping Brownfields
February 11, 1994	President Clinton issued Executive Order on Environmental Justice
January 1995	Initial Brownfields Action Agenda announced, included awards for Brownfields Assessment Demonstration Pilots
Summer 1995	National Environmental Justice Advisory Council (NEJAC) Waste Facility Siting Subcommittee and U.S. EPA co-sponsored a series of five public hearings entitled "Public Dialogues on Urban Revitalization and Brownfields: Envisioning Healthy and Sustainable Communities"
July 1996	Federal Interagency Working Group on Brownfields established
May 13, 1997	Clinton Administration announced the Brownfields National Partnership Action Agenda (which was developed by the Interagency Working Group on Brownfields)
August 5, 1997	President Clinton signed the Taxpayer Relief Act, which included a new tax incentive to spur the cleanup and redevelopment of Brownfields in distressed urban and rural areas.
August 20, 1997	EPA issued public notice of Brownfield Showcase Communities in Federal Register

TABLE 4
State Voluntary Cleanup and Incentive Programs

Alabama	Yes	-	Montana	Yes	-
Alaska	Yes ^A	-	Nebraska	Yes	-
Arizona	Yes	-	Nevada	Yes	-
Arkansas	Yes	Yes	New Hampshire	Yes	Yes
California	Yes	Yes	New Jersey	Yes	Yes
Colorado	Yes	-	New Mexico	Yes	-
Connecticut	Yes	Yes	New York	Yes	-
Delaware	Yes	Yes	North Carolina	Yes	-
District of Columbia	-	-	North Dakota	-	-
Florida	Yes	Yes	Ohio	Yes	Yes
Georgia	Yes	-	Oklahoma	Yes	Yes
Hawaii	Yes	-	Oregon	Yes	Yes
Idaho	Yes	Yes	Pennsylvania	Yes	Yes
Illinois	Yes	Yes	Puerto Rico	Yes ^B	-
Indiana	Yes	Yes	Rhode Island	Yes	Yes
Iowa	Yes	Yes	South Carolina	Yes	-
Kansas	Yes ^C	-	South Dakota	Yes ^D	-
Kentucky	-	-	Tennessee	Yes	-
Louisiana	Yes	-	Texas	Yes	Yes
Maine	Yes	-	Utah	Yes	-
Maryland	Yes	Yes	Vermont	Yes	Yes
Massachusetts	Yes	Yes	Virginia	Yes	Yes
Michigan	Yes	Yes	Washington	Yes	-
Minnesota	Yes	Yes	West Virginia	Yes	-
Mississippi	-	-	Wisconsin	Yes	Yes
Missouri	Yes	Yes	Wyoming	-	-

Source: U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1995 Update*, July 1996 and *Brownfields News*, "50-State Roundup," December 1997.

^A Pilot program in place (1996).

^B Developing a VCP as of 2/98.

^C Five-site pilot began in 1997.

^D Developing legislation as of 2/98.

**TABLE 5
NIEHS Minority Worker Training Program Grants**

Awardee	Other Participating Organizations	Target Training Populations
Alice Hamilton Occupational Health Center	<ul style="list-style-type: none"> • University of Maryland • Howard University 	Low income minority youth in the Washington, DC and Baltimore, MD areas
Clark Atlanta University	<ul style="list-style-type: none"> • Laborers-AGC Training Fund • Xavier University 	Youth from environmentally impacted neighborhoods in Atlanta, GA and New Orleans, LA
DePaul University	<ul style="list-style-type: none"> • Center for Workplace Education • People for Community Recovery • Center for Workforce Education • Laubach Literacy International • National Association of Minority Contractors • Construction and Education Fund of the Associated Builders and Contractors 	Minority youth in Southeast Chicago, IL
Jackson State University	<ul style="list-style-type: none"> • University of Alabama at Birmingham • Laborers International Union of North America (Local #145) - LIUNA 	Minority youth in disadvantaged communities in Mississippi
Laborers-AGC Education and Training Fund	<ul style="list-style-type: none"> • Laborers-AGC Health & Safety Fund • Building & Construction Trades Department (AFL-CIO) • Cuyahoga Community College • San Francisco University 	Minority youth from the San Francisco Bay area and from Cleveland, OH
United Brotherhood of Carpenters and Joiners Health and Safety Fund	<ul style="list-style-type: none"> • Ironworkers National Training Fund • Painters and Allied Trades Labor-Management Fund (PAT) • Sheet Metal Workers Training Fund • Operative Plasterers and Cement Masons Union • Xavier University in partnership with Delgado Community College • Community College of Southern Nevada • National Association of Minority Contractors • International union of Operating Engineers 	Minority youth from New Orleans, LA; Las Vegas, NV; Los Angeles, CA; Minneapolis/St. Paul, MN; Oakland, CA; East Palo Alto, CA and Albuquerque, NM
University of Medicine & Dentistry of New Jersey - New Jersey/New York Consortium	<ul style="list-style-type: none"> • New Jersey Department of Labor • Hunter College, School of Health Sciences • New York Committee for Occupational Safety & Health • New York Carpenters Labor Technical College • New York City Environmental Justice Alliance (lead agency for a host of community-based organizations in New York and New Jersey) 	Minority youth in New Jersey and New York

APPENDIX

CASE STUDY

The following case study details the history of a former shipyard site in Richmond, California and the redevelopment activities that are returning the land to productive use. Comparisons between cleanup at this site and cleanup at a typical Superfund site show marked similarities. Similarities are apparent in size -- this being a large tract of land; in the cleanup process; in remediation activities; and in the various contamination levels encountered at the site; as well as in the length of time it took for cleanup and redevelopment to occur.

Marina Bay, Richmond⁴⁰

Prior to 1941, Marina Bay in Richmond, CA consisted primarily of undeveloped tidal mudflats and salt marshes. The land was owned by the Santa Fe Land Improvement Company, now known as the Catellus Development Corporation. At that time, the Ford Peninsula, which forms the western shore of Marina Bay, was the only development in the area. In the early 1920s the land was filled and by the 1930s, Ford began operating there.

Around 1939, Henry J. Kaiser and his partners agreed to build a shipyard that would produce cargo ships for the British government. This shipbuilding operation, located slightly north and west of today's Marina Bay was later designated Richmond Shipyard No. 1. Two years later Kaiser agreed to build Richmond Shipyard No. 2. This shipyard was used for production of cargo ships for the U.S. Government.

Kaiser's companies -- Richmond Shipbuilding Corporation and later Permanente Metals Corporation which became Kaiser Aluminum & Chemical Corporation after the war -- leased the majority of the real property needed for the shipyard from Santa Fe. Additional land was either acquired by condemnation or lease.

These companies dredged several million cubic yards of bay mud to create an approximately 100-acre launching basin. Today that land is the site of public marina facilities. Kaiser used the dredge soils and imported land fill to reclaim approximately 200 acres of mudflats and tidal areas along the northern, eastern, and southern shores of the launching basin.

Twelve shipways were then built along the northern shore, along with four "outfitting docks," and approximately 60 buildings that would support the shipbuilding operation. Richmond Shipyard No. 2 operated twenty-four hours a day and employed more than 25,000 workers. The shipyards overall employed approximately 90,000 people. Before the war Richmond's population was 23,462. By 1942, it had grown to 50,000 and by 1944 to almost 100,000.

⁴⁰ American Bar Association, Section of Natural Resources, Energy and Environmental Law, Presidential Showcase Program: Brownfields Redevelopment: Making Brownfields Transaction Work -- A Key to Urban Revitalization and Environmental Stewardship, August 2-5, 1997, ABA Annual Meeting, Mayor Rosemary M. Corbin.

Previously vacant housing became occupied; residents took in boarders; and low cost housing was built to accommodate the demand. People rented out any vacant space they could -- including garages and barns, and slept anywhere they could including movie theatres, parks, and hotel lobbies. Hot beds (beds rented for an eight hour shift) were commonplace. More and more people arrived in Richmond. In the early days of the war, many of the new employees of the Shipyards were from California, but as the demand for new workers grew, recruiters combed the country trying to get 150 people a day. People came from Arkansas, Oklahoma, Texas, and the deep South, leaving their families to earn a dollar an hour. Recruiters promised cottages with white picket fences, and paid transportation fees. They never delivered on the cottages, and the transportation fees were repaid from the initial paychecks, in exchange for a signed one-year work contract.

Not only were there poor living conditions and not enough housing, but new comers to Richmond often faced resentment, jealousy and prejudice. The influx of lower class, unskilled, uneducated, rural Southern workers were not well received by Richmond's predominantly working class citizens. Many of the newcomers were black. In just three years, the number of blacks in the city increased by more than 5,000 and in another four years it increased by an additional 8,000 increasing the black population in Richmond by 51 times it's pre-war population of 270. (In and before 1940, the 270 blacks lived in a rural four-block area outside the city in North Richmond.)

The shipbuilding operation produced many kinds of waste that were later found and cleaned up, including scrap metal, paint and paint thinner, and acetylene production sludge. Apparently, some of the waste material was used as fill as the perimeter of the shipyard was progressively expanded on the eastern and southern shores of the launching basin to create additional space for shipbuilding activities.

Richmond Shipyard No. 2 ceased operation in late 1945 and the land was returned to the Santa Fe Land Improvement Company in the summer of 1947.

Meanwhile, when the war ended, Richmond faced a tremendous set of problems including inadequate housing, unemployment, and prejudice. During the war, much of the prejudice was diffused by the work at the Shipyards. However, with the closing of the Shipyards, vast unemployment changed that. The public housing that was built by the Federal Government had been careless and designed for temporary use only, and it was segregated. There were not enough jobs to go around since the war had ended, and so competition grew. Those who had learned one skill only at the shipyard found that that skill could not easily transfer to another job.

Santa Fe Land Improvement Company's original post-war plan for the property was to lease the land to industries that would generate rail traffic for the Santa Fe Railroad. Between 1947 and 1951, Santa Fe cleared all but about twelve of the shipyard structures from the property. During this process, the graded and filled portions of the property -- some of the scrap metal material from the demolition -- was used as fill material.

Beginning in the early 1960s, Santa Fe began evaluating development plans for its property along the Bay which spanned the cities of Richmond, El Cerrito, Albany, Berkeley, Emeryville, and Oakland. By the mid 1970s, Santa Fe had decided that the property that was once Richmond Shipyard No. 2 should become a mixed use residential-commercial development oriented around a large marina. Consultants to Santa Fe advised them to do three things: 1) sell the launching basin along with some adjacent land to Richmond; 2) encourage Richmond to develop the marina and related commercial facilities with the assistance of low costs state-supported financing; and 3) act as a "master developer" for the remainder, selling individual development sites to companies that had expertise to develop and sell residential housing and apartments.

As part of its redevelopment plan, in the 1970s Richmond conducted an environmental impact review. Though there was apparently subsurface toxic contamination, at the time it was not a major concern. In the spring of 1982 a grading contractor unearthed a paint deposit. Investigations revealed that the paint was confined to a limited area. This was the only contamination found during five years of redevelopment work along the north shore of the harbor or in the limited work at the northeast corner of the harbor.

Between 1982 and 1985 very little development took place. In 1985 and 1986 redevelopment resumed, mostly along the north shore. Again, environmental investigations revealed no contamination problems. In 1987 when intensive residential development work was beginning along the eastern and southern shores, developers began encountering pockets of buried contamination in various locations. Between 1987 and 1990, approximately fifteen pockets of contaminated soil were identified. Contamination consisted of paint, paint cans, paint-stained rags, scrap metal from metal fabrication and demolition operations, various types of hydrocarbons (oils and paint thinners), acetylene production sludge, and small amounts of other types of contamination.

Although there was extensive soil contamination, there was no substantial groundwater contamination. The groundwater at the site was of such poor quality, relative to the standard for human consumption, that the groundwater issue became one of preventing any substantial harm to the bay. It was also determined that the contamination had not moved significantly during the previous 40 years. Finally, with some exceptions, the contamination was not severely toxic. Although dioxin and pesticides had been found in other formerly industrial areas along Richmond's southern waterfront, they were not found at Marina Bay.

Because there was no significant groundwater contamination and because the soil contamination was neither mobile nor highly toxic, substantial amounts of it were managed on site, reducing the volume that had to be sent to hazardous waste landfills. The soil that was more highly contaminated with lead-bearing pieces of paint and chromium, was cleaned with mining and material processing equipment in the following manner. Conventional soil and rock processing equipment -- vibratory screens, conveyors, and crushers -- was assembled and operated using an innovative design that efficiently separated the paint pieces from the soil. Specially trained City staff hand-

picked gravel and cobble sized paint pieces from the screened soil as it was conveyed from the screening process to another. The paint separation process effectively reduced the volume of contaminated soil that required off site disposal and allowed the intended use of the area to be met. Approximately 99 percent of the soil was designated to be returned to the area as clean fill; the one percent was disposed of in a permitted landfill. Cleanup was completed in less than five months and cost \$1.2 million. Many innovative remediation technologies were used including bioremediation, and waste minimization. Construction of housing units proceeded simultaneously allowing development-generated revenues to partially offset remediation costs.

Twenty thousand cubic yards of petroleum hydrocarbons-containing soils that were excavated from Marina Bay were used in the embankment of I-580. Richmond was the first city in California to convince CalTrans to allow the substitution of Class II soils for clean soils in an interstate freeway embankment. This saved an estimated \$1 million, with total construction costs approximately at \$350,000.

The Harbor 11-A Redevelopment Project, consisting of approximately 964 acres, was clearly an example of a large Brownfield project. More than \$40 million of public investment and \$205 million in private investment have transformed the former Kaiser Shipyard site into a productive waterfront neighborhood on the San Francisco Bay. Over seventy-five percent of the public improvements were financed with the reinvestment of property taxes generated within the area and the funds generated from the sale of land to private investors. (See Table B.)

TABLE A
Chronology of Marina Bay

Year	Investigations and Other Activities	Contamination and Remedial Activity	Construction Activity
1980	--	--	<ul style="list-style-type: none"> • Marina Bay condominium development started on North Shore I-130 condominium units.
1982	--	<ul style="list-style-type: none"> • Paint material in soil discovered during Marsh Restoration project and inadvertently mixed with excavated soil. Soil with paint was then used as fill at three locations over Parcels BB, CC, DD and Marsh park. Initial Investigation of contamination. 	<ul style="list-style-type: none"> • Private marina development on East Shore started - 278 private boat slips and a yacht club building.
1985	--	--	<ul style="list-style-type: none"> • "Marina Cove" rental complex under construction - 248 rental units.
1986	--	--	<ul style="list-style-type: none"> • "The Beach" development under construction.
1987	<ul style="list-style-type: none"> • Preliminary Investigation of Parcels CC, DD, and EE. Subsequent investigations expanded to include Parcel FF (no contaminants found at Parcel FF). • Initiated investigations of West, North, and South shores. • Oily soil and debris uncovered on Parcel O; investigation initiated. Initial investigations at Parcel AA and BB. • Initial investigations of Parcel T (contaminants: petroleum hydrocarbons found). 	<ul style="list-style-type: none"> • Excavation and physical separation of paint pieces from Marsh Park contamination. Paint/soil debris disposed of at Class I landfill. DHS approved management of residual soil as non-hazardous waste based on chemical analysis. Innovative approach to hand separate lead pieces from soil. City staff performed the remediation. 	<ul style="list-style-type: none"> • "Marina Shores" rental complex under construction - 448 rental units. • Lincoln Properties starts construction of 160,000 sq. ft. office flex commercial development.
1988	<ul style="list-style-type: none"> • Health Risk Assessment conducted • Phase II West Shore investigations 	<ul style="list-style-type: none"> • Remediation implemented at Parcel O; soil excavated, aerated, relocated beneath building foundations and paved areas, and covered with clean fill; installation of passive vapor barriers. 	--
1989	<ul style="list-style-type: none"> • Completion of Richmond Marsh restoration. 	<ul style="list-style-type: none"> • Total petroleum hydrocarbons (TPH) - contaminated soil excavated Parcel S, and later placed in I-580 freeway Class II Landfill Embankment. Use of presumptive remedies 	<ul style="list-style-type: none"> • "The Breakers" development under construction - 156 single family residences.

Year	Investigations and Other Activities	Contamination and Remedial Activity	Construction Activity
		<p>approach, which continued throughout Marina Bay Project and is documented in RAP.</p> <ul style="list-style-type: none"> • TPH soil from Parcel BB excavated and placed in I-580 freeway Class II Landfill Embankment. • Separation of metal and paint debris from Parcel AA and BB soil; metal sent to recycler and soil blended with pond sediments and placed in Parcel E boat launch ramp. • South pond alkali sediments excavated, stockpiled at Parcel M. Department of Health Services approved use of this material as soil amendment. 	<ul style="list-style-type: none"> • 150,000 sq. ft. office flex started on West Shore (phase I). • Salute Restaurant and marina General Store under construction.
1990	<ul style="list-style-type: none"> • Preliminary Endangerment Assessment completed for Parcel L, SA, and M. • Completed Community Relations Plan • Initial investigation on Parcel E. 	<ul style="list-style-type: none"> • On Parcel SA: building demolished, UST and lime removed and used as soil amendment. • UST (diesel) discovered during construction at Parcel BB; tank removed and recycled; soil excavated, bioremediated onsite and disposed of at Class III landfill. • Excavation of metal-contaminated soil from Parcel CC; physical and magnetic separation of debris; disposal of scrap to Class I landfill. Soil relocated to beneath Parcel FF tennis courts. • TPH - and lead-contaminated soil from Parcel W excavated and disposed of at a Class I landfill. • TPH soil encountered during realignment of Meeker Ditch adjacent to Parcel DD and EE. Soil excavated and stockpiled on Vincent Park. • Excavation and physical screening of soil containing TPH and construction debris at Parcel U. Screened soil relocated to Parcel V beneath proposed parking lot. Excavation and stockpiling (on Parcel M) of alkali pond sediments from three South Shore areas. 	--
1991	--	<ul style="list-style-type: none"> • Construction of clay cap over TPH-contaminated soil in Shimada Park. Soil containing paint debris and lead excavated from Parcel U, debris was segregated and debris and soil stockpiled at Vincent Park. • Excavation of TPH-contaminated soil on Parcel U, ex-situ bioremediation, reuse of remediated soil. Soil containing paint debris and lead excavated from Parcel U, debris was segregated and debris and soil stockpiled in Vincent Park 	<ul style="list-style-type: none"> • "Marina Lakes" rental complex under construction - 448 rental units.

Year	Investigations and Other Activities	Contamination and Remedial Activity	Construction Activity
		<ul style="list-style-type: none"> • Soil containing TPH and lead near Parcels U and Y were excavated and disposed of at Class I landfill; soil containing only lead was excavated and stockpiled at Vincent Park. The contaminated soil will be encapsulated for removal when the park is constructed. • At public shoreline access area north of Parcel W, lead-contaminated soil was excavated and relocated to area beneath Peninsula Drive right-of-way. • Excavation and ex-situ bioremediation of TPH-contaminated soil from Parcel Y. Remediated soil was relocated to beneath the Parcel V parking lot. • Construction of soil repository for lead-bearing soil from Parcel BB, mixed with alkali pond sediments, at Parcel E. Deed restriction recorded. Cost-effective remediation of contaminated soil in controlled, City-owned parcel. 	
1992	<ul style="list-style-type: none"> • Public review period for RAP. 	--	--
1993	<ul style="list-style-type: none"> • Final RAP. 	--	--
1994	--	--	--
1995	--	--	<ul style="list-style-type: none"> • "Promontory" development under construction - 78 single family units. • "Bayfront" development under construction - 166 townhomes. • "Sunset Pointe" development under construction - 132 single family residences.

Source: *Brownfields Redevelopment: Marina Bay - From Shipyards to Waterfront Community*, Presented at the American Bar Association Annual Meeting, Section of Natural Resources, Energy and Environmental Law, Mayor Rosemary M. Corbin, August 2-5, 1997, San Francisco, CA.

TABLE B
Improvements and Developments at Marina Bay

	Public Improvements	Commercial Development	Residential Development
Already Completed	1.7 miles of shoreline trails	Marina Bay West Shore - 150,000 sq. ft. of office flex space software and biotech firms	North Shore Condominiums - 136 units
	1.2 miles of esplanade	Lincoln Marina Bay Business Center - 170,000 sq. ft. of R&D and distribution space	The Beach - 138 town homes located adjacent to the Marina
	20 acres of water related parks	Salute Restaurant and Marina General Store - fine waterside dining and convenience shopping	The Breakers - 156 single family homes located on San Francisco Bay
	16 acres of trailside landscaping	11.5 acre office, commercial R&D development on Marina Bay West Shore	--
	6 acres of restored marshlands	7.3 acre shoreline commercial and retail development on the North Shore	--
	3 miles of street and other public infrastructure	--	--
	\$10 million of environmental mitigation	--	--
	750 first-class boat berths at the Richmond Marina	--	--
	The Boathouse - home to the Marina Bay Yacht Club and offering meeting facilities	--	--
	The Harbor Master's Office - marina administrative offices and classroom facilities	--	--
Still to Come	"Vincent Park" will be a six acre recreation facility at the end of the Peninsula (construction beginning in September 1997)	11.5 acre office, commercial and R&D development on Marina Bay West Shore	--
	West Shore Park - two acres of recreational activities directly adjacent to the Ford Assembly Building (construction to begin 1998)	7.3 acre shoreline commercial and retail development on the North Shore	--
	Additional street, esplanade and trail construction (construction beginning October 1997)	--	--
Under Construction	--	--	Bayfront - 162 town homes and condominiums with views of Marina Bay and the East bay Hills
	--	--	Promontory - 77 single family homes located on San Francisco Bay
	--	--	Sunset Pointe - 132 single family homes located on San Francisco Bay and Marina Bay

Source: *Brownfields Redevelopment: Marina Bay - From Shipyards to Waterfront Community*, Presented at the American Bar Association Annual Meeting, Section of Natural Resources, Energy and Environmental Law, Mayor Rosemary M. Corbin, August 2-5, 1997, San Francisco, CA.

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METHODOLOGICAL CHALLENGES

The original goal of this project was to collect payroll records or similar data that would allow us to better identify the crafts, number of people, and specific remedial actions at various Brownfield sites across the country. However, once we began contacting contractors involved in Brownfields cleanup and redevelopment many issues surfaced that led us to believe that ours was an unrealistic goal at this particular time. These issues included:

- The newness of Brownfields legislation, and how that affects work being done in the future, versus work already underway.
- That by definition, Brownfields are privately funded, and so contractors have no interest in divulging the type of detailed information RRA was looking for.
- The point at which remediation activities are separated from the construction phase.
- That some contractors do not provide training the local people they hire to do cleanup and so are unwilling to speak with RRA.
- That HAZMAT training is expensive, so contractors bring their own trained workers, rather than hiring locally and having to pay to train the local community.
- That those Brownfields sites that have been cleaned up and redeveloped are those with the least contamination.

These are only some of the issues encountered. Though this paper does not satisfy its original goal, we hope that it still finds an attentive audience, as we believe that it offers some important considerations. It is our hope that as Brownfield cleanups progress, data will become more available, and that we will be able to meet our original goal.