

US EPA ARCHIVE DOCUMENT



XL Project Progress Report HADCO Corporation



On March 16, 1995, the Clinton Administration announced a portfolio of reinvention initiatives to be implemented by the U.S. Environmental Protection Agency (EPA) as a part of its efforts to achieve greater public health and environmental protection at a more reasonable cost. Through Project XL, which stands for eXcellence and Leadership, EPA enters into specific project agreements with public or private sector sponsors to test regulatory, policy, and procedural alternatives that will produce data and experiences to help the Agency make improvements in the current system of environmental protection. The goal of Project XL is to implement 50 projects that will test ways of producing superior environmental performance with improved economic efficiencies, while increasing public participation through active stakeholder processes. As of October 1998, 10 XL projects are in the implementation phase and 20 XL projects are under development. Project XL Progress Reports provide project-specific overviews of the status of individual XL projects that are implementing Final Project Agreements (FPAs). The progress reports are available on the Internet via EPA's Project XL web site at <http://www.epa.gov/Project XL>. Or, hard copies may be obtained by contacting the Office of Reinvention's Project XL Docket at 202-260-7434. General information on Project XL is available on the web site or by contacting the general information number at 202-260-5754.

Background

The HADCO Corporation, headquartered in Salem, New Hampshire, is a leading manufacturer of printed wiring boards (PWB) and electronic interconnection products. Founded in 1966 as a three-person operation in Cambridge, Massachusetts, HADCO has grown to employ over 8,000 employees in the U.S. and Malaysia. It reported \$826 million dollars in sales in 1998. There are three HADCO facilities currently involved in the XL project—Owego, New York; Derry, New Hampshire; and Hudson, New Hampshire. The HADCO Corporation, in partnership with the New York State Department of Environmental Conservation (NYSDEC), the New Hampshire Department of Environmental Services (NHDES),



Major Milestones

July 21, 1995 HADCO XL Proposal Submitted	October 7, 1997 HADCO Final Project Agreement Signed	March 1, 1999 HADCO submits first annual Project XL report	April 2002 Final Report for HADCO
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and EPA, is piloting an initiative examining ways to overcome barriers to the recovery of metals that are associated with sludge waste. The HADCO project is striving to test whether valuable copper metal that is used as an electricity conductor on PWBs can be reclaimed directly by a recycler without shipping the copper long distances to “middleman” processors. This transport is costly and potentially risky. Further, the HADCO project may demonstrate that new regulatory approaches to safely handling sludge can tip the economic scales in favor of recycling certain wastes throughout the PWB industry. Through a series of commitments and agreements among HADCO, EPA, and the States of New York and New Hampshire, the HADCO XL project will improve recycling efforts, reduce pollution, and reduce risks to surrounding communities by the following:

- Taking steps to show that its Resource Conservation and Recovery Act (RCRA) F006 waste stream can be recycled safely by either primary-metals smelters or other appropriate metal reclamation facilities.
- Reducing the risks created by transportation of wastes across a large distance to a “middleman” for processing, by shipping the waste directly to an approved reclamation facility.
- Voluntarily recycling copper dusts that are another by-product of its operations; currently, these copper dusts are sent to landfills.
- Examining the potential of installing sludge dryers to reduce the volume of sludge wastes.
- Committing all of the cost savings realized from this project to expand HADCO’s existing programs for recovering valuable metals or preventing pollution.

Regulatory Flexibility

Background. Currently, HADCO ships its listed wastewater sludge to a third-party processor, before sending it to an outside recycling facility that will reclaim the valuable copper from the sludge. HADCO’s XL project is testing approaches to handling the copper-rich sludge, which can both reduce the company’s RCRA regulatory burden and promote waste recycling. The statutory program, and the EPA office administering the program affecting the HADCO project is:

- Resource Conservation and Recovery Act (RCRA), administered by EPA’s Office of Solid Waste and Emergency Response.

Under the RCRA regulations, HADCO’s sludge waste is classified as F006, which means that it is a solid waste that contains certain hazardous constituents. The solid waste specifically listed in the F category defines it as a hazardous waste generated from a nonspecific production or operation source, and the 006 category specifies the hazardous waste in question as wastewater treatment sludge from electroplating operations—which can add certain hazardous constituents to the waste. Due to process changes since the 1970s, HADCO believes that the sludge currently created as a by-product of its operations is far less toxic than before, and therefore no longer needs to be regulated as hazardous waste under RCRA. The following are two ways in which the EPA and State Agencies can offer regulatory flexibility to the three HADCO facilities by removing the F006 waste from under the RCRA regulation:

- (1) A solid waste variance; and
- (2) A conditional delisting.

A solid waste variance granted for the F006 wastes would mean that the sludge is no longer considered a solid waste under either RCRA or the corresponding state-level hazardous waste regulations in New York and New Hampshire. A conditional delisting would exclude a listed waste from RCRA regulations as well as the corresponding state-level hazardous waste regulations in New York and New Hampshire as long as the waste exhibits no hazardous waste characteristics. Eligibility for a solid waste variance or a conditional delisting is granted only if the sludge waste is considered safe by EPA and the States. Then, once the waste is removed

from under both RCRA and state hazardous waste regulations, the waste would be managed as municipal and industrial solid waste in accordance with other Federal, state and local regulations.

Requirements for HADCO's Conditional Delisting or Solid Waste Variance. HADCO, EPA, NYSDEC, and NHDES signed the FPA on October 2, 1997. The FPA required sludge testing by HADCO facilities in order for their sludge wastes to be considered eligible for either a solid waste variance or a conditional delisting. The sampling of the sludge waste was conducted according to a schedule outlined in the "Project Commitments" tables presented below, and the samples were then sent to an EPA pre-approved laboratory for analysis. HADCO submitted the analytical results of its sludge samples to EPA, NYSDEC and NHDES on January 13, 1998. The sludge analyses tested for the levels of copper and the presence of other constituents to determine the sludge's ability to be recycled and to see whether other constituents present were below the allowable Federal and state toxicity characteristic limits for a delisting or a variance. After reviewing the analyses of the sludge, EPA and NHDES determined on July 2, 1998 that HADCO's Derry, and Hudson, New Hampshire facilities were eligible to pursue either a conditional delisting or a solid waste variance. NYSDEC has not determined that the Owego facility is eligible for conditional delisting, but it has determined that it is eligible for a solid waste variance.

HADCO's Responsibilities. Now that EPA and NHDES have determined that HADCO is eligible for this regulatory flexibility, HADCO is in the process of submitting petitions for review by EPA and NHDES which specify the types of regulatory relief requested for each facility. NYSDEC has not yet determined that the Owego facility is eligible for this regulatory flexibility; however, HADCO is in the process of submitting petitions for review by EPA and NYSDEC. On September 16, 1998 HADCO indicated that it would submit petitions for conditional delisting for each of the New Hampshire facilities and the New York facility. These petitions must comply with specific regulatory requirements that are outlined in the Code of Federal Regulations, and they must be submitted to EPA. A conditional delisting will provide limitations and restrictions on how and where the sludge will be managed in order to protect human health and the environment.

EPA's Responsibilities. EPA is responsible for determining whether the petitions for conditional delisting are in accordance with the specific regulatory requirements in the Code of Federal Regulations, and then for informing the States that the petitions are complete. The States can then review the petitions and may apply additional requirements. If the information submitted by HADCO appears to support a delisting, EPA will propose the delisting by publishing the decision for public notice and opportunity for comment. Also, EPA is required to review and comment upon a petition for a solid waste variance before the petition is granted by an authorized State.

State Responsibilities: New Hampshire. The sludge generated at HADCO's New Hampshire facilities is also listed as F006 generic industrial process waste under the New Hampshire hazardous waste rules. Although the NHDES delisting procedures generally follow the Federal delisting procedures, NHDES has some additional requirements to the Federal hazardous waste delisting petition requirements. The HADCO petitions must address these additional requirements in order for the NHDES to grant regulatory flexibility to HADCO's New Hampshire facilities. HADCO can also apply for a waiver of these State requirements; NHDES would then review the waiver request and decide whether or not HADCO must comply with the additional requirements.

State Responsibilities: New York. The sludge generated at HADCO's Owego facility in New York is also listed as F006 generic industrial process waste under New York's hazardous waste regulations. According to the state law, NYSDEC can only consider a delisting petition if EPA first grants a Federal delisting. In considering the HADCO petition, NYSDEC will evaluate the delisting criteria utilized by EPA, but will not repeat EPA's technical review process. If HADCO should petition New York for a solid waste variance, NYSDEC is authorized under State hazardous waste regulations to issue the variance if the petition meets the State's requirements.

Next Steps. Once HADCO submits the petitions for regulatory flexibility to EPA, NHDES, and NYSDEC, EPA and the State Agencies will then publish their decisions on whether to grant flexibility to each of the HADCO facilities in the respective statewide newspapers. EPA will issue a public notice and once the public comments have been addressed, the States and EPA will issue their final decisions regarding HADCO's petitions requesting regulatory relief. The date that this decision is placed in the Federal Register and appropriate State notices, the HADCO facilities will start to monitor and report on the environmental performance of the XL project.

Promoting Innovation and System Change

Project XL provides EPA with opportunities to explore and implement flexible approaches that protect the environment and advance collaboration with stakeholders. Specifically, the project promotes innovation and system change as described below.

Alternative hazardous waste permitting and recycling. By offering regulatory flexibility to HADCO, EPA and the State Agencies may be able to evaluate the effectiveness of offering a conditional delisting or solid waste variance for the F006 waste in order to encourage the recycling of copper as well as other recycling and pollution prevention efforts at the HADCO facilities. The information that will be gained on environmental benefits and cost savings experienced by HADCO under Project XL may be used by EPA to develop a framework to address the potential transferability of this type of regulatory flexibility to the PWB industry at large. Already this XL project has provided a great deal of information to the EPA's Office of Solid Waste, which has completed Phase I of a data collection report, developed jointly with environmental groups and industry.

Project Commitment Status

In the XL Final Project Agreement (FPA), the HADCO Corporation agreed to have the terms of the XL project apply to four HADCO facilities: Salem, New Hampshire; Derry, New Hampshire; Hudson, New Hampshire; and Owego, New York. On May 18, 1998, HADCO removed its Salem, New Hampshire facility from the XL project because the Salem facility operations were consolidated into another facility. The FPA for the HADCO XL project laid out a significant number of initial commitments on which HADCO would report baseline data, to be followed by implementation of the superior environmental performance commitments.

Commitment	Status
Schedule for Collection of Samples	
Collect first weekly set of samples.	Completed October 13-19, 1997.
Collect second weekly set of samples.	Completed October 20-26, 1997.
Collect third weekly set of samples.	Completed October 27, 1997- November 2, 1997.
Collect fourth weekly set of samples.	Completed November 3-9, 1997.
Collect quarterly set of samples. (To be initiated for the quarter 4-6 months after the effective date of the FPA, and continued for each following quarter until termination of the FPA. EPA and State Agencies may approve annual, in place of quarterly, sample collections, if the samples collected during the first year fall within a limited range of variability.)	Completed January 1-12, 1998. Completed April 13-19, 1998. Completed July 13-19, 1998.

Commitment	Status
Sample Analysis	
Collect four representative sludge samples for each set.	Completed October 13-19, 1997.
Combine representative samples to create a composite sample and grab sample.	Completed October 20-26, 1997.
Conduct analysis for Toxic Characteristic Leaching Procedure (TCLP) metals to determine inorganics.	Completed October 27, 1997- November 2, 1997.
Collect grab samples and duplicates, and conduct TCLP organics analysis.	Completed November 3-9, 1997.
Collect grab samples and duplicates, and conduct total volatile organic analysis, semi-volatile organic analysis, and carbonyl compounds analysis.	Completed October 27, 1997- November 2, 1997.
Collect grab samples directly from the filter press or installed sludge dryer to avoid organic volatilization.	Completed November 3-9, 1997.
Send each sample to certified laboratories for analysis.	Completed October 20, 1997; October 27, 1997; November 3, 1997; November 10, 1997; January 19, 1998; April 20, 1998; July 20, 1998.
Ensure each composite sample is analyzed for each parameter as specified in the FPA.	Complete.
Demonstrate that samples do not exceed 500 parts per million in total concentration for organic compounds, as needed.	Completed May 18, 1998.
Petitions for Regulatory Flexibility	
HADCO Owego, New York files petition.	Expected 2/1/99.
HADCO Hudson and Derry, New Hampshire file petitions.	Submitted 12/16/98.
State of New York informs HADCO that petition is complete.	30 days after submission of petition.
State of New Hampshire informs HADCO that petitions are complete 30 days after petition submissions.	Update on status will be available in the 1999 annual report.
EPA and State Parties grant regulatory flexibility as appropriate.	45 days after submissions of petition.
State and EPA authorization for regulatory flexibility for HADCO New Hampshire facilities published in Federal Register.	To be determined.

Commitment	Status
Petitions for Regulatory Flexibility	
State and EPA authorization for regulatory flexibility for HADCO New York facility published in Federal Register.	To be determined.
Public comments received on regulatory flexibility notice for New Hampshire facilities.	To be determined.
Public comments received on regulatory flexibility notice for New York facility.	To be determined.
Stakeholder meetings on regulatory flexibility decision.	To be determined.
Annual report submitted to EPA for HADCO New York and New Hampshire facilities	Report due in 1999, the date will be agreed upon by EPA, the States, and HADCO.

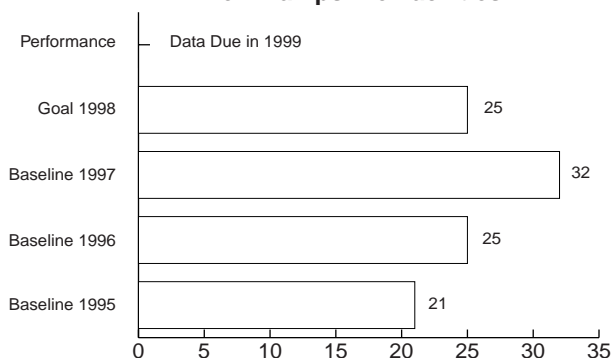
Environmental Performance

Once EPA and the State Agencies grant regulatory flexibility to the three HADCO facilities participating in this project, then those facilities will address their superior environmental performance commitments that are presented below. The HADCO facilities will be responsible for collecting environmental performance data on a state-by-state basis—one report on the two facilities in New Hampshire, and one report for New York on the Owego plant. This information will be compiled into one annual report to be submitted to EPA and the States in 1999. EPA, the States, and HADCO will determine the due date of the annual report. The report will detail the efforts of the facilities to achieve the goals for superior environmental performance which are broadly defined in four categories—reduction of mobile source air emissions associated with disposal/recycling, copper dust recycling, sludge reduction, and pollution prevention.

Reduction of Mobile Source Air Emissions

Associated with Recycling/Disposal: HADCO has committed to collecting data at each HADCO facility involved with the project on the reduction of mobile source air emissions associated with the direct recycling of the F006 sludge under the XL agreement. The baseline data will be extrapolated at each facility and will be developed from F006 sludge shipment records from 1995 through 1997. The data will also include analyses and estimates for the same time period. For the New Hampshire facilities, the analyses will include baseline information on the total number of shipments, the truck and rail miles required for transporting the sludge shipments, and the total gallons of fuel consumed. For the New York facility, the analyses will include baseline information on the truck and rail miles required for transporting the sludge shipments and the total gallons of fuel consumed. This will assist the company in calculating the reduction of air emissions associated with recycling to determine whether the project is meeting the

Reduction of Number of Sludge Shipments for New Hampshire Facilities



1998 goal of reducing emissions by 75%. Cost savings resulting from reduced transportation or recycling under the XL project will be used to increase copper reclamation activities at the HADCO facility.

Progress: HADCO will describe its progress in reducing mobile source air emissions on a statewide basis in its annual report due in 1999. This performance data will be on the reduction of air emissions associated with both direct recycling of F006 sludge and the reduction in the numbers of sludge shipments to processing facilities. HADCO, the States, and EPA will determine the exact date for the annual report.

Copper Dust Recycling: HADCO has voluntarily committed to applying all of its project-related savings to the reclamation of its copper drilling, sawing, and edging dusts, as well as to reducing their production. HADCO will begin its reclamation at all three facilities within 8 months of the date that each facility is officially granted regulatory flexibility by EPA and the States. HADCO will describe its progress in implementing the reclamation, pollution prevention activities, or both, and include relevant data and documentation in each of its annual reports on a facility basis. The first annual report is due in 1999. If HADCO finds that the amount of cost savings is insufficient to finance the recycling of 100% of the copper dusts from its productions, then the precise amount of copper dusts to be recycled will be agreed upon by HADCO, EPA and the States.

Progress: HADCO will describe its progress in implementing the reclamation, pollution prevention activities, or both, and will include relevant data and documentation on a facility basis in its annual report.

Reduction of Air Emissions Associated with Recycling

	New Hampshire	New York
Performance	To be determined	To be determined
Goal 1998	Reduce by 75%	Reduce by 75%
Baseline	To be determined	To be determined

Percentage of Copper Dusts in Waste Stream Currently Landfilled

	New Hampshire	New York
Performance	To be determined	To be determined
Goal	0%	0%
Baseline	100%	100%

Amount of Copper Claimed under Project XL

	New Hampshire	New York
Performance	To be determined	To be determined
Goal	100%	100%
Baseline	0%	0%

Sludge Reduction: HADCO has voluntarily committed to examining ways its New Hampshire facilities may be able to use sludge dryers in order to reduce the quantity of sludge transported. The New York facility currently is operating with a sludge dryer. Under the XL project, HADCO has installed one sludge dryer in the Derry facility. The goal is to reduce the sludge from the New Hampshire facilities by 40%. HADCO expects cost savings due to the reduction of the number of sludge shipments to processing facilities. HADCO will begin the installation of additional sludge dryers if it determines that the sludge dryers are technically and economically feasible. The sludge dryer installation would qualify as a pollution prevention activity for HADCO. HADCO will describe the status of the sludge dryer installation and include relevant data and documentation, in each annual report. In addition, in each report HADCO will evaluate the technical and economic feasibility supporting its decision to install or not install sludge dryers in the New Hampshire facilities.

Performance: HADCO has installed one sludge dryer in a new operation in the Derry, New Hampshire facility at a cost of \$200,000. HADCO will report on the performance of the sludge dryer in 1999.

Pollution Prevention: HADCO has voluntarily committed to investigating ways it can use the cost savings generated from reducing mobile air emissions and sludge to improve pollution prevention efforts at its three facilities. In addition to the copper dust reclamation, HADCO will begin to document ways in which its facilities can adopt pollution prevention techniques or technology within 8 months of the granting of regulatory flexibility to HADCO.

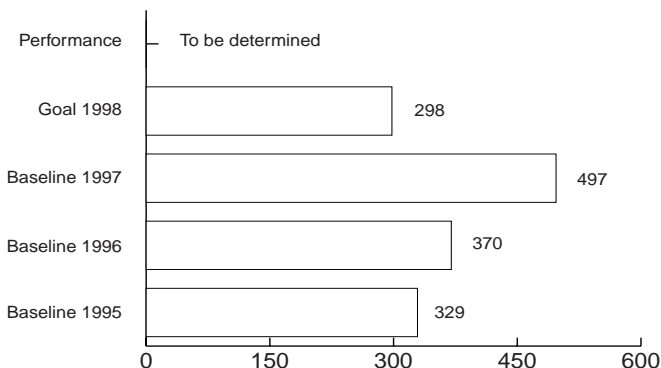
Progress: HADCO has installed one sludge dryer in its Derry, New Hampshire facility. HADCO will report its progress on a statewide basis on its pollution prevention activities. HADCO's goal is to reinvest 50% of the total cost savings from the XL project into additional pollution prevention activities.

Stakeholder Participation

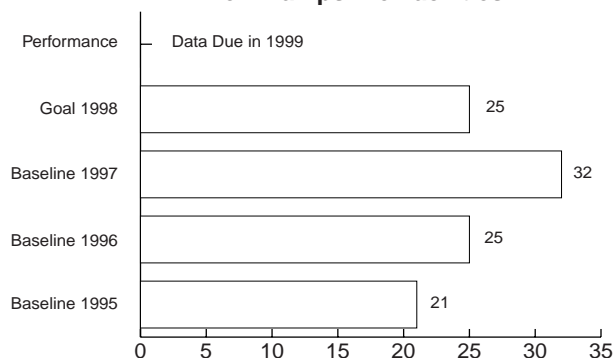
An integral part of the HADCO XL project is to involve local and national stakeholders in its development and the implementation. A key component for this XL project was to involve public stakeholders for the three HADCO facilities participating.

A number of stakeholders do not participate in day-to-day negotiations and project development, but have expressed their perspectives with written or oral comments. This group of stakeholders includes the Merrimack Watershed Council of New Hampshire, New Hampshire Town of Hudson Health Office, the Audubon Society of New Hampshire, the Sierra Club New Hampshire Chapter, the Atlantic States Legal Foundation of New York, Teradyne, M/A-Com, Lockheed Martin Loral Federal Systems, the World Legal

Reduction of Sludge (in tons) with the Use of a Sludge Dryer in the New Hampshire Facilities



Reduction of Number of Sludge Shipments for New Hampshire Facilities



Foundation, the IPC (the PWB industry association), New Hampshire Wastecap (a New Hampshire Business and Industry Association) and the World Resources Corporation.

HADCO Corporation conducted the majority of its stakeholder meetings in 1996 in both the states of New Hampshire and New York so that interested citizens could provide comments and input into the development of the XL proposal. Local citizens from the towns of Derry, Hudson, and Owego also participated. Subsequent to EPA's acceptance of the HADCO XL project proposal, HADCO conducted stakeholder meetings to obtain comments and input into the development of the FPA as well. Signatories to the HADCO FPA were the HADCO Corporation, Region I EPA, Region II EPA, NHDES, and NYSDEC. The signatories to the FPA did not include citizen or environmental groups.

In the FPA, HADCO agreed to continue to communicate with its stakeholders using the following methods:

- Place the signed FPA and subsequent annual reports in local libraries in Derry and Hudson, New Hampshire, as well as in Owego, New York. Copies of the same documents and the analytical data will be publicly available at EPA headquarters, EPA's regional offices in New York City and Boston, and at the offices of Atlantic States Legal Foundation in Syracuse, New York.
- Mail copies of the signed FPA and executive summaries of the subsequent annual reports to stakeholders identified and invited to participate in the FPA development process.
- Post the signed FPA and executive summaries of the subsequent annual reports on HADCO's World Wide Web page (<http://www.hadco.com>).
- Conduct annual site meetings with those stakeholders who request meetings to review project progress and discuss other aspects of the project, after stakeholders receive the annual report summaries.
- File press releases of pertinent project accomplishments such as completion of sludge drier installation in all New Hampshire facilities or commencement of copper dust reclamation in both New York and New Hampshire newspapers and trade journals.

When a Federal Register notice is published regarding the proposed regulatory relief to be granted to HADCO, EPA will notify each of the stakeholders that submitted comments during FPA development.

Six-Month Outlook

Once EPA receives HADCO's petitions for regulatory flexibility, EPA will take the steps necessary to propose a delisting or variance with opportunity for public notice and comment. If no adverse comments are received, EPA and the State intend to finalize the proposal in a final Federal Register notice and appropriate state notices. Once this occurs, HADCO will begin addressing and quantifying its goals and commitments for achieving superior environmental performance.

Project Contacts

- Lee R. Wilmot, Manager Corporate Safety, HADCO Corporation, 603-898-8010
- Ken Marschner, NHDES, 603-271-2943
- Mark Moroukian, NYSDEC, 518-457-2553
- Larry Nadler, NYSDEC, 518-487-8988
- Ken Rota, EPA Region I, 617-565-3349
- James Sullivan, EPA Region II, 212-637-4138
- Katherine Dawes, EPA Headquarters, 202-260-8394

Information Sources

The information sources used to develop this progress report include: 1) discussions during a teleconference among representatives of the U.S. Environmental Protection Agency, HADCO Corporation, New York State Department of Environment and Conservation, New Hampshire Department of Environmental Services, Atlantic States Legal Foundation, and World Resources Corporation; and 2) the Final Project Agreement for the HADCO Corporation XL project. The information sources are current through December, 1998.

Glossary

Carbonyl compound analysis: The identification of key chemical functional groups. A carbonyl compound contains a single carbon atom with a double bond to an oxygen atom and two open bonds.

Composite sample: A series of samples taken over a given period of time and combined proportionally by time, flow, volume, or mass.

Conditional delisting: Use of the petition process to have a facility's toxic designation rescinded.

Electroplating operations: Involves plating various metals onto printed wiring boards and computer components that provide electronic interconnection.

F006 listing: A hazardous waste that is wastewater treatment sludge produced from nonspecific electroplating processes and operations.

Final Project Agreement (FPA): The project's sponsors, EPA, state agencies, other regulators, and direct participant stakeholders negotiate a FPA. The FPA outlines the details of the project and each party's commitments.

Grab sample: Single sample collected at a particular time and place that represents the composition of the water, air, or soil only at that time and place.

Hazardous waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Landfill: Sanitary landfills are disposal sites for nonhazardous solid wastes spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day. Secure chemical landfills are disposal sites for hazardous waste, selected and designed to minimize the chance of release of hazardous substances into the environment.

Printed wiring boards (PWB): A device that provides electronic interconnections and a surface for mounting electronic components.

Reclamation: (In recycling) Restoration of materials found in the waste stream to a beneficial use which may be for purposes other than the original use.

Resource Conservation and Recovery Act (RCRA): Passed in 1976, RCRA gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of nonhazardous wastes. RCRA enables EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned sites.

Sludge: A semi-solid residue from any of a number of air or water treatment processes; this can be a hazardous waste.

Sludge dryers: A piece of equipment that reduces the volume and weight of the semi-solid sludge wastes by drying and reducing the water content of the sludge.

Solid waste: Nonliquid, nonsoluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Toxic characteristic leachate procedure (TCLP): Required under RCRA, the TCLP determines whether a waste exhibits hazardous toxicity characteristics and tests whether toxic constituents may leach from land-disposed waste.

Variance: Government permission for a delay or exception in the application of a given law, ordinance, or regulation.

Volatile organic compounds (VOCs): Any organic compound that easily evaporates and participates in atmospheric photochemical reactions, except those designated by EPA as having negligible photochemical reactivity.

Wastewater: Spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Wastewater treatment sludge: The sludge that is produced from the treatment and removal of pollutants of wastewater.