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# Project XL 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 1999, 15 XL projects are in the implementation phase and 35 XL projects are under development. EPA Project XL Progress Reports provide overviews of the status of 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 general information number at 202-260-7434. Additional information on Project XL is available on the web site or by contacting the general information number.

## 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 one billion dollars in sales in 1999. 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), and EPA, is piloting an initiative

HADCO Corporation XL Project, Hudson NH, Derry NH, Owego NY

### Major Milestones

July 21, 1995
HADCO XL Proposal Submitted

October 2, 1997
HADCO Final Project Agreement Signed

January 7, 2000
HADCO submitted its first annual Project XL report

April 2002
Final Report for HADCO

examining ways to overcome barriers to the recovery of metals that are associated with sludge waste. The HADCO project is testing 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 "intermediate" processors. This transport is costly. 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 an "intermediate" processor, 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.

## The Experiment

The HADCO project examines whether valuable copper metals can be recovered more safely and cost effectively through direct reuse by a primary metals smelter rather than through following the current regulatory requirement to first ship copper sludge wastes long distances to intermediate processors.

## The 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 facilities' electroplating sludge wastes—which have a high concentration of several valuable metals, especially copper, and relatively low toxicity in comparison to typical electroplating sludges—which can both reduce the company's RCRA regulatory burden and promote waste recycling. The statutory programs and the EPA offices administering the programs affecting the HADCO project are

- Resource Conservation and Recovery Act (RCRA), administered by EPA's Office of Solid Waste and Emergency Response; and
- Pollution Prevention Act (PPA) programs, administered by EPA's Office of Prevention, Pesticides, and Toxic Substances.

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 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 conditional delisting is granted only if the sludge waste is considered safe by EPA and the states. Eligibility for a solid waste variance is granted only if the partially-reclaimed sludge is considered commodity-like by EPA and the states. Whether or not the sludge is "safe" only affects delisting. Variances are based on whether or not the material is commodity-like. 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 the schedule outlined in the "Project Commitments" tables presented on page 5, and the samples were sent to a State-approved laboratory for analysis. HADCO submitted the initial analytical results of its sludge samples to EPA, NYSDEC, and NHDES on January 8, 1998. Additional analyses were submitted in 1998 on January 27, May 19, July 22, and September 16. The sludge analyses tested for the levels of copper and the presence of other constituents to determine the sludge's potential 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 did not determine that the Owego facility is eligible for conditional delisting, but has determined that it is eligible for a solid waste variance.

*HADCO's Responsibilities.* On September 16, 1998, HADCO indicated that it would submit petitions for a conditional delisting for each of the New Hampshire facilities and a solid waste variance for the New York facility. These petitions must comply with specific regulatory requirements that are outlined in the Code of Federal Regulations (CFR), 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. On December 18, 1998, HADCO filed petitions for conditional delistings for the Derry and Hudson facilities. EPA notified HADCO by letter dated January 25, 1999, that several items required by the Final Project Agreement were missing, that the delisting application was therefore considered administratively incomplete, and that EPA would not complete its initial review until receipt of this information. Specifically, the petition did not include the "Initial Projected Benefits Report" (see FPA paragraphs 18 and 26) or copies of letters of intent between HADCO and the receiving reclamation facilities that detail the acceptance criteria for the sludge (FPA paragraph 24). HADCO submitted this information to EPA by letter dated January 7, 2000. HADCO submitted a petition for a solid waste variance for the Owego facility on September 28, 1999.

*EPA's Responsibilities.* EPA is responsible for determining whether the petitions for conditional delisting for the New Hampshire facilities, and for a solid waste variance for the New York facility, are in accordance with the specific regulatory requirements in the CFR, and then for informing the states that HADCO's 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. Since the petition for a solid waste variance for the Owego facility has been filed, EPA is now required to review it and provide comments before a variance is granted by the State of New York.

*State Responsibilities: New Hampshire.* The sludge generated at HADCO's New Hampshire facilities is 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 State requirements in order for the NHDES to grant regulatory flexibility to HADCO's New Hampshire facilities. HADCO also can 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. NHDES is waiting for EPA to make its decision on whether the Agency will grant regulatory flexibility before reviewing the petition.

*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. HADCO submitted a petition for a variance to NYSDEC on September 28, 1999. Upon receipt of the petition, NYSDEC is authorized under state hazardous waste regulations to issue the variance if the petition meets the state's requirements.

*Next Steps.* EPA and New Hampshire will review the delisting petition to determine if the information appears to support a delisting. EPA and the state agencies will 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. On the date that this decision is placed in the Federal Register and in 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 opportunities to test and implement approaches that protect the environment and advance collaboration with stakeholders. EPA is continually identifying specific ways in which XL projects are helping to promote innovation and system change. The innovations and system changes emerging from the HADCO Corporation XL project are described below.

*Alternative Regulatory Approaches to Encourage 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 Summary

In the 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. The following table and the environmental performance section that follows summarize progress in meeting commitments described in the FPA for HADCO Corporation.

| 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. |
| **Sample Analysis** | |
| Collect quarterly sets of samples, beginning the first quarter 4-6 months after the effective date of the FPA, and continued for each following quarter until termination of the FPA. However, with EPA and state agency approval, HADCO could begin annual sampling if the samples taken during the first year fall within a limited range of variability. | Completed January 1-12, 1998.<br>Completed April 13-19, 1998.<br>Completed July 13-19, 1998.<br>Completed October 4-10, 1999.<br>Note: HADCO requested that EPA Region 1 approve a change from quarterly to annual sampling in its December 18, 1998, delisting petition to NHDES. HADCO plans to request the same from EPA Region 2 in its variance petition, which was submitted to NYSDEC on September 28, 1999. |
| 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, semivolatile organic analysis, and carbonyl compounds analysis. | Completed October 27-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; October 11, 1998. |
| Ensure each composite sample is analyzed for each parameter as specified in the FPA. | Complete. |

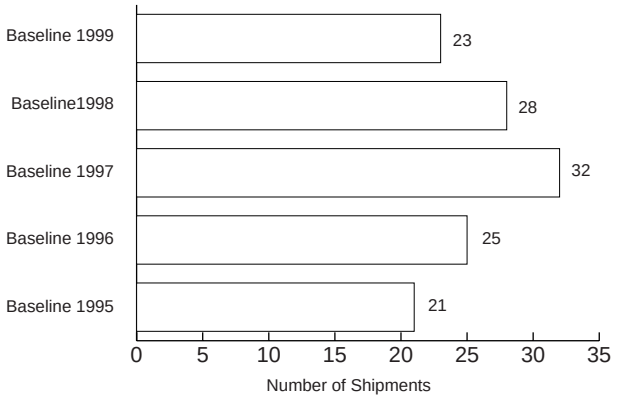
| Commitment | Status |
|---|---|
| **Petitions for Regulatory Flexibility** | |
| Demonstrate that samples do not exceed 500 parts per million (ppm) in total concentration for organic compounds, as needed. | Completed May 18, 1998. |
| HADCO Owego, New York, files variance petition. | Submitted September 28, 1999. |
| HADCO Hudson and Derry, New Hampshire, file delisting petitions. | Submitted December 18, 1998. |
| EPA will review delisting petition and determine whether the petition is complete and accepted for filing. | EPA notified HADCO of several items missing from the delisting petition by letter dated January 25, 1999. The FPA states that HADCO should submit corrections within 30 days of receipt of notification from EPA. This information was submitted January 7, 2000. |
| State of New York informs HADCO that petition is complete. | Within 30 days of receipt of the petition. |
| State of New Hampshire informs HADCO that petitions are complete. | Update on status will be available in the 1999 Annual Report. |
| EPA and state parties grant regulatory flexibility as appropriate. | 45 days after receipt of the petitions.<br>HADCO must submit to EPA and the states letters of intent, contacts, or agreements with the reclamation facilities. Relevant information was submitted to the EPA and states on January 7, 2000. |
| State and EPA authorization for regulatory flexibility for HADCO New Hampshire facilities published in Federal Register. | To be determined. |
| 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. |
| Initial report for 1995-1997 and Annual Reports for 1998 and 1999 to be submitted to EPA for HADCO New York and New Hampshire facilities. | All submitted January 7, 2000. |

# Environmental Performance

This section summarizes progress in meeting the environmental performance described in the FPA for HADCO Corporation. Once EPA and the state agencies grant regulatory flexibility to the three HADCO facilities participating in this project, 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 on the Owego plant in New York. This information is compiled in HADCO's first annual report, which was submitted to EPA and the states on January 7, 2000. This report details the efforts of the facilities to achieve the goals of 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. Whereas no regulatory relief has been provided to date, all of the data collected and submitted should be considered baseline.

***Reduction of Mobile Source Air Emissions Associated with Recycling/Disposal:*** HADCO collected data at each HADCO facility involved with this XL project on the reduction of mobile source air emissions associated with the direct recycling of F006 sludge and included this data in its annual report, which was submitted to EPA and the states on January 7, 2000. This report includes baseline data that was developed from F006 sludge shipment records from 1995 through 1999. The report also includes data analyses and estimates of additional parameters for the same time period. For the New Hampshire facilities, the analyses includes baseline information on the total number of sludge shipments, the truck and rail miles required for transporting the sludge shipments, and the total gallons of fuel consumed by those shipments. For the New York facility, the analyses includes baseline information on the truck and rail miles required for transporting the sludge shipments and the total gallons of fuel consumed by those shipments. This will assist the company in calculating the reduction of air emissions associated with recycling to determine whether the project is meeting the goal of reducing fuel usage by 75% once regulatory relief is provided. Cost savings resulting from reduced transportation or recycling under the XL project will be used to increase copper reclamation activities at the HADCO facility.

**Reduction of Number of Sludge Shipments for New Hampshire Facilities**




**Reduction of Fuel Usage Associated with Recycling**

| | New Hampshire | New York |
|---|---|---|
| Performance | To be determined | To be determined |
| Goal | Reduce by 75% | Reduce by 75% |
| Baseline 1999 | 2912 | 5252 |
| Baseline 1998 | 3544 | 3680 |
| Baseline 1997 | 4051 | 1831 |
| Baseline 1996 | 3164 | 1134 |
| Baseline 1995 | 2659 | 1134 |

*Progress*: HADCO provided baseline data on fuel usage on a statewide basis in its annual report, which was submitted to EPA and the states on January 7, 2000. Performance data 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 will be determined once regulatory relief is provided.

***Copper Dust Recycling:*** HADCO has voluntarily committed to applying all of its project-related savings to reclaiming and reducing production of its copper drilling, sawing, and edging dusts. HADCO will begin its reclamation at all three facilities within eight months of the date that each facility is officially granted regulatory flexibility by EPA and the states. HADCO describes its progress in implementing the reclamation and provides relevant data and documentation in each of its annual reports on a facility basis. The first annual report was submitted on January 7, 2000. 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.

**Percentage of Copper Dusts in Waste Stream Currently Landfilled**

| | New Hampshire | New York |
|---|---|---|
| Performance | To be determined | To be determined |
| Goal | 0% | 0% |
| Baseline 1999 | 100% | 48% |
| Baseline 1998 | 100% | 100% |
| Baseline 1997 | 100% | 100% |
| Baseline 1996 | 84% | 100% |
| Baseline 1995 | 97% | 100% |

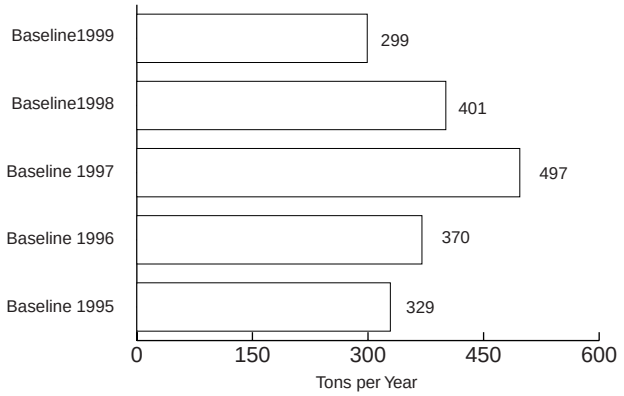
**Amount of Copper Reclaimed Under Project XL**

| | New Hampshire | New York |
|---|---|---|
| Performance | To be determined | To be determined |
| Goal | 100% | 100% |
| Baseline 1999 | 0% | 52% |
| Baseline 1998 | 0% | 0% |
| Baseline 1997 | 0% | 0% |
| Baseline 1996 | 16% | 0% |
| Baseline 1995 | 3% | 0% |

*Progress:* HADCO provided baseline data associated with implementing the reclamation in its first annual report, which was submitted to EPA and the states on January 7, 2000.

***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. Prior to this XL project, HADCO installed one sludge dryer in the Derry facility. The goal is to reduce the sludge from the New Hampshire facilities by 40% from the 1997 baseline. 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 describes the status of the sludge dryer installation and includes relevant data and documentation in its first annual report, which was submitted to EPA and the states on January 7, 2000. In future reports, HADCO will evaluate the technical and economic analyses supporting its decision to install or not install sludge dryers in the New Hampshire facilities once regulatory relief is provided.

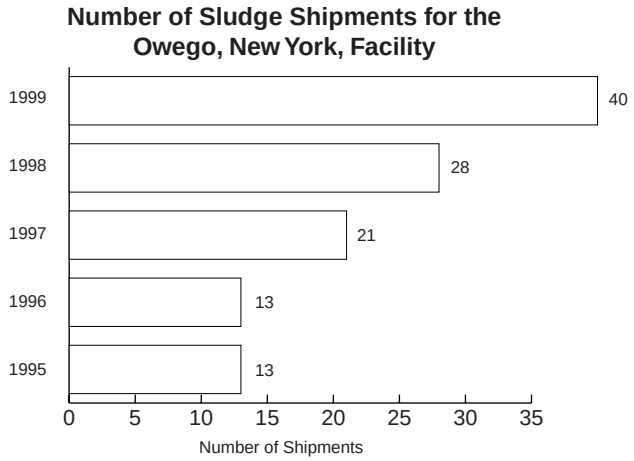
**Reduction of Sludge (in tons) with the Use of a Sludge Dryer in the New Hampshire Facilities**




*Progress:* HADCO installed one sludge dryer in its Derry, New Hampshire facility as part of a new installation.

***Pollution Prevention:*** HADCO has voluntarily committed to investigating ways it can use the cost savings generated from reducing mobile air emissions and sludge to reclaim copper dusts or improve pollution prevention efforts at its three facilities.

*Progress*: HADCO installed one sludge dryer in its Derry, New Hampshire facility as part of a new installation. HADCO will report its progress on copper dust reclamation or pollution prevention activities on a statewide basis once regulatory relief is provided.




# Stakeholder Participation

An integral part of the HADCO XL project is to involve local and national stakeholders in its development and implementation at the three participating HADCO facilities. A number of stakeholders did 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 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 New Hampshire and New York so that interested citizens could provide comments and input into the development of the XL project 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 the Atlantic States Legal Foundation in Syracuse, New York.
- Mail copies of the signed FPA and executive summaries of the subsequent annual reports to stakeholders 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

EPA will take the steps necessary to propose a conditional delisting for HADCO's New Hampshire facilities with opportunity for public notice and comment. EPA also will review and comment on any proposal by New York to grant a variance to HADCO's New York facility. If no adverse comments are received, EPA and the respective states intend to publish the action 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, Director of Health and Human Safety, HADCO Corporation, (603) 896-2424.
- Ken Marschner, NHDES, (603) 271-2943.
- Mark Moroukian, NYSDEC, (518) 485-8988.
- Larry Nadler, NYSDEC, (518) 485-8988.
- Martha Curran EPA Region 1, (617) 918-1802.
- James Sullivan, EPA Region 2, (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. EPA, HADCO Corporation, NYSDEC, NHDES, the Atlantic States Legal Foundation, and the World Resources Corporation; and (2) the FPA for the HADCO Corporation XL project. The information sources are current through December 1999.

## Glossary

Baseline: The measure by which future environmental performance can be compared.

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 double 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 the toxicity designation of a facility's waste rescinded and to subsequently exclude that waste from applicable regulations.

Electroplating Operations: Involves plating various metals onto PWBs and computer components that provide electronic interconnection.

F006 Listing: A wastewater treatment sludge produced from nonspecific electroplating processes and operations that is considered a hazardous waste under RCRA.

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

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 that is 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.

Media: Specific environments—air, water, soil—which are the subject of regulatory concern and activities.

Mobile Source: Any non-stationary source of air pollution such as from cars, trucks, motorcycles, buses, airplanes, and locomotives.

Multimedia: Several environmental media, such as air water, and land.

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 that 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 "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets 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.

Semivolatile Organic Compounds: Organic compounds that volatilize slowly at standard temperature (20 degrees C and 1 atmosphere pressure).

Sludge: A semisolid 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 semisolid 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 in wastewater.