



# Superfund At Work

## Hazardous Waste Cleanup Efforts Nationwide

### United Chrome Products Site Profile

**Site Description:**

A chrome plating plant located in an industrial park in western Oregon

**Site Size:** 2.5 acres

**Primary Contaminant:**  
Hexavalent chromium

**Potential Range of Health Risks:**

Intestinal, liver, and kidney damage from drinking contaminated water

**Nearby Population Affected:**  
42,000 within three miles

**Year Listed on NPL:** 1984

**EPA Region:** X

**State:** Oregon

**Congressional District:** 5

### Success In Brief

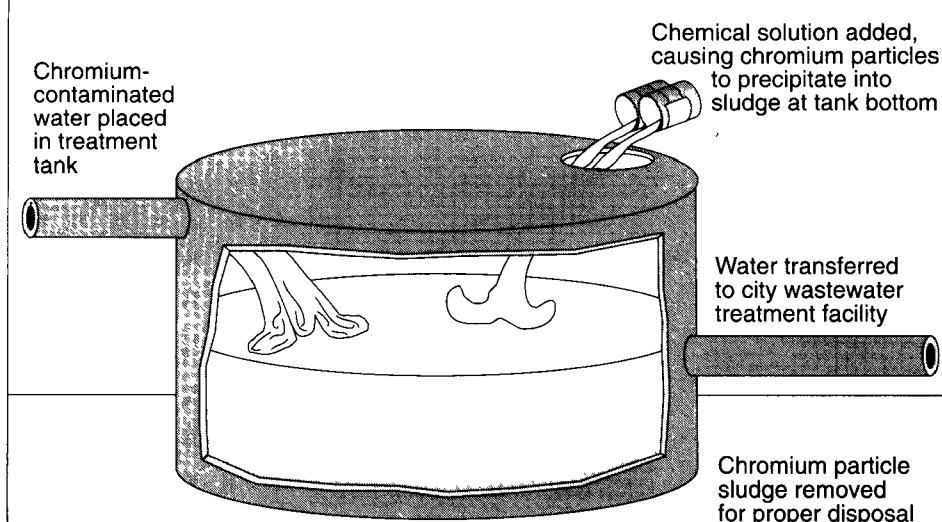
## A Chrome-Plated Success at Superfund Site in Oregon

The United Chrome Products site in Corvallis, Oregon posed a significant environmental threat until the U. S. Environmental Protection Agency (EPA) performed comprehensive cleanup actions. Under the Superfund program, EPA reduced the risk of chromium contamination to the local community and environment by:

- Removing contaminated soil, structures, tanks, and various hazardous wastes; and
- Removing 30,000 pounds of chromium from ground water, thereby reducing the level of contamination by 98 percent, and preventing any further migration.

In addition, EPA negotiated a significant cost recovery to reimburse the Superfund for \$2 million in cleanup costs and to operate on-site treatment facilities. The United Chrome Products site cleanup illustrates Superfund's ability to act quickly and to negotiate equitable settlements with private parties.

### Chrome Waste Removed from Ground Water



## The Site Today

EPA eliminated immediate threats to the surrounding community through its comprehensive cleanup efforts. Removal of the surface contaminants has prevented further migration of chromium into the ground water, while an extraction and treatment plant continues to remove chromium in the ground water.

Cleanup goals for ground water are expected to be met before 1998, when the site should be suitable for industrial use.

U.S. Environmental Protection Agency  
Region 5, Library (PL-12J)  
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Chicago, IL 60604-3590

## A Site Snapshot

The United Chrome Products site covers two and a half acres in an industrial park next to the Corvallis Municipal Airport, south of the City of Corvallis.

Approximately 42,000 people live within three miles of the site, with the closest residence just 900 feet to the northeast.

From 1956 to 1985, United Chrome Products manufactured and repaired sawmill equipment on property leased from the City of Corvallis.

**Hexavalent chromium, the form of chromium produced in plating operations, can be toxic in high concentrations**

Wastes from the hard chrome plating operations, improperly stored and disposed of for nearly thirty years, caused extensive soil

and ground water contamination.

Hexavalent chromium, the form of chromium left behind from the electroplating process, is a heavy metal which is toxic in high concentrations, and can cause liver, intestinal, and kidney problems if ingested.

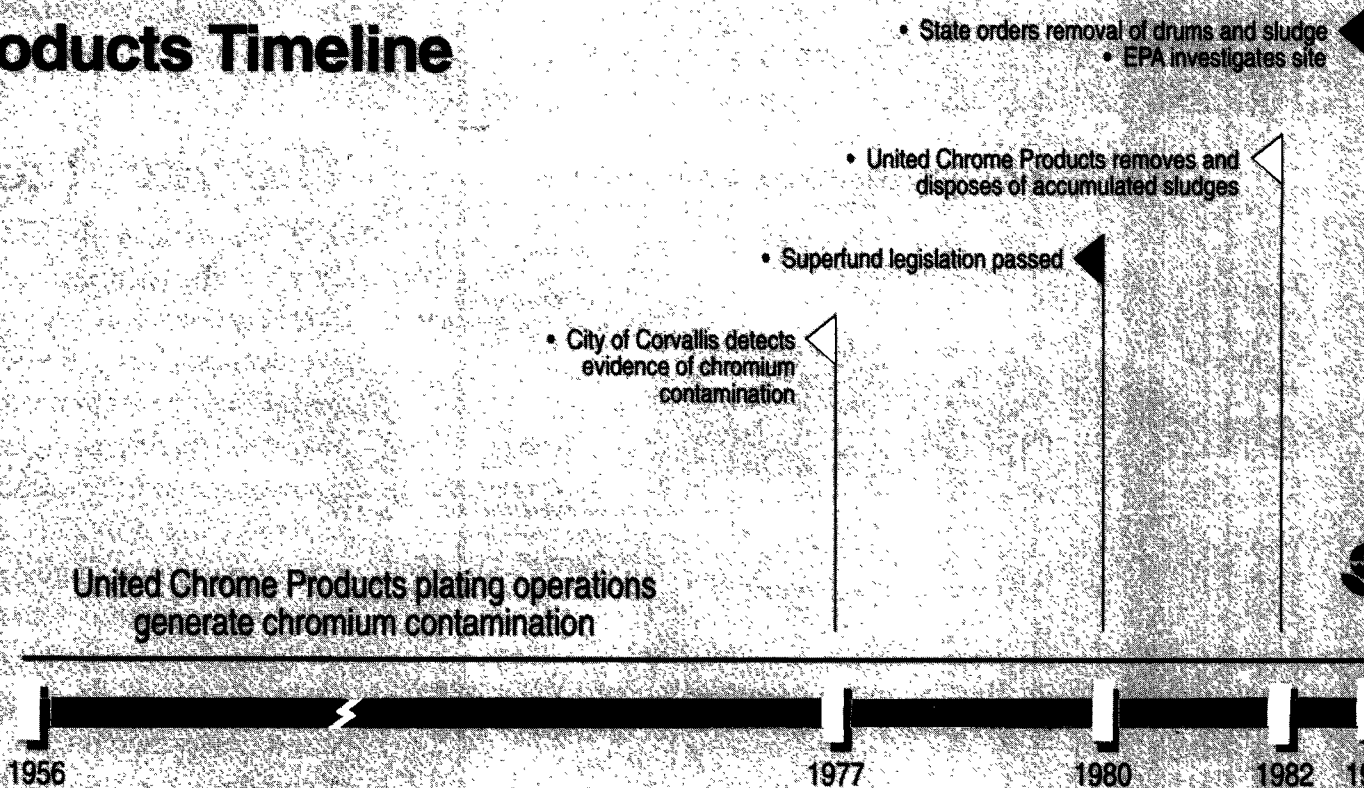
## Success From Team Effort:

### Evidence of Chromium Contamination Surfaces

In 1977, the City of Corvallis detected evidence of chromium contamination at the site. United Chrome Products admitted that between 1960 and 1977 it discharged an unknown quantity of chrome plating waste liquids and sludge into a 15-foot dry well on the property, which was a major source of the contamination.

In 1982, some of the accumulated sludges at the site were removed and disposed of under the guidance of Oregon's Department of Environmental

## United Chrome Products Timeline



# EPA, City, and State Work Together To Clean Up United Chrome Products Site

Quality (DEQ). Another cleanup took place in 1983, when DEQ ordered the company to remove and drum chrome sludges from

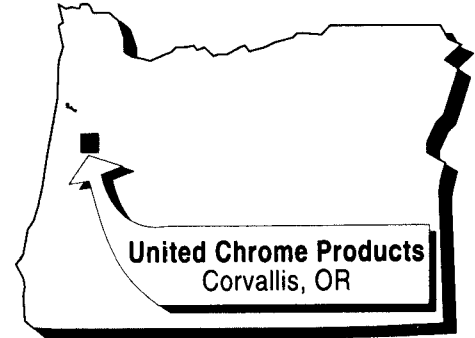
**“(A)nywhere water fell it turned yellow or orange” indicating the presence of chromium, according to a Superfund investigator**

a disposal pit and send the waste to an approved hazardous waste facility.

## Congress Enacts Superfund

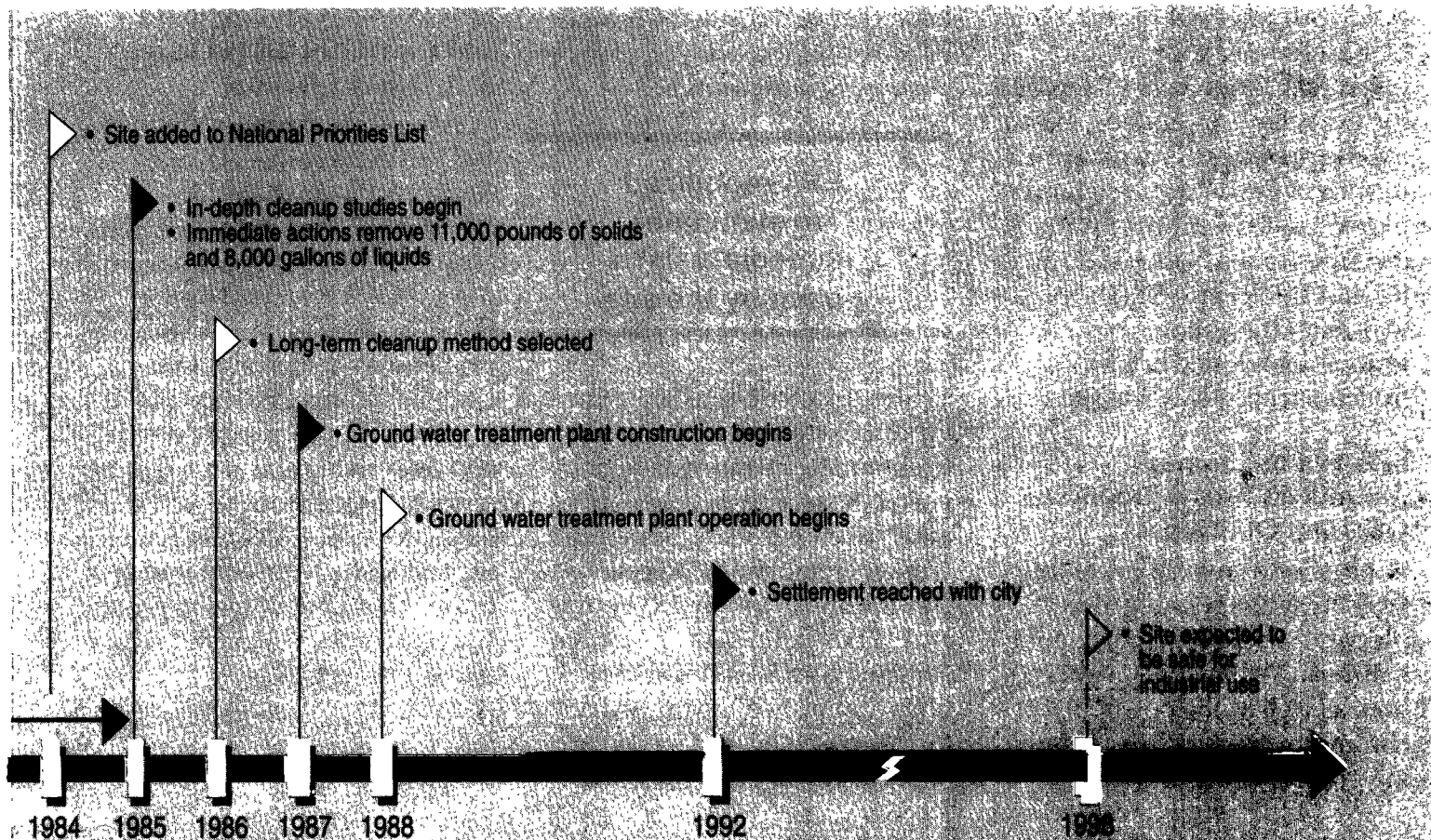
United Chrome Products was just one of hundreds of industrial problem sites that had gained national attention during the late 1970s. In 1980, Congress responded by passing legislation that created the Superfund program, empowering EPA to clean up America’s worst hazardous waste sites. In 1983, under this new program, EPA began investigating possible chromium contamination at the site.

EPA’s field investigation in late 1983 confirmed chromium contamination in the soil, surface

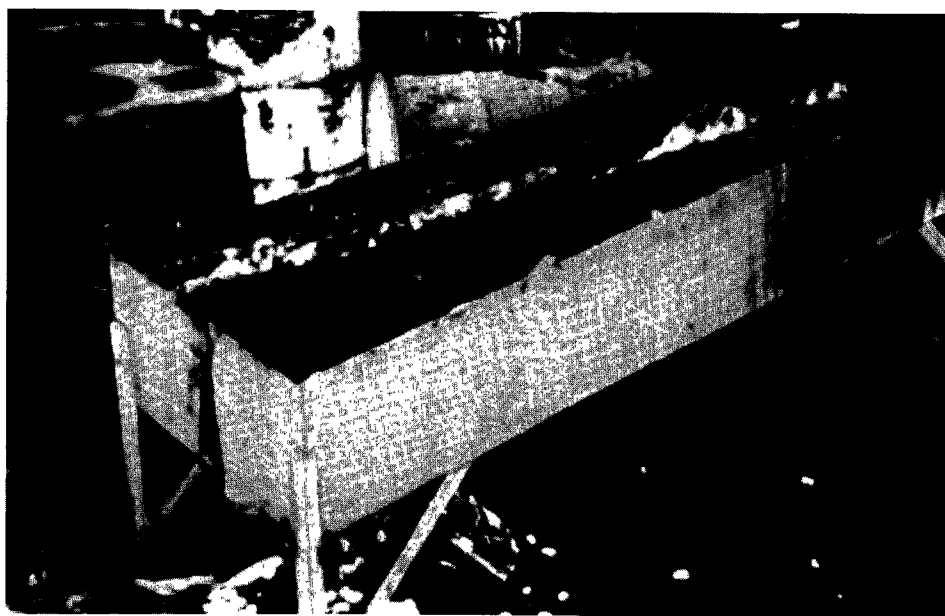


water, and shallow ground water around the plant. Chromium levels in the soil and ground water were many times higher than national safety standards permitted. While examining the

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## Agencies Work Together to Clean Up Site



**The Problem's Source** This acid washing tank from United Chrome Products shows corrosion and seepage marks, as do drums in the background. Poor handling and on-site disposal of the chemicals from the plating process led to the contamination of soil and ground water at the site.

*continued from page 3*

United Chrome Products site, investigators recorded high concentrations of chromium residue throughout the building. One Superfund investigator noted that "anywhere water fell it turned yellow or orange," indicating the presence of chromium. Results of the field investigation placed United Chrome Products on Superfund's National Priorities List (NPL) in 1984. The NPL is a roster of the nation's most serious abandoned or uncontrolled hazardous waste sites.

### **EPA Begins Cleanup As United Chrome Products Goes Out Of Business**

From November 1984 to July 1985, EPA investigated and prepared a report evaluating the nature and extent of contamination, as well as the potential for chromium reaching the underlying ground water. In January

1985, DEQ fined United Chrome Products \$6,000 for "negligent and sloppy operating practices" *Salem (Oregon) Statesman/Journal*. Later that year, United Chrome Products folded, with no plans to pay for the site cleanup.

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### **EPA mobilized to eliminate immediate risks posed by the site**

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Shortly after United Chrome Products' closure, EPA mobilized to eliminate the immediate risks posed by the site. Between July and November 1985, Superfund workers removed 8,130 gallons of chromium-contaminated liquids and 11,000 pounds of chromium-contaminated solids. These actions diminished the immediate threats posed by surface contaminants, while EPA investigators

continued their evaluation of the site to determine the necessary long-term cleanup measures.

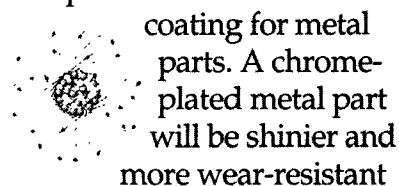
### **EPA Works With Community and Local Officials to Design Satisfactory Cleanup**

At a public forum in August 1985, EPA presented several cleanup options to the local community, the City of Corvallis, and the State of Oregon for comment. EPA's preferred option called for demolishing two heavily contaminated sections of the United Chrome Products building, and disposing of the debris and underlying soil at a hazardous waste facility. EPA would infiltrate clean water into underlying soil to flush out contamination, extract contaminated ground water, treat the water, and release it into a nearby creek.

*continued on page 6*

# Insight Into the Manufacturing Process: Chrome Plating at United Chrome

When people think of chrome, they often imagine shining hub caps, tools, and household fixtures. Chromium is used extensively in industry as a protective and decorative



coating for metal parts. A chrome-plated metal part will be shinier and more wear-resistant than an uncoated one. United Chrome carried out only industrial hard chrome plating at its Corvallis plant.

The chrome plating process is fairly simple. The metal object to be plated is placed in a tank containing a solution of water, chromic acid, and sulfuric acid.

A negative electrode is attached to the object, while a positive electrode is attached to an insoluble piece of metal also in the tank. When an electric current is run through the two metal objects, chromium contained in the chromic acid becomes positively charged and bonds to the negatively charged object in the tank – building up the chrome plate.

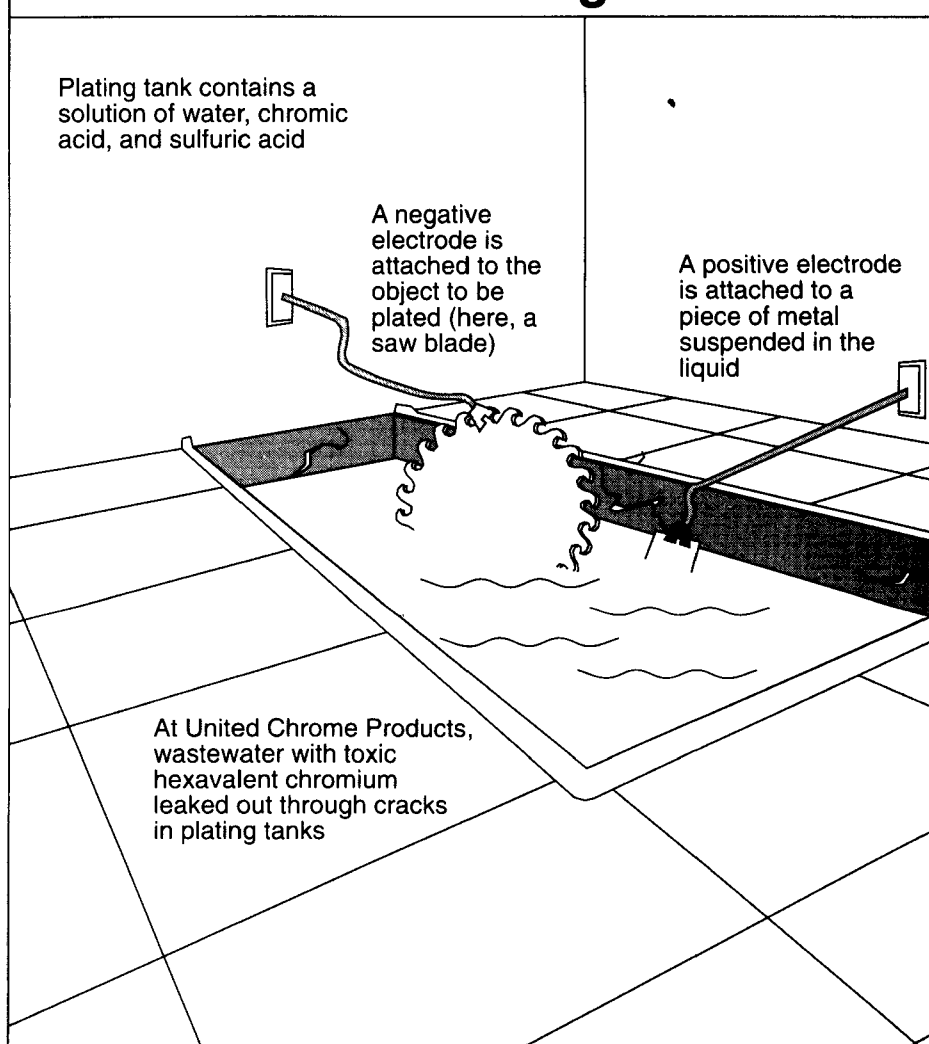
Chromium is found in nature in two common forms, hexavalent and trivalent. Hexavalent chromium ( $\text{Cr}^{+6}$ ), which causes liver, kidney, and intestinal disease if ingested over a long time period, is far more toxic than trivalent chromium ( $\text{Cr}^{+3}$ ).

Trivalent chromium is the shiny metal chrome we see coating the finished products. Toxic hexavalent chromium is a by-product of the chrome-plating process found in the wastewater left behind.

United Chrome plated parts and tools for the lumber industry. For decades, chrome leaked from their plating tanks, and liquid

wastes from their chrome-plating operations were dumped into a pit behind their plant. It was hexavalent chromium that eventually leached into the soil and underlying ground water causing extensive contamination and requiring a comprehensive, long-term cleanup.

## The Chrome Plating Process





# Agencies Work Together to Clean Up Site...

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After reviewing the proposal, city and state officials were not satisfied with the scope of EPA's preferred cleanup method. They favored a more thorough approach featuring the removal of a greater volume of soil and a more comprehensive ground water cleanup.

Local farmers also voiced concern about the plan because it would release treated water into a creek used for crop irrigation. After extensive meetings and discussions with state and city officials in September 1986, EPA agreed to perform the more comprehensive cleanup favored by the community.

Over the next year, engineers designed the cleanup system. The remaining chromium-contaminated soil would be flushed clean by percolation basins constructed on site.

The proposed ground water extraction and treatment system would pump contaminated ground water to a plant at the site. The following steps would then be taken:

- (1) contaminated water would be sent to a holding tank;
- (2) chemicals would be added to adjust the pH level and settle out the chromium;
- (3) the resulting partially treated water would be routed to the City of Corvallis wastewater treatment plant for further treatment; and
- (4) chromium sludge in the bottom of the treatment tanks would be disposed of at an approved hazardous waste site.

Extraction wells would be used to draw up water for treatment from both the shallow ground water zone and the deep aquifer.

## EPA Proceeds With Long-Term Cleanup

EPA began constructing the ground water remedy in 1987. However, the source of the contamination had to be eliminated before the ground water cleanup could be effective. Cleanup crews first decontaminated and demolished the United Chrome Products building.

Next, Superfund personnel removed over 1,000 tons of debris and heavily contaminated soil

## Superfund personnel removed about 1,000 tons of debris and heavily contaminated soil

from the former disposal pit and plating tank areas. These wastes were disposed of at a federally regulated hazardous waste facility. Between 1987 and 1988, EPA also constructed the percolation basins to flush contaminated soil, built the on-site ground water treatment plant, and installed shallow extraction wells.

Monitoring of both the shallow and deep ground water aquifers below the site revealed that contamination was more extensive than originally estimated. Superfund workers drilled several more extraction wells, covering a wider area, to address the more extensive chromium contamination. They also added water injection wells to the system.

These wells pumped clean water into deeper ground water areas to prevent contaminated



**Discolored and corroded drums** of industrial waste were found at the United Chrome Products site. As part of the cleanup, Superfund personnel removed over 1,000 tons of contaminated waste, debris and soil.

# EPA Negotiates Equitable Settlement With City

ground water from flowing from the shallow to the deeper areas. The additional wells improved the performance of the system and further reduced the risk of chromium migrating into ground water and contaminating local drinking water sources. EPA workers also rerouted a surface drainage ditch to divert drainage around the site and prevent contaminated water from flowing off site.

In addition to these cleanup measures, an alternate water supply was provided to the airport area prior to construction of the ground water cleanup system in 1987.

## Ground Water Cleanup A Success

Although the extensive chromium contamination requires a long-term cleanup, as of early 1993 the ground water treatment plant has removed approximately

## Corvallis' operation of the water treatment plant considerably reduced cleanup costs

30,000 pounds of chromium from the ground water. As a result, chromium levels have dropped significantly and the contamination has been contained.

To date, average chromium concentrations in the ground water have been reduced by 98

percent — from approximately 2,000 parts per million to approximately 36 parts per million since the plant began operating. Given the past performance of the plant, the cleanup goal of returning the deep ground water to national drinking water standards, and the shallow ground water to a level protective of the deeper water, should be met by 1998.

## Superfund Enforcement Proves Flexible and Fair

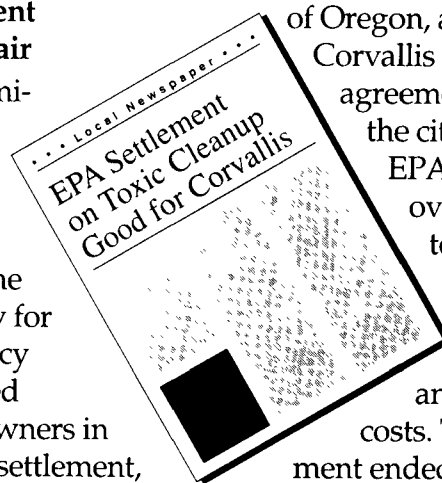
With surface contaminants removed and the ground water cleanup moving forward, EPA focused its efforts on making the responsible parties pay for the cleanup. The Agency thoroughly investigated the company and its owners in an attempt to obtain a settlement, but that was unsuccessful. This situation forced EPA to negotiate a settlement with the City of Corvallis which, as the owner of the land upon which the site is located, was also liable for the United Chrome Products cleanup.

From the outset, the city displayed a willingness to participate in the cleanup process, but consistently maintained it was not liable for the entire site cleanup. Corvallis aided the cleanup by operating the ground water extraction and treatment plant from the time it was built.

This contribution reduced cleanup costs considerably, since the city's municipal workers were able to operate the plant much more economically than a private contractor. Rather than force Corvallis to pay the entire cleanup bill, the Agency sought to negotiate an equitable settlement with the city.

In June 1992, EPA, the U.S. Department of Justice, the State of Oregon, and the City of Corvallis signed an agreement whereby the city would pay EPA \$2 million over seven years to help defray some of Superfund's investigation and cleanup costs. This agreement ended years of negotiation over who would bear the cleanup costs and alleviated the city's concerns that it would be forced to pay the entire \$8.6 million cleanup bill.

Shortly after the settlement was announced, a local newspaper declared, "EPA Settlement on Toxic Cleanup Good for Corvallis." The settlement also calls for the city to continue operating the ground water treatment plant until cleanup goals are met.



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## Community Involvement Plays Role at Site

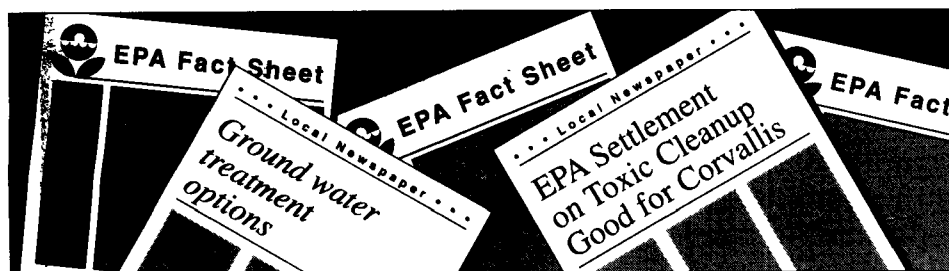
Another Superfund priority is getting the community involved at every stage of a cleanup. Throughout the cleanup process at the United Chrome Products site, EPA made every effort to keep Corvallis' residents and officials up to date on the latest site developments. Toward this end, Superfund staff provided information for numerous newspaper articles and distributed site fact sheets.

These activities were especially important during the selection of

the ground water treatment method, for which community input was considered by EPA.

Ultimately, EPA chose the cleanup option favored by city and state officials and addressed local farmers' concern about the on-site treatment plant's discharge.

This dialogue and cooperative relationship between EPA and the affected community illustrates the Agency's commitment to keeping local residents informed and involved during the cleanup process.



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## Success at United Chrome Products

EPA, working cooperatively with state and local officials, effectively eliminated the immediate risk of contamination by removing surface contaminants and providing clean drinking water.

Levels of chromium contamination in the ground water have already been reduced by 98 percent by the on-site treatment plant, and cleanup will continue until national drinking water standards are met.

Additionally, the successful cleanup of the United Chrome site illustrates Superfund's commitment to fairness when seeking to recover its cleanup costs.



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