



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 Sixth Avenue  
Seattle, Washington 98101

**RECORD OF DECISION  
DECLARATION, DECISION SUMMARY,  
AND  
RESPONSIVENESS SUMMARY  
FOR  
FINAL REMEDIAL ACTION OF GROUNDWATER  
AND SEDIMENTS OPERABLE UNIT  
TELEDYNE WAH CHANG ALBANY SUPERFUND SITE  
MILLERSBURG, ALBANY  
JUNE 10, 1994**

AR 8.2



# **DECLARATION**

## **SITE NAME AND LOCATION**

Teledyne Wah Chang Albany  
Millersburg, Linn County, Oregon

## **STATEMENT OF BASIS AND PURPOSE**

This decision document presents the selected remedial actions for the Teledyne Wah Chang Albany Site (Site or TWCA Site), in Millersburg, Linn County, Oregon, which were chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1986, 42 U.S.C. §§9601 et. seq., Pub. L. 99-499 (CERCLA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300, Published in 55 Fed. Reg. 8666, et. seq., on March 8, 1990 (NCP). This decision is based on the administrative record for the Site.

The State of Oregon concurs with the selected remedy.

## **ASSESSMENT OF THE SITE**

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

## **DESCRIPTION OF THE SELECTED REMEDY**

The remedial actions described below are the final response actions planned for the groundwater and sediments operable unit at the Site. Teledyne Wah Chang Albany is an active operating facility which primarily manufactures zirconium metal from zircon sands. The processing of the zircon sands generates sludge, waste water, residues and gases as by-products. The cleanup actions described in this ROD address the threats to groundwater and sediment posed by radionuclides, metals, polychlorinated biphenyls (PCBs), methyl isobutyl ketone (MIBK), trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, and other contaminants at the Site.

The selected remedy combines containment, source remediation, and treatment measures to reduce risks to human health and the environment posed by contaminated groundwater and sediment at the TWCA Site. The selected remedy consists of the following:

### **For Contaminated Groundwater:**

- Remediation of groundwater via groundwater extraction in the Feed Makeup area and at areas on Site where contaminant concentrations exceed lifetime cancer risk levels of  $10^{-4}$  and/or substantially exceed

noncancer HI of 1 for worker exposure. Extraction shall continue until contaminant concentrations in groundwater throughout the Site are reduced to below SDWA MCLs, non-zero MCLGs, or cancer risk levels of  $10^{-6}$  and noncancer risk HI  $< 1$  for worker exposure, or until EPA in consultation with DEQ determines that continued groundwater extraction would not be expected to result in additional cost effective reduction in contaminant concentrations at the Site. Contaminated groundwater in exceedance of SDWA MCLs, non-zero MCLs, or cancer risk levels of  $10^{-6}$  and noncancer risk HI  $> 1$  for residential use shall be prevented from migrating off the plant site, or beyond the current boundary of the groundwater contaminant plume at the Farm Ponds Area.

- Discharge of extracted groundwater to Teledyne Wah Chang Albany's wastewater treatment plant. Pretreatment of groundwater to comply with CWA requirements prior to discharge to the wastewater treatment plant.
- Treatment or removal of subsurface source material near the Feed Makeup Building on the main plant.

#### **For Contaminated Sediments:**

- Slope erosion protection consisting of a geotextile covered by riprap placed along the banks of Truax Creek to prevent contaminated fill material from entering the creek.
- Removal of approximately 3,600 cubic yards of contaminated sediments from the surface water bodies adjacent to, or flowing through the Site. Additional ecological characterization prior to removal to determine potential impacts of sediment removal to the local ecosystem and to provide mechanisms to mitigate those impacts.

#### **Site-Wide Actions:**

- Deed restrictions and institutional controls on land and groundwater use for both the main plant and Farm Ponds area. The objective of this component of the remedy is to ensure that the property and groundwater are used only for purposes appropriate to the cleanup levels achieved.
- Environmental evaluations of currently uncharacterized potential contaminant source areas, as needed to ensure achievement of groundwater RAOs. The objective of this component of the remedy is to ensure that contaminant source areas do not adversely impact the remedy.
- Long-term on-Site and off-Site groundwater, surface water, and sediment monitoring which shall include at a minimum the monitoring of on-Site



wells which are in exceedance of MCLs and non-zero MCLGs, cancer risk levels of  $10^{-6}$ , and noncancer risk HI > 1 for residential exposure.

- Review of selected remedy at least once every five years to ensure protection of human health and the environment.

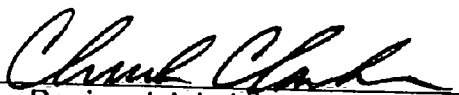
#### **STATUTORY DETERMINATIONS**

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces, toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

JUN 10 1994

Date



Regional Administrator  
Environmental Protection Agency  
Region 10

May 24, 1994

Ms. Carol Rushin  
Chief, Superfund Remedial Branch  
U.S. Environmental Protection Agency  
Mail Stop HW-113  
1200 Sixth Avenue  
Seattle, Washington 98101

RECEIVED

JUN - 1 1994

GROUNDWATER REMEDIAL BRANCH

DEPARTMENT OF  
ENVIRONMENTAL  
QUALITY

Re: Teledyne Wah Chang Albany  
Groundwater and Sediments Operable Unit  
Record of Decision

(Carol)

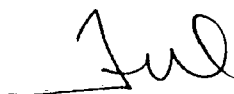
Dear Ms. Rushin:

The Oregon Department of Environmental Quality (DEQ) has reviewed the Record of Decision, dated May 1994, for the Groundwater and Sediments Operable Unit at the Teledyne Wah Chang Albany (TWCA) Superfund site. I am pleased to advise you that DEQ concurs with the remedy selected by EPA (extraction and treatment of groundwater, treatment or removal of subsurface source material, slope erosion protection and removal of contaminated sediments, and environmental evaluations of potential contamination source areas etc.). I find that this alternative is protective, and to the maximum extent practicable is cost effective, uses permanent solutions and alternative technologies, is effective and implementable. Accordingly, it satisfies the requirements of ORS 465.315, and OAR 340-122-040 and 090.

It is understood that remediation of contaminated soils at the TWCA site will be addressed in a subsequent soils operable unit Record of Decision.

If you have any questions concerning this matter, please contact Max Rosenberg of DEQ's Western Region Cleanup Group at 503-686-7838 ext. 228.

Sincerely,



Fred Hansen  
Director

PSR:  
twcarod.fh

cc: Howard Orlean, USEPA  
Thomas Miller, SRS/DEQ  
Kerri Nelson, SRS/DEQ



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DEQ-1



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## **1.0 SITE NAME AND LOCATION**

Teledyne Wah Chang Albany  
Millersburg, Oregon

## **2.0 SITE DESCRIPTION**

### **2.1 Setting**

The Teledyne Wah Chang Albany Site (Site or TWCA Site) is located in Millersburg, Oregon, an industrial-based community two miles north of downtown Albany (**Figure 2-1**). The Site is approximately 20 miles south of Salem, 65 miles south of Portland, 60 miles east of the Pacific Ocean, and adjacent to the Willamette River. Portions of the TWCA Site are within the river's 100-year and 500-year flood plains.

The TWCA plant is bounded on the east by Old Salem Road and Interstate 5 (I-5). The land east of the plant is used mainly for residential and commercial purposes. The land west of the Willamette River, which forms the western boundary of the plant, is used for agriculture. The land surrounding the Farm Ponds Area to the north of the main plant is also used for agricultural purposes.

The city of Albany had a population of approximately 29,000 in 1990; Millersburg had a population of about 700 people.

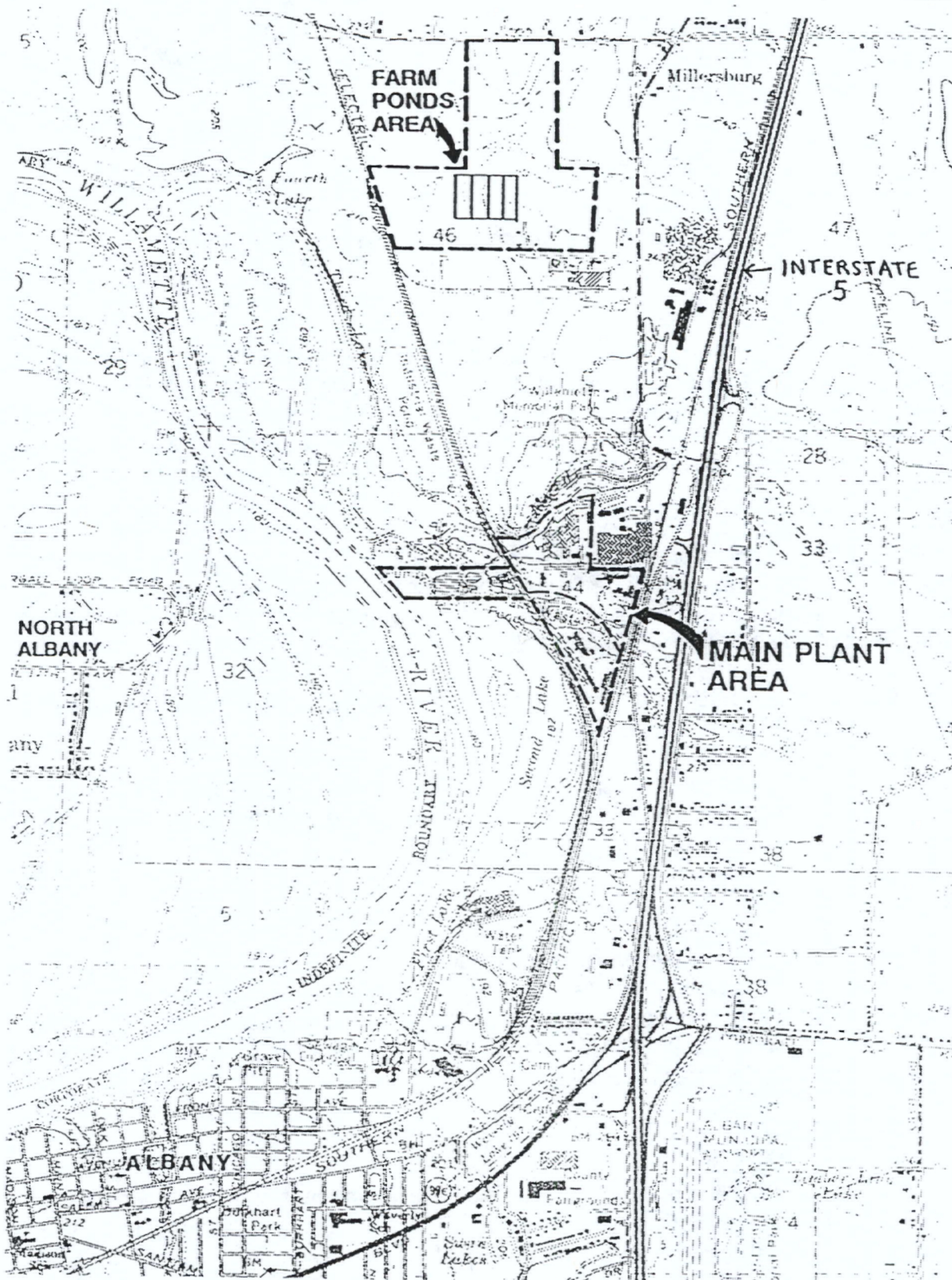
The TWCA Site is located within an area that is zoned for heavy industry. Industrial facilities closest to the TWCA Site include; a particle board plant, a resin plant, a wood flour processing plant, and a closed plywood mill.

### **2.2 Topography**

TWCA is located within the broad and relatively flat Willamette Valley which was formed by the Willamette River as it meandered back and forth between the Coast Range mountains to the west and the Cascade Mountains to the east. The ground surface in the vicinity of TWCA slopes westward towards the river with a gradient of approximately 11 feet per mile.

### **2.3 Land Use**

The TWCA Superfund site includes the 110 acre main plant and the 115 acre area known as the farm site (Farm Ponds area). The main plant is organized into the following areas; the Extraction Area (south of Truax Creek), the Fabrication Area (north of Truax Creek), and a Solids Storage Area west of the Burlington Northern Railroad. The farm site contains the plant's wastewater treatment ponds (Farm Ponds) and is located approximately 3/4 mile north of the main plant (**Figure 2-1**).



Source: USGS 1:24,000 Albany, Oregon

0 1000 2000 3000 4000 5000 FEET  
SCALE



**FIGURE 2-1  
LOCATION MAP**

TELEDYNE WAH CHANG ALBANY  
ALBANY, OREGON

CHM HILL

The Farm Ponds area includes four 2-1/2 acre solids storage ponds in addition to the Soil Amendment Area. The Soil Amendment Area has been primarily used in the past for agriculture.

### 3.0 SITE BACKGROUND AND ENFORCEMENT ACTIVITIES

#### 3.1 Site History

Operations at the TWCA Site began in 1956 when, under contract with the U.S. Atomic Energy Commission, Wah Chang Corporation reopened the U.S. Bureau of Mines Zirconium Metal Sponge Pilot Plant. Construction of new facilities, at the location of the existing plant, began in 1957. These facilities were established primarily for the production of zirconium and hafnium sponge; however, tantalum and niobium pilot facilities were also included. Melting and fabrication operations were added in 1959. TWCA was established in 1967 after Teledyne Industries, Inc., purchased the Wah Chang Corporation of New York. In 1971, the plant became a separate corporation, Teledyne Wah Chang Albany.

Beginning in 1957, waste materials from TWCA's processes were placed in unlined ponds on the facility. Examples of unlined ponds used for disposal of waste sludges and other materials in the past include Arrowhead Lake, V-2 Pond, Chlorinator Residue Pile, Magnesium Resource Recovery Pile, Schmidt Lake, and the Lower River Solids Pond (LRSP) (Figure 3-1).

From 1972 until 1978 chlorinator residues from TWCA's sand chlorinator process were placed in a separate pile north of Schmidt Lake. This practice was discontinued in 1978, when the contents of the pile were removed and transported off Site to a permitted low level radioactive waste disposal facility.

Solid residues generated during the development and operation of nonferrous metals manufacturing processes at the plant site were placed in a resource and recovery pile. The major material placed in the pile was magnesium chloride. From 1983 through 1988 TWCA recovered material from this pile to produce magnesium oxide for use in its ongoing processes.

The V-2 Pond was used for temporary storage and pretreatment of primarily hydrous metal precipitate and unreacted lime solids. The use of this pond was discontinued in 1979. The V-2 Pond was emptied in 1989 and the solids were removed to the Farm Ponds Area where they are currently stored under cover on a concrete pad awaiting approval for processing or disposal. Confirmatory soil sampling of the pond was conducted in late 1991 and early 1992. The V-2 Pond is currently being filled with gravel and soil. Purchased gravel was placed and compacted into the V-2 Pond and the remaining fill is made up of excavated materials from around the plant.

The unlined sludge ponds have attracted the attention of regulatory agencies (U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (DEQ)) and the public for many years, particularly because of the presence of



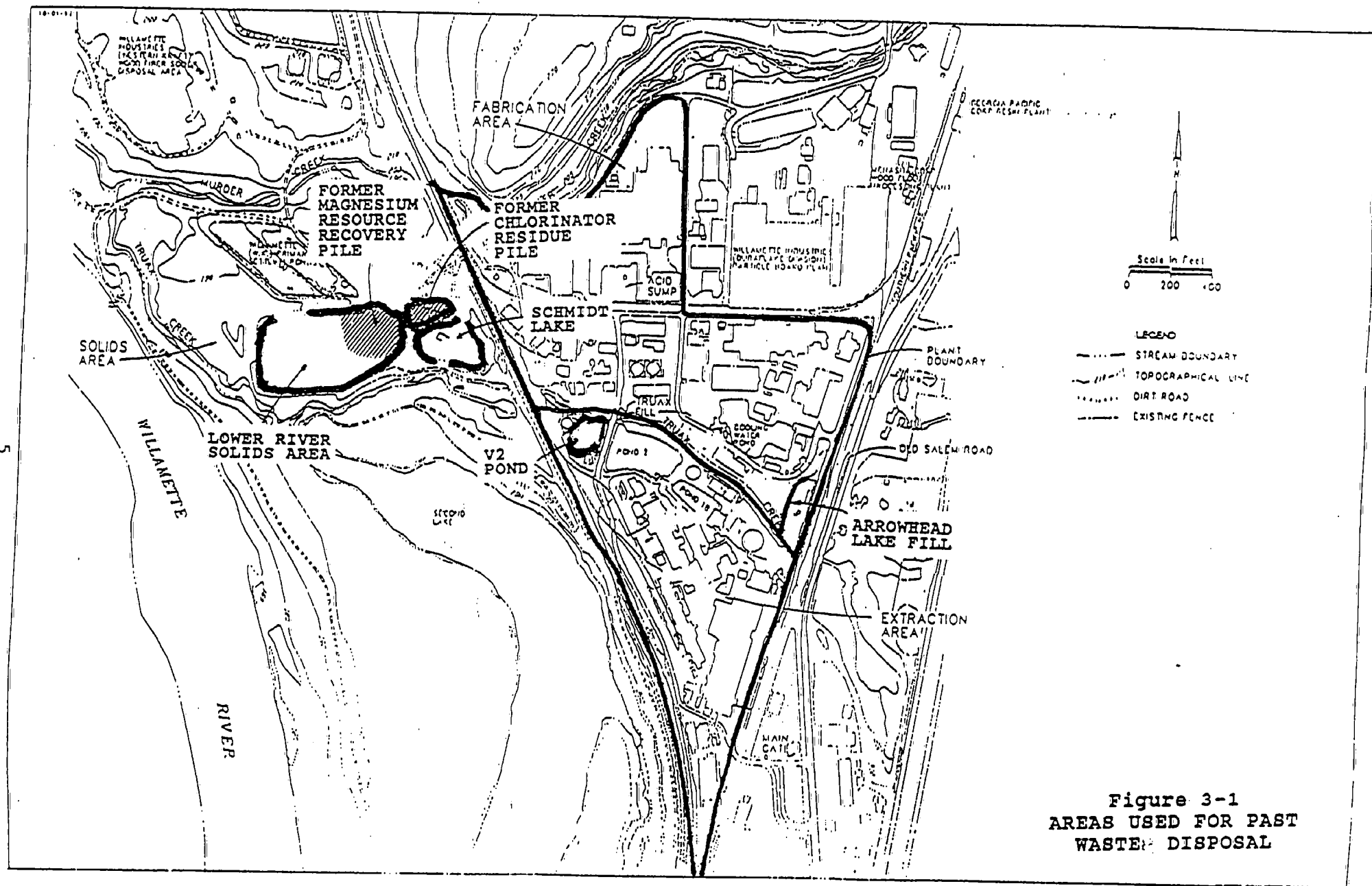


Figure 3-1  
AREAS USED FOR PAST  
WASTE DISPOSAL

radioactive materials, which was first confirmed by the Oregon State Health Division in 1977. Waste sludges (lime solids) generated prior to 1979 were contained in the LRSP, Schmidt Lake, Arrowhead Lake, and the V2 Pond. Much of the public concern has focused on the LRSP and Schmidt Lake because of their proximity to the Willamette River. A summary of the history of state and public involvement regarding the LRSP and Schmidt Lake is given below in Section 3.1.1.

Some of the solids generated prior to 1976 were used as a beneficial soil amendment on the TWCA farm site. In 1978 TWCA changed its production process which reduced the amount of radioactive materials in the lime solids. Lime solids generated after 1979 are now contained in 4 unlined ponds located in the Farm Ponds Area.

Concerns that the unlined sludge ponds were located in the Willamette River floodplain, and that hazardous materials from the sludge ponds would migrate to soil, surface water, and groundwater, led to the TWCA facility being proposed for inclusion on the National Priorities List (NPL) in December of 1982. The TWCA Site was placed on the NPL in October 1983.

### **3.1.1 Summary of State and Public Involvement Regarding the LRSP and Schmidt Lake**

- Prior to the TWCA Site being proposed for inclusion on the NPL, in June 1982, TWCA submitted an application to the Energy Facility Siting Council of the State of Oregon (EFSC) for a site certificate to remove approximately 120,000 cubic yards of sludge from the LRSP and Schmidt Lake to an area outside of the 100-year floodplain.
- After a series of public hearings, the EFSC denied TWCA's site certificate application in December 1982. This denial was in part due to public concerns regarding geologic standards for the proposed new sludge ponds location.
- TWCA appealed the decision of EFSC to the Oregon Supreme Court in February 1983.
- During the 1983 Oregon State Legislative Session, a bill was introduced which would impose new stringent geological standards on site certificates. The bill died in committee but it became a ballot measure which would be voted on by the Oregon voters.
- In November 1984, the ballot measure was passed by the Oregon voters.
- In December 1984, the Oregon Supreme Court remanded the site certificate matter back to the EFSC.

- During the 1985 Oregon State Legislative Session, a bill was introduced to lower the threshold levels of radioactivity for site certificates. This bill failed on the Oregon State Senate floor, but was introduced as a public initiative petition (ballot measure). This ballot measure was defeated by the voters in the November 1986 election.
- In March 1987, EFSC concluded that the sludges in the LRSP and Schmidt Lake were not subject to their jurisdiction.
- In May 1987, TWCA proposed a LRSP and Schmidt Lake closure plan to the Oregon State Health Division.
- In June 1987, EPA and DEQ recommended that no closure of the LRSP and Schmidt Lake be performed until after conclusion of the Superfund remedial investigation.

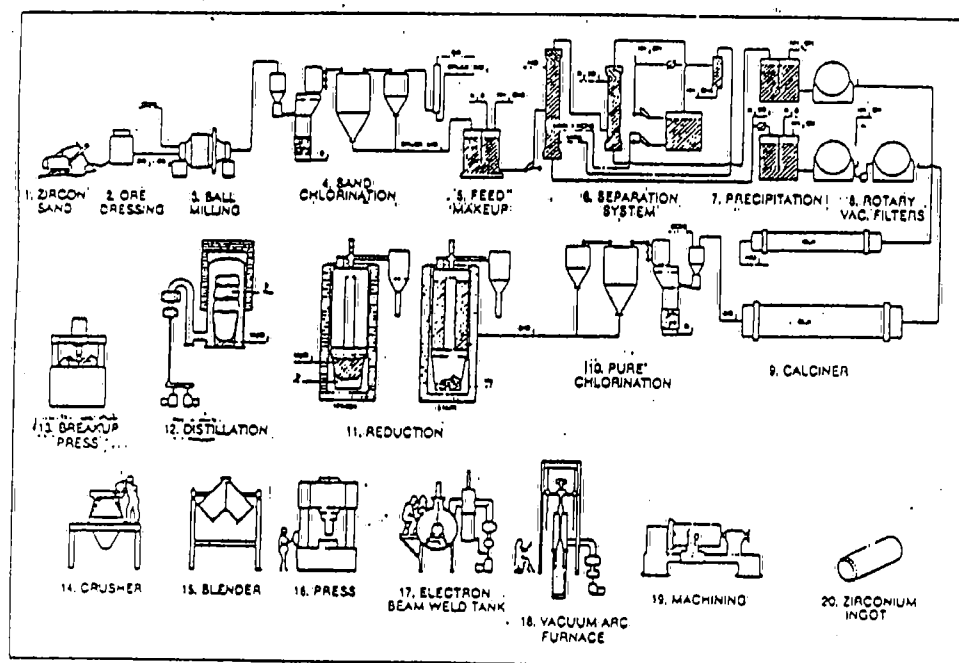
### **3.2 Plant Processes**

TWCA is an active, operating, producer of zirconium metal. Zircon sand, the principal ore, is generally imported from Australia. A schematic diagram showing TWCA's process for producing zirconium and hafnium is shown in **Figure 3-2**.

Zircon sand (zirconium orthosilicate) is concentrated by gravity, electrostatic, and magnetic methods to remove all but a small amount of impurities before being shipped to the TWCA facility. Zircon sands typically contain small amounts of radioactive elements such as uranium and thorium which are concentrated during the TWCA production process. In addition, the zircon sands will contain 1 to 5 percent hafnium which becomes a co-product with zirconium.

The zircon concentrate is combined with petroleum coke, and mixed in a ball mill before feeding to a chlorination reactor where at high temperatures the zirconium orthosilicate is converted to zirconium-hafnium tetrachloride and silicon tetrachloride. The hafnium and zirconium are separated by mixing the zirconium-hafnium tetrachloride with methyl isobutyl ketone (MIBK), containing ammonium thiocyanate. This portion of the process separates the hafnium into an organic phase and the zirconium into an aqueous phase. Hafnium is removed from the organic phase by stripping with sulfuric acid, and then it is formed into a solid by precipitation with ammonium hydroxide. The precipitate is filtered and heated to form hafnium oxide. Zirconium is removed from the aqueous phase by precipitation with sulfuric acid. The zirconium precipitate is also filtered and heated to form zirconium oxide. MIBK and ammonium thiocyanate are purified and recycled.

The zirconium and hafnium oxides follow similar paths to metal production. Zirconium oxide is mixed with petroleum coke and fed to a chlorination reactor to form zirconium



# 1. Zircon Sand ( $ZrSiO_4$ )

Zirconium is fairly common in the earth's crust, being more plentiful than some of the more familiar metals such as nickel and copper. Zircon (zirconium orthosilicate), the principal and most abundant zirconium-bearing mineral, is widely distributed throughout the world. Australia is currently the major supplier of this important mineral.

## 2. Ore Dressing

Zircon is recovered as a byproduct with rutile and limonite. Flotation, electrostatic, and magnetic processes are employed to separate these minerals.

## 3. Ball Milling

Zircon sand and stoichiometric quantities of carbon in the form of coke are mixed and ground together in a ball mill to provide an intimate mixture within a specified particle size range.

## 4. Sand Chlorination

The zircon sand/coke mixture is reacted with chlorine ( $Cl_2$ ) at about  $1200^\circ C$  to produce zirconium tetrachloride ( $ZrCl_4$ ) and silicon tetrachloride ( $SiCl_4$ ) according to the following chemical reaction:



Zirconium tetrachloride and silicon tetrachloride are subsequently separated by partial condensation of the chlorinator off-gas. Silicon tetrachloride is treated as a byproduct of the process.

## 5. Feed Makeup

Zirconium tetrachloride containing approximately two percent hafnium tetrachloride, a major impurity and a sister element of zirconium, is dissolved in water. The feed solution is adjusted to a specific concentration and filtered to remove suspended solids (fine sand and carbon). This solution is then transferred to the separation system.

## 6. Separation System

The separation system is composed of a series of extraction, stripping, and scrubbing columns which separate, via liquid-liquid extraction, the elements zirconium and hafnium. Although these sister elements are very similar chemically, they differ markedly in their nuclear properties. Zirconium acts like a window to thermal neutrons while hafnium absorbs large quantities of neutrons. Consequently, there is a need for their separation.

## 7. & 8. Precipitation and Rotary Vacuum Filters

Solutions containing hafnium and zirconium are collected in their own storage tanks and handled separately. The aqueous zirconium solution is precipitated with sulfuric acid to form a hydrous zirconium sulfate. This slurry is filtered on a rotary filter; the filter cake is reupped with aqueous ammonia to form hydrous zirconia and is filtered again to remove sulfate ions.

Hafnium precipitation is effected by the addition of ammonia to an aqueous solution of hafnium sulfate.

## 9. Calciner

Hydrous zirconia from the last wash filter is pumped to a gas-fired rotary kiln which operates at a temperature of approximately  $1000^\circ C$  ( $1832^\circ F$ ). The calcined product, zirconium oxide ( $ZrO_2$ ), is collected in containers at the discharge end of the calciner.

Hafnium is also processed through a calciner to obtain hafnium oxide ( $HfO_2$ ).

## 10. Pure Chlorination

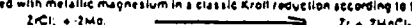
Zirconium oxide and stoichiometric quantities of carbon (coke) are intimately blended and reacted with chlorine according to the following chemical reaction:



Several impurities including aluminum, iron and titanium are reduced during this chlorination operation.

## 11. Reduction

Zirconium tetrachloride is reacted with metallic magnesium in a classic Kroll reduction according to the following chemical reaction:



Magnesium chloride ( $MgCl_2$ ) is formed as a byproduct.

## 12. Distillation

The magnesium chloride byproduct is physically removed from the Kroll reduction reaction products. The remaining zirconium regulus is loaded into a distillation furnace. Here the surplus magnesium is distilled from the zirconium metal, leaving a porous sponge-like material.

## 13. Breakup Press

The zirconium sponge regulus is broken into smaller pieces which are suitable as feed to the crushing operation. Hand grading of sponge product is performed during this operation to upgrade quality.

## 14. Crusher

Sponge is crushed from approximately four inch material down to minus three-eighths inch. Fines are rejected at this point.

## 15. Blender

Individual runs of zirconium sponge are blended together to meet production specification requirements.

## 16. Press

Zirconium sponge and alloying elements are mixed together and pressed into a 14" diameter x 3" thick compact.

## 17. Electron Beam Weld Tank

Sponge compacts and scrapblends are electron beam welded to form arc melt electrodes.

## 18. Vacuum Arc Furnace

Welded electrodes are melted into ingots (25" dia. x 13,000#) by the consumable arc melting process. Doubling melting ensures homogeneity.

## 19. Machining

Cast ingots are machined to remove surface porosity and melting anomalies.

## 20. Zirconium Ingot

Final machined ingots are then fabricated into wrought product by forging, hot rolling, cold rolling or extrusion.

FIGURE 3-2

ZIRCONIUM MANUFACTURING PROCESS

tetrachloride. Elemental magnesium is then reacted with the zirconium tetrachloride to form a sponge-like material consisting of magnesium chloride and zirconium. The magnesium chloride is physically removed from the zirconium sponge and sold as a byproduct. The zirconium sponge is consolidated into ingots by first crushing, blending and pressing the sponge into briquettes. The briquettes are then welded together with an electron beam to form an electrode which is melted and cast into homogenized ingots in a vacuum arc furnace. The cast zirconium ingots are then fabricated into numerous shapes and forms such as forgings, plate, sheet, foil, tubing, rod, and wire. The fabrication process can involve caustic cleaning, degreasing, and/or pickling.

### **3.3 Waste Management Programs**

Waste management programs at the TWCA facility include a wide range of activities because of the many processes involved in the production of zirconium, hafnium, and other metals. These activities include process wastewater treatment, lime solids storage, solid waste management, and radioactive waste management.

#### **3.3.1 Process Wastewater Treatment**

The TWCA facility's central wastewater treatment system consists of a continuous chemical precipitation and sedimentation system. Metals removal is accomplished by neutralization with lime, magnesium hydroxide, or sulfuric acid and carbon dioxide to pH 6 to 9 to form metal hydroxides and sulfates. Fluorides are removed prior to neutralization in a fluoride treatment facility which began operating in March 1989. After neutralization, the precipitated metals and lime solids are removed in a clarifier by settling. These solids, referred to as "sludge", are then piped as a slurry of two to five percent solids to the lime solids storage ponds for additional settling and dewatering. Return flow from the lime solids storage ponds is sent to the wastewater treatment system. Effluent from the wastewater treatment plant is regulated by DEQ and is currently discharged to Truax Creek under a National Pollutant Discharge Elimination System (NPDES) wastewater discharge permit.

#### **3.3.2 Lime Solids Storage ("Farm Ponds")**

Lime solids (sludge) generated from the wastewater treatment facility are presently stored in four surface impoundments located in the farm site area approximately 3/4 mile north of the main plant. These ponds were placed in operation in 1979 and are presently regulated under TWCA's existing NPDES permit.

The ponds are filled with approximately 5 to 7 feet of solids and are constructed with a soil-bentonite liner. The ponds receive a slurry of 2 to 5 percent solids from the wastewater treatment plant via a pipeline. The slurry enters the ponds on the south

end. As the water velocity slows in the ponds the solids settle to the bottom where they remain. Any removal and disposal of the solids is regulated under the NPDES permit. Solids-free liquid is decanted from the north end of the ponds and then piped back to the main plant's wastewater treatment system.

### **3.3.3 Solid Waste Management**

Solid waste management programs at TWCA have been designed to comply with the requirements of the Resource Conservation and Recovery Act (RCRA) and the Toxic Substances Control Act (TSCA). These programs include procedures for; (1) management and disposal of brand-name products and items used on the plant site, (2) management and disposal of solid wastes generated by various process operations, and, (3) management of transformers and capacitors containing polychlorinated biphenyls (PCBs).

Materials are initially delivered to a centralized area on the main plant known as the "dumpmaster" area if they are intended for transportation to and disposal at a public landfill or at a hazardous waste, treatment, storage or disposal facility. Nonhazardous material is inspected by the operator of this area to make sure it does not contain any items prohibited from disposal in a public landfill by federal and state law. **Table 3-1** lists process wastes presently generated on a routine basis at TWCA.

### **3.3.4 Radioactive Waste**

In March 1978, a Naturally Occurring Radioactive Materials (NORM) license was granted to TWCA to transfer, receive, possess and use zircon sands and industrial byproducts containing licensable concentrations of radioactive material. TWCA currently disposes of its radioactive waste material at the U.S. Ecology Low Level Radioactive Waste Site located on the Hanford Reservation in Washington and operates under the provisions set forth in the 1978 NORM license.

## **3.4 Past Remedial and Removal Activities**

### **3.4.1 Sludge Ponds Operable Unit**

The LRSP and Schmidt Lake lie adjacent to each other in the western portion of the TWCA Site, next to the east bank of the Willamette River, between Murder Creek to the north and Truax Creek to the south (**Figure 3-1**).

<b>Table 3-1 PROCESS WASTES GENERATED AT TWCA</b>			
Generating Process	Waste	Characteristic	Management Option
1. Zirconium and Hafnium Manufacturing			
a. Sand Chlorination	Sand Chlorinator Residues	Radioactive	Radioactive Waste Disposal Facility
	Sand Chlorinator Residues	Nonhazardous	Onsite Corrosive Neutralization Tank
b. Separations	MIBK Still Bottoms Uranium	Ignitable	Hazardous Waste Incinerator
	Removal Treatment System Solids	Radioactive	Radioactive Waste Disposal Site
c. Pure Chlorination	Pure Chlorinator Residues	Nonhazardous	Onsite Corrosive Neutralization Tank
	Pure Chlorination Residues	Radioactive	Radioactive Waste Disposal Facility
	Recycled Oxide Chlorinator Residue	EP Toxic (D008)	Hazardous Waste Disposal Facility
d. Reduction	MgCl <sub>2</sub> Wastes	Fire Hazard	Beneficial Use of Mg as Magnesium Hydroxide Slurry Oxidation of Metal Fines in Smokehouse
	Smokehouse Material (Nonhazardous)	Nonhazardous	Public Waste Disposal Facility
	Smokehouse Material (Hazardous)	EP Toxic (D008)	Hazardous Waste Disposal Facility
	Stainless Steel Liners	Nonhazardous	Metal Recycle Facility
2. Niobium Manufacturing	Nb Thermite Slag	EP Toxic (D005)	Hazardous Waste Disposal Facility
	FeNb Thermite Slag	Nonhazardous	Public Waste Disposal Facility

**Table 3-1  
PROCESS WASTES GENERATED AT TWCA**

Generating Process	Waste	Characteristic	Management Option
3. Vanadium Manufacturing	Thermite Slag	Nonhazardous	Public Waste Disposal Facility
4. Round Products Forming	Salt Bath Material	EP Toxic (D005)	Hazardous Waste Disposal Facility
5. Extrusion Products Forming	Rocker Lube	Nonhazardous (animal fat)	Biological Treatment Lagoon
	Honing Solids	Fire Hazard	Hazardous Waste Disposal Facility
	Al <sub>2</sub> O <sub>3</sub> Blasting Grit	Nonhazardous	Recycle or Public Disposal Facility
	Scrubber Solids (Nonhazardous)	Nonhazardous	Public Disposal Facility
	Scrubber Solids (Hazardous)	EP Toxic (D008)	Hazardous Waste Disposal Facility
6. Powder Metallurgy	Isopropyl Alcohol	Ignitable	Ignitable Waste Incinerator
	1,1,1-Trichloroethane	Toxic (F001)	Reclaimed
7. Metal Forming	Metal Grinding Solids	Fire Hazard	Hazardous Waste Disposal Facility
	Abrasive Saw Fines	Nonhazardous	Public Disposal Facility
	Metal Fines	Fire Hazard	Onsite Oxidation in Burnback System
	Burnback Material	Nonhazardous	Public Disposal Facility
8. Paint Shop and Maintenance Shop	Waste Thinners	Ignitable	Incineration
9. Analytical Laboratory	Methyl Isobutyl Ketone	Ignitable	Recycle Onsite
	1,1,1-Trichloroethane	Toxic (F001)	Reclaimed



In the summer of 1988, in order to expedite cleanup, EPA and TWCA identified the sludges in the LRSP and Schmidt Lake as a separate operable unit from the rest of the Site for the following reasons:

- a) the sludges in the unlined ponds were a likely source of groundwater contamination;
- b) the LRSP and Schmidt Lake are located in the Willamette River flood plain;
- c) the sludges in the ponds contained low levels of radioactive materials, and had been the focus of community concerns about the Site; and
- d) TWCA, in response to the community concerns wished to clean up the ponds without waiting for the full Site RI/FS to be completed.

A Record of Decision (ROD) for an Interim Response Action at the Sludge Ponds Unit was signed by EPA on December 28, 1989. The Operable Unit ROD presented the selected remedial action for the sludge ponds unit.

The major components of the selected remedy consisted of:

- Excavation and removal of the sludges from the ponds.
- Partial solidification of the sludge with a solidification agent such as Portland cement.
- Construction of a monocell at an off-site permitted solid waste facility.
- Transportation of the solidified sludge to the off-site facility and disposal in the monocell.
- Long-term operation and maintenance (O&M) of the off-site monocell.

On February 14, 1991, EPA issued a Unilateral Order (Order) to TWCA for design and implementation of the selected remedy for the operable unit. In June of 1991, construction of the off-site monocell at the Finley Buttes Landfill in Boardman, Oregon was completed. Excavation and removal of the sludges began in July of 1991 and was completed in November 1991. Approximately 100,000 cubic yards of solids (including cement) were transported to the monocell at Finley Buttes. Cover construction and grass seeding of the monocell was completed in April 1992. On June 30, 1993, EPA issued a Certification of Completion for the Sludge Ponds Operable Unit Remedial Action to TWCA.

### **3.4.2 Supplementary Removal Action at Schmidt Lake**

After removal of the lime solid wastes from Schmidt Lake in 1991 as part of the operable unit remedial action, additional follow up work included the removal of materials containing metal crucibles and zircon sand with low levels of thorium and uranium from beneath the earthen bench in the northwest corner of the sludge pond. In December 1992, 2,016 cubic yards of material were excavated and transported to the U.S. Ecology low-level radioactive waste site in Washington for disposal.

### **3.4.3 Soil Removal In Fabrication Area**

In December 1991, during the installation of a soil boring adjacent to the Emergency Services Building in the Fabrication Area of the main plant (Boring B91-5) (**Figure 3-3**), a floating nonaqueous oil layer containing 8 percent PCBs was detected. Groundwater in the vicinity of this boring contains up to 22,500 parts per billion (ppb) PCBs. Additional sampling identified an area of soil, approximately 30 feet by 30 feet, as a probable source/receptor for the PCB-contaminated oil.

In order to prevent further degradation of water quality resulting from the oil layer, in November 1992 TWCA initiated a removal action in the area. After approval by EPA, TWCA excavated approximately 230 cubic yards of PCB-contaminated soil and disposed the soil at an off-Site permitted landfill. However, the oil layer itself was not addressed and the source of the oil layer was not identified.

### **3.4.4 Groundwater Extraction In Extraction Area (Well PW-28A)**

Well PW-28A is located in the northerly portion of the Extraction Area of the main plant (**Figure 3-4**). Important features in the vicinity of this well include the zirconium-hafnium separations process building, located to the southwest of PW-28A, and feed makeup (zirconium chloride dissolving process), located to the southeast. Groundwater at this well is characterized by a very low pH (approximately 1) and elevated concentrations of inorganic and organic compounds (**Table 3-2**). The total dissolved solids (TDS) concentration is approximately 41 to 42 grams per liter (g/l) and includes elevated concentrations of radium, uranium, and thorium. The maximum total radium activity was approximately 650 picocuries per liter (pCi/l). The chemistry of the groundwater suggests that the source of the contamination is the residues of feed makeup solution that was released as a result of tank failures prior to 1979.

In 1991, a pilot test and treatability study was implemented by TWCA to determine the feasibility of extracting and treating the contaminated groundwater from Well PW-28A. Groundwater from the well was pumped to a 5,500 gallon storage tank located near the well. The water was then transported to TWCA's existing barium coprecipitation treatment facility near the Lower River Solids Pond. The metals in the water were removed (precipitated) and the pH was adjusted by treating the water with barium

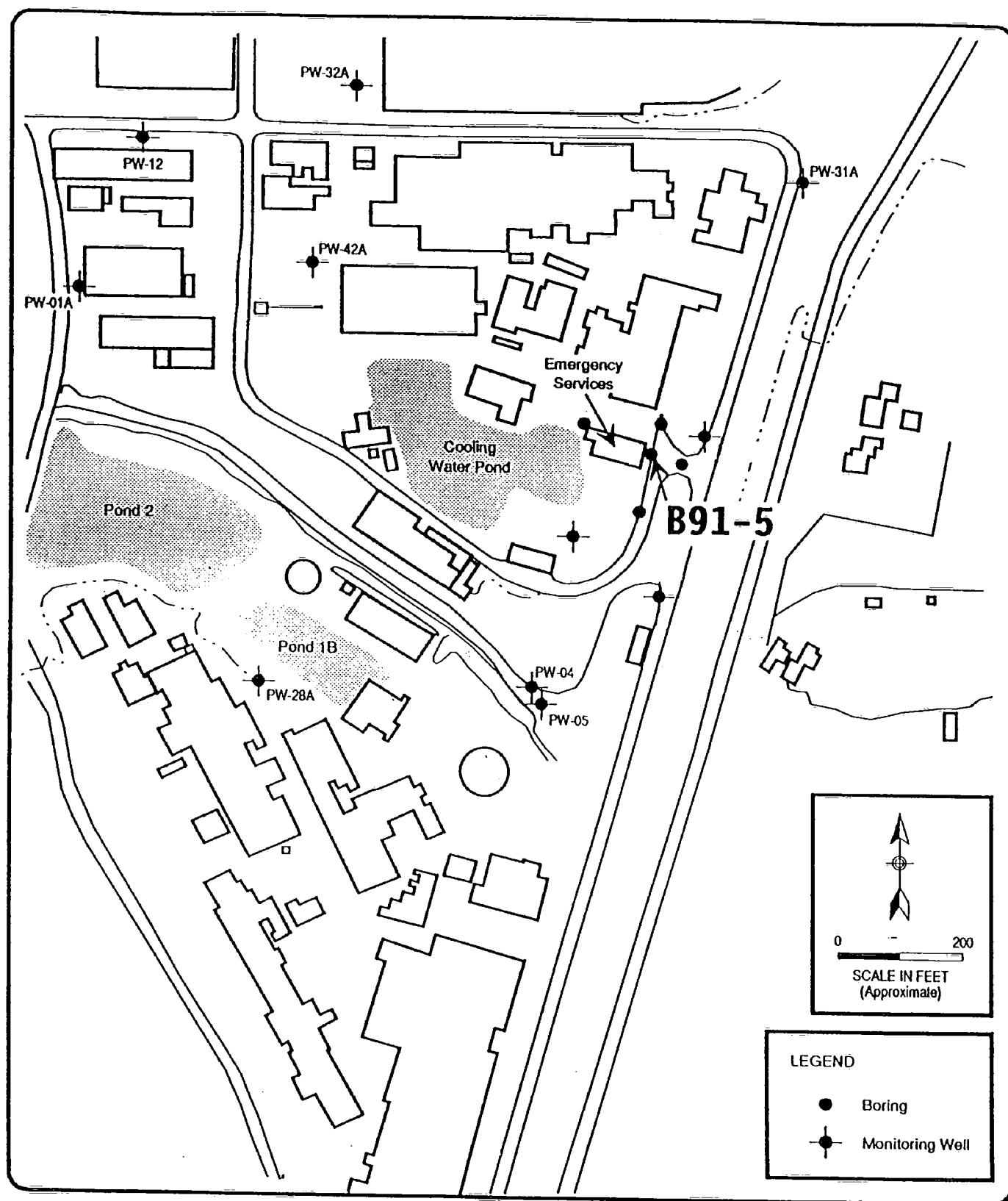
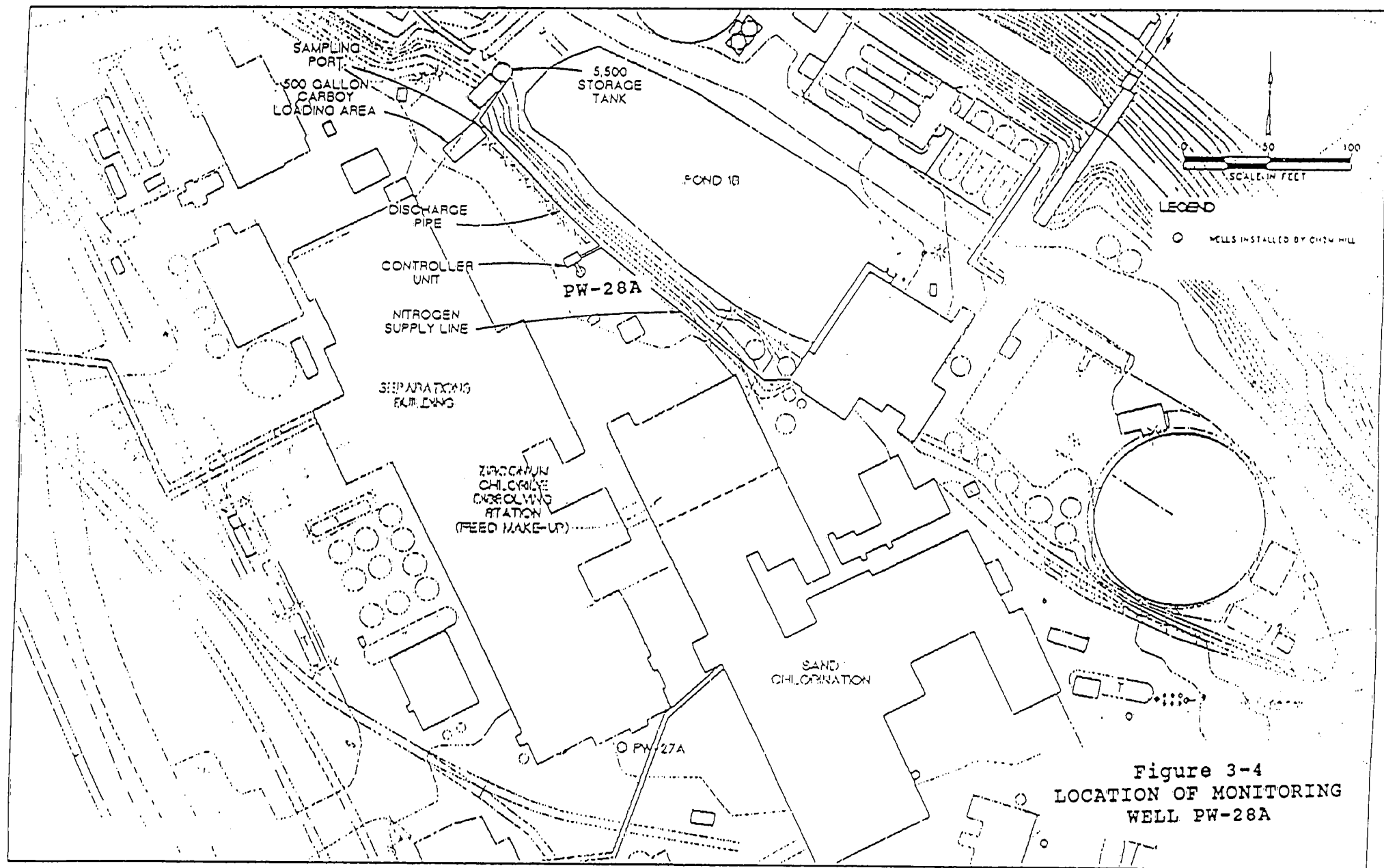


Figure 3-3

LOCATION OF BORING B91-5  
TELEDYNE WAH CHANG



**Table 3-2  
WELL PW-28A GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analyte	Round 1 (9/89)	Round 2 (4/90)	Round 3 (4-91)	Treatability Study				Background
				10/14/91	10/21/91	12/03/92	1/14/92	
VOLATILE ORGANIC COMPOUNDS (ppb)								
2-Butanone	17	36	18	42	11	9J	8J	ND
Chloroform	8	7	9	8	7	7	4J	4.81
Chloromethane	36	21	45	20	14	15	5J	ND
1,1-Dichloroethylene	7	4J	2J	ND	ND	ND	ND	4.09
Methylisobutylketone (MIBK)	120	200D	220	200	160	180	150	ND
1,1,1-Trichloroethane	60	46	29	17	9	11	2J	ND
TOTAL METALS (ppb)								
Aluminum	1,720,000	1,930,000	1,430,000	1,358,000	772,000	721,000L	884,000J	44,299
Arsenic	586K	537	399	515	130J	53.4	131L	15.8
Barium	8,160	6,570	5,740	4,840	2,740	3,660L	3,170	243
Cadmium	12J	8.4	13.8L	12.3K	7.0K	8.4	8.1	0.44
Calcium	920,000	1,030,000	899,300	809,100L	454,000L	538,000	492,000	43,960
Chromium	10,800	10,500	7,900	6,240L	4,870L	6,390	7,000	48
Copper	3,880	4,610	3,700	3,000	1,640	2,520	2,340	60
Iron	2,450,000	2,170,000K	1,226,000	1,008,000L	730,000L	946,000L	853,000	48,800
Lead	3,060K	1,920	1,500	846L	449	504L	557	41.9
Magnesium	597,000	713,000L	560,800	455,600	257,000L	321,000L	283,000	25,300
Manganese	25,700	23,400	21,100	30,600	16,400	14,400	18,500	4,450
Thorium	1,930	1,490	1,110L	623L	472	632L	8,990	50.6
Uranium	7,360	5,570	4,900	3,200L	1,870K	1,930L	1,830L	3.47

**Table 3-2**  
**WELL PW-28A GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analyte	Round 1 (9/89)	Round 2 (4/90)	Round 3 (4-91)	Treatability Study				Background
				10/14/91	10/21/91	12/03/92	1/14/92	
Zinc	2,590	2,760	2,720	2,450	1,660L	2,570L	2,800L	193
Zirconium	NA	NA	NA	3,000,000L	2,240,000L	2,275,661L	2,270,000L	NA
<b>GENERAL CHEMISTRY (ppm)</b>								
Ammonia	1,200	1,100	930	920	540	610	480	2.35a
Chloride	21,000	20,000	17,000	13,000	4,400	10,000	10,000	59.3
Sulfate	1,100	730	440	280	150	240	210	17.12
Total Dissolved Solids	41,000	42,000	29,500	15,400	14,400	16,500	11,700	392
<b>RADIONUCLIDES (pCi/L)</b>								
Radium-226	420	220	82	170	78	80	80	1.47
Radium-228	230	200	140	23	130	130	56	2.54

**Notes:**

a Value was reported as ammonium (NH<sub>4</sub>)

NA = Not analyzed

ND = Not detected

D Sample required dilution

J Estimated value below method detection limits (organic compounds)

K Biased high

L Biased low

chloride and barium sulfate. The solids generated by the barium coprecipitation process were sent to the Low Level Radioactive Disposal Area at Hanford in Washington State.

Approximately 28,400 gallons of groundwater were removed and treated. The extraction and treatment system was in operation for approximately 4 months, from October 14, 1991 to February 12, 1992. Pumping rates from the well varied from 0.1 to 1.0 gallons per minute (gpm). During the pumping period the pH averaged between 0.8 and 1.2. Groundwater samples were taken during the pumping period. Sampling results were inconclusive. Concentrations of organic compounds generally decreased during the pilot test. However, concentrations of some inorganic heavy metals such as chromium, nickel, zinc, and thorium actually increased during the test.

### **3.5 Enforcement Activities**

Since 1956 when Wah Chang took over the facility, TWCA has had a history of variance with state and federal environmental agencies. Some of the major enforcement actions pertaining to past actions undertaken pursuant to CERCLA are summarized below:

- In March of 1975, the process wastewater treatment facility was issued a NPDES permit by DEQ.
- The presence of low-grade radioactive materials in the sludge ponds at the TWCA facility was first confirmed by the Oregon State Health Department in 1977.
- In March 1978, a Naturally Occurring Radioactive Materials (NORM) license was granted to TWCA to transfer, receive, possess and use zircon sands and industrial byproducts containing licensable concentrations of radioactive material.
- In 1981, TWCA applied to the state of Oregon's Energy Facility Siting Council (EFSC) for a site certificate to close the LRSP and to store approximately 120,000 cubic yards of lime solids on Site.
- The TWCA Site was proposed for inclusion on the National Priorities List (NPL) in December 1982. In October 1983, The TWCA Site was placed on the NPL.
- TWCA was found in violation of wastewater discharge permits in 1975, 1977, and 1978; subsequent process changes reduced the toxicity of the facility's wastewater discharges. TWCA was assessed fines for other water quality permit violations in 1979, 1980, and 1989. The facility was fined for illegal open burning in 1983. In 1986, TWCA was cited for several violations of the state's

hazardous management rules.

- After several years of hearings, court actions, and sampling investigations, the EFSC ruled in 1987 that the sludge ponds were not subject to their jurisdiction, because the levels of radioactivity were too low. TWCA then submitted a closure plan for the LRSP to the Oregon State Health Division, however EPA and other agencies recommended that closure be delayed until after conclusion of a remedial investigation.
- On May 4, 1987, TWCA signed a Consent Order with EPA to conduct the Remedial Investigation/Feasibility Study (RI/FS) pursuant to Section 106 of CERCLA 42 U.S.C §9606.
- EPA Region 10 issued a Record of Decision (ROD) for an Interim Response Action for the Sludge Ponds Operable Unit on December 26, 1989.
- On February 14, 1991, EPA issued a Unilateral Order (Order) to TWCA pursuant to Section 106 of CERCLA, 42 U.S.C. §9606. This Order called for TWCA to conduct the remedial design and remedial action as set forth in the operable unit ROD.
- Based on additional information received by EPA regarding the burial of hazardous materials in or around Schmidt Lake, on February 13, 1992, EPA sent to TWCA a Request for Information pursuant to Section 104 of CERCLA 42 U.S.C. §9604 and Section 3007 of RCRA 42 U.S.C. §6927.
- In March and April of 1992, EPA's National Enforcement Investigation Center (NEIC) conducted a multi-media compliance investigation of the TWCA facility.

TWCA currently holds permits for water and air emissions. Discharge of process wastewater is regulated by DEQ through a NPDES permit. An Air Contaminant Discharge Permit regulates air emissions at the TWCA Facility. The TWCA facility is currently classified as a hazardous waste generator under the Resource Conservation and Recovery Act (RCRA) program.

#### **3.5.1 RI/FS Reports Produced by Potentially Responsible Party Under Consent Order with EPA**

- June 1991, CH2M Hill on Behalf of Teledyne Wah Chang Albany, "Remedial Investigation/Feasibility Study for Sludge Ponds Operable Unit, Teledyne Wah Chang Albany", Volumes I through III.
- March 1993, CH2M Hill on Behalf of Teledyne Wah Chang Albany, "Remedial Investigation/Feasibility Study. Teledyne Wah Chang Albany, Albany, Oregon",



including Executive Summary (Volume I), RI Report (Volume II), Baseline Risk Assessment for Human Health and Environment (Volume III), FS Report (Volume IV), A Summary of the Analytical Data for Phase 1 and Phase 2 of the RI (Volume V), and Appendices for the first four volumes (Volume VI).

- December 1993, CH2M Hill on Behalf of Teledyne Wah Chang Albany, "Addendum 1 - Radiological Survey, Remedial Investigation/Feasibility Study, Teledyne Wah Chang Albany Facility, Millersburg, Oregon", Addendum to the RI Report, Risk Assessment, and FS Report Incorporating External Gamma and Ambient Outdoor Radon Measurements.

### **3.5.2 Major Reports Produced by Teledyne Wah Chang Albany Under Unilateral Order of EPA**

- August 1991, "Remedial Action Disposal Plan for Operable Unit No. 1, Teledyne Wah Chang Albany, Volumes I and II".
- May 1993, "Remedial Action Report, Teledyne Wah Chang Albany, Lime Solids Operable Unit No. 1".

### **3.5.3 Major Reports Prepared and Issued by EPA**

- December 1989, "Record of Decision, Decision Summary and Responsiveness Summary for Interim Response Action, Teledyne Wah Chang Albany Superfund Site, Operable Unit #1 (Sludge Ponds Unit), Albany, Oregon".
- August 1992, National Enforcement Investigations Center, "Multi-Media Compliance Investigation, Teledyne Wah Chang - Albany, Millersburg, Oregon".
- August 1993, "Superfund Proposed Plan, Teledyne Wah Chang Albany, Millersburg, Oregon".

#### **4.0 COMMUNITY RELATIONS**

The Revised Draft RI/FS and the Proposed Plan for the Site were released to the public for comment on August 25, 1993. The Proposed Plan addressed remediation for contamination in groundwater and sediments, and in surface and subsurface soils. Based in part on supplemental RI/FS data received from Teledyne Wah Chang Albany on December 21, 1993, EPA determined that it would be most realistic to address remediation of the contamination in two parts. This ROD addresses contamination in groundwater and sediments as Operable Unit Two. Remediation of contamination in surface and subsurface soils will be addressed in a subsequent ROD for Operable Unit Three. The public comment period initially lasted from August 27 to September 27, 1993. Because of the large number of public comments received, and at the request of Teledyne Wah Chang Albany, the public comment period was extended until October 27, 1993. The RI/FS and supporting documentation were made available to the public in both the administrative record and information repositories maintained at the Superfund Records Center in Region 10's offices in Seattle, the Oregon Department of Environmental Quality in Portland, and the Albany Public Library. The notice of availability of the RI/FS documents was published in the "Albany Herald" in August 1993.

A public meeting was held at Linn-Benton Community College in Albany, Oregon on September 14, 1993. The meeting was attended by approximately 160 people including representatives of TWCA. At this meeting, representatives from EPA presented the results of the RI/FS and EPA's preferred remedial alternative. In addition, EPA answered questions about the preferred alternative and about contamination at the Site. Twenty-two commenters presented oral comments at the meeting. Most of the commenters expressed recognition for the value that Teledyne brought to the community as a local employer. However, rather than addressing the cleanup activities in the Proposed Plan, the majority of the comments focused on the potential economic effects that the preferred remedial alternative would have on Teledyne.

Commenters were concerned that the Proposed Plan would hinder TWCA's ability to adapt competitively in the market place, and that regulatory efforts of the environmental agencies would impose an ever increasing financial burden on TWCA with ever decreasing environmental benefits. Commenters also questioned whether the health risks associated with human exposure to contaminated groundwater at the Site were realistic as portrayed in the Proposed Plan because of the unlikely scenario of the groundwater being used for human consumption.

A transcript of the public meeting is available at the information repositories listed above. A meeting on the record was held between representatives of EPA, DEQ, and TWCA on October 15, 1993 at which time TWCA reiterated its comments on the Proposed Plan. EPA's responses to comments received at the public meeting and

during the public comment period are included in the Responsiveness Summary, which is Appendix A to this ROD.

Past EPA Region 10 community relations activities at the Site have included the following:

- December 1982 - TWCA Site proposed for inclusion on NPL: 60-day public comment period initiated.
- October 1983 - TWCA Site listed on NPL.
- February-May 1987 - Local citizens and officials interviewed in order to prepare a Community Relations Plan.
- November 1987 - Final Community Relations Plan issued.
- November 1987 - Information Repositories established at Albany Public Library, DEQ (Portland), and EPA Region 10 (Seattle).
- November 1988 - RI/FS work plan for entire facility sent out for 30-day public comment period. Work plan was placed in Information Repositories and a Fact Sheet was published.
- February 1989 - Fact Sheet published announcing EPA's approval of the final work plan.
- June 1989 - Fact Sheet published announcing that TWCA had submitted a draft RI/FS report to EPA for the Sludge Ponds Operable Unit.
- August 16, 1989 - Interim Action (Operable Unit #1) Proposed Plan published.
- August 18 - October 16, 1989 - Public comment period for the Operable Unit #1 Proposed Plan.
- September 6, 1989 - Public meeting for the Operable Unit #1 Proposed Plan was held in Albany, Oregon.
- October 11, 1990 - Fact Sheet published announcing expansion of scope of RI to include identification of potential sources of contamination. Fact Sheet also announces beginning of negotiations with TWCA for Sludge Ponds Operable Unit remedial action.
- March 5, 1991 - Fact Sheet published announcing issuance of Unilateral Order by EPA to TWCA for cleanup of Sludge Ponds Operable Unit.

- July 1991 - Local citizens and officials updated and interviewed in order to prepare a Revised Community Relations Plan.
- October 1991 - Revised Community Relations Plan issued.
- February 19, 1992 - Fact Sheet published announcing issuance of Request for Information letter by EPA to TWCA regarding the threat of a release of hazardous substances in or around Schmidt Lake. Fact Sheet also updated continuing RI investigations.
- October 29, 1992 - Fact Sheet published announcing that TWCA had submitted a draft RI/FS report to EPA for the entire Site. Fact Sheet also updates public on discovery of decayed metal drums containing zircon sand within Schmidt Lake.
- April 1, 1993 - Fact Sheet published announcing removal of decayed metal drums and approximately 2,100 cubic yards of contaminated sands from Schmidt Lake.
- August 25, 1993 - Proposed Plan for entire Site Superfund cleanup published.
- August 27-October 27, 1993 - Public comment period for Proposed Plan.
- September 14, 1993 - Public meeting to take comments and answer questions regarding the Proposed Plan held in Albany, Oregon.
- October 15, 1993 - EPA meets with TWCA to discuss TWCA's objections to Proposed Plan.
- October 22, 1993 - Fact Sheet published updating public on public comment period and Proposed Plan.

## **5.0 SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY**

As with many Superfund sites, the problems at the TWCA Site are complex. TWCA is an active facility with ongoing operations. As a result, EPA organized the Superfund work into three operable units (OUs). These are:

- OU One: The sludges in the LRSP and Schmidt Lake.
- OU Two: Contamination in the groundwater and sediments.
- OU Three: Contamination in surface and subsurface soils.

EPA has already selected a remedy for OU One in a ROD signed on December 28, 1989. The selected remedy for OU One has resulted in removal and off-Site disposal of contaminated sludges from the LRSP and Schmidt Lake. This remedial action was completed in June 1993.

Remediation of contaminated soil at the TWCA Site will be addressed in the subsequent third operable unit ROD.

The second OU, the subject of this ROD, addresses the contamination in groundwater and sediment at the Site. The remedial actions described in this ROD are designed to deal with sources of groundwater and sediment contamination, as well as identified contamination in groundwater and sediment at the facility which has been caused by past practices.

Groundwater beneath the TWCA Site is contaminated with metals, volatile organic compounds (VOCs), PCBs, and radionuclides. Groundwater beneath some areas of the Site is very acidic. Groundwater monitoring wells near the boundary of the Site are contaminated with VOCs. Modifications of the general groundwater flow direction due to interference from man-made structures on the facility may cause localized off-Site migration of contaminated groundwater.

Sediments in surface water bodies within and adjacent to the TWCA Site are contaminated with PCBs and HCB.

The remedial actions presented in this ROD will address the presently known threats to human health and the environment posed by contaminated groundwater, and sediment at the TWCA Site.

## **6.0 SITE CHARACTERISTICS**

The TWCA RI was conducted in two phases. Phase I was designed to determine whether contamination existed in groundwater along the perimeter of the facility. Phase II was designed to locate and investigate potential sources of contamination at the facility. In recognition of TWCA's concerns, EPA agreed that the scope of the RI/FS could be designed so as not to interfere with ongoing operations at the facility. Concerns regarding the potential adverse impact of the RI/FS on TWCA's ability to remain in operation, were also a factor in EPA's agreement at the time of scoping of the RI/FS that TWCA could forego sampling of areas beneath certain active ponds, and existing buildings and structures at the facility, at that time. It was recognized that, should there be contaminated areas beneath those unsampled areas, those areas could potentially serve as additional contaminant sources that could continue to undermine the effectiveness of the remedial action. Because of the potential for those contaminant sources to adversely impact the effectiveness of the remedy, determination of the nature and extent of possible contamination in these unsampled areas must necessarily take place at some point in the future. EPA has determined that this can best be done through integration of such sampling into the normal ongoing operational activities at the TWCA facility as described in the section entitled "Deed Restrictions and Institutional Controls" which is Section 10.3.1 of this ROD.

### **6.1 Geology and Soils**

The geology beneath the TWCA Site is typified by a stratigraphic column common to much of Oregon's central Willamette Valley. The column consists of five stratigraphic units which in order of youngest to oldest are; recent alluvium, Willamette Silt, Linn Gravel, Blue Clay (present in stratigraphic lows of the Spencer Formation), and Spencer Formation. A geologic cross section showing these units beneath the Solids Area is shown in **Figure 6-1**. Engineered fill is also present in many locations within the main plant area. The stratigraphic column at the Farm Ponds Area consists of Willamette Silt (brown silt and basal gray clay), Linn Gravel, and Blue Clay.

### **6.2 Hydrogeology**

#### **6.2.1 Main Plant**

Under the main plant, the Linn Gravel is the major water-bearing unit. The Linn Gravel is laterally continuous beneath TWCA and is recognized as the aquifer for groundwater supply in the Albany area. Groundwater beneath the main plant generally flows westerly towards the Willamette River, but it is also greatly influenced by Truax and Murder Creeks, and possibly by the man-made structures at the main plant.

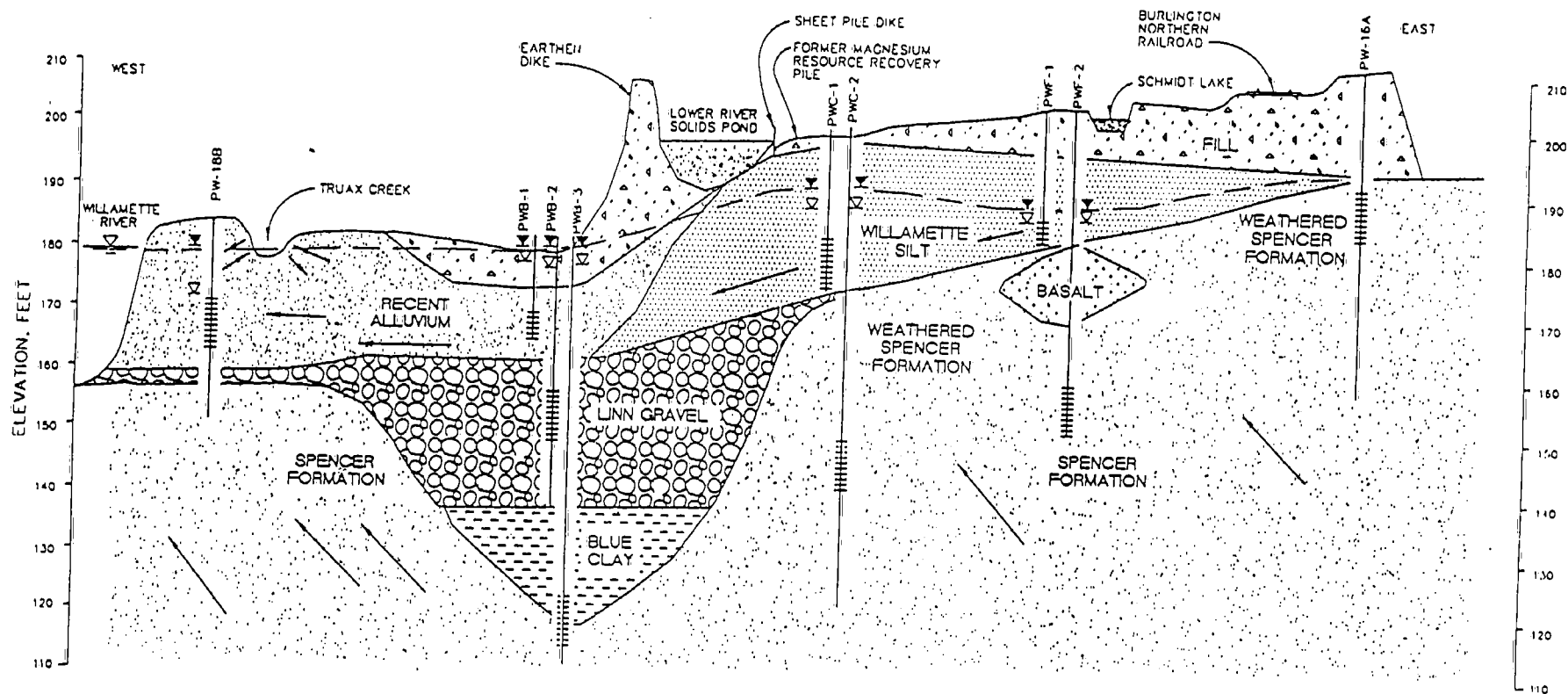


Figure 6-1  
Conceptual Hydrogeologic Model

Man-made features which can influence groundwater movement include Ponds 1B and 2, and the Cooling Water Pond in the vicinity of well PW-28A (**Figure 3-4**). Off Site, the primary settling ponds used by Willamette Industries can locally influence groundwater flow.

The Spencer Formation, which underlies the Linn Gravel, has little water-bearing capacity and is considered an aquitard beneath the Site. The Blue Clay is also considered an aquitard where it is present. A schematic cross section of the area across the main plant (Extraction Area) is shown in **Figure 6-2**.

### **6.2.2 Farm Ponds**

The Linn Gravel constitutes the deep aquifer beneath the Farm Ponds Area. The Willamette Silt overlying the Linn Gravel comprises the shallow saturated unit. Beneath the ponds, groundwater flows in a westerly direction. Groundwater is mounded in the Willamette Silt beneath and adjacent to the ponds due to the higher hydraulic head caused by the liquid within the ponds. The Blue Clay underlying the Linn Gravel is considered to be an aquitard. The Willamette Silt (gray clay), which overlies the Linn Gravel and is beneath the water-bearing Willamette Silt, is also considered an aquitard. A hydrogeologic cross section of the Farm Ponds Area is shown in **Figure 6-3**.

## **6.3 Extent of Contamination**

For purposes of the RI, the TWCA Site was divided into five areas, termed "remedial sectors". The remedial sectors, which are shown in **Figure 6-4**, include; (1) the Farm Ponds Area, (2) the Extraction Area, (3) the Fabrication Area, (4) the Solids Area, and (5) the Surface Water Remedial Sector. Groundwater and sediment contamination, as applicable, will be discussed below for each of these remedial sectors. In addition, sources of groundwater or sediment contamination are identified, where applicable.

### **6.3.1 Farm Ponds Area**

The Farm Ponds Area is located approximately 3/4 mile north of the main plant, and contains four 2-1/2-acre solids storage ponds (**Figure 6-5**). These ponds receive lime solids waste generated in TWCA's industrial wastewater treatment plant. The ponds are constructed with a soil-bentonite liner. The ponds have been operational since 1979, and are regulated under the National Pollutant Discharge Elimination System (NPDES) program.

The lime solids are similar in composition to the sludges that were placed in the LRSP and Schmidt Lake prior to 1979. However, the Farm Ponds solids have a lower concentration of radionuclides.



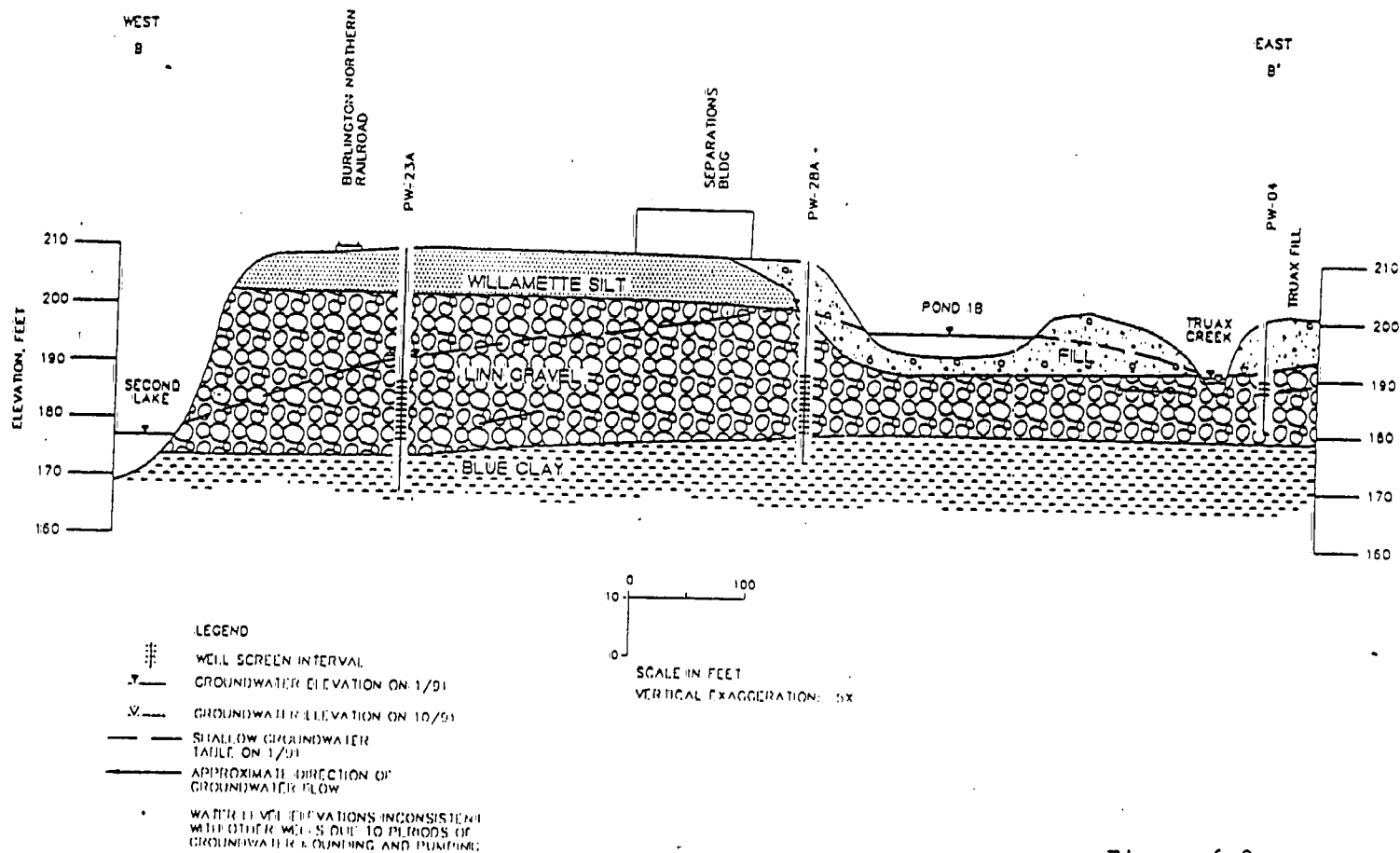
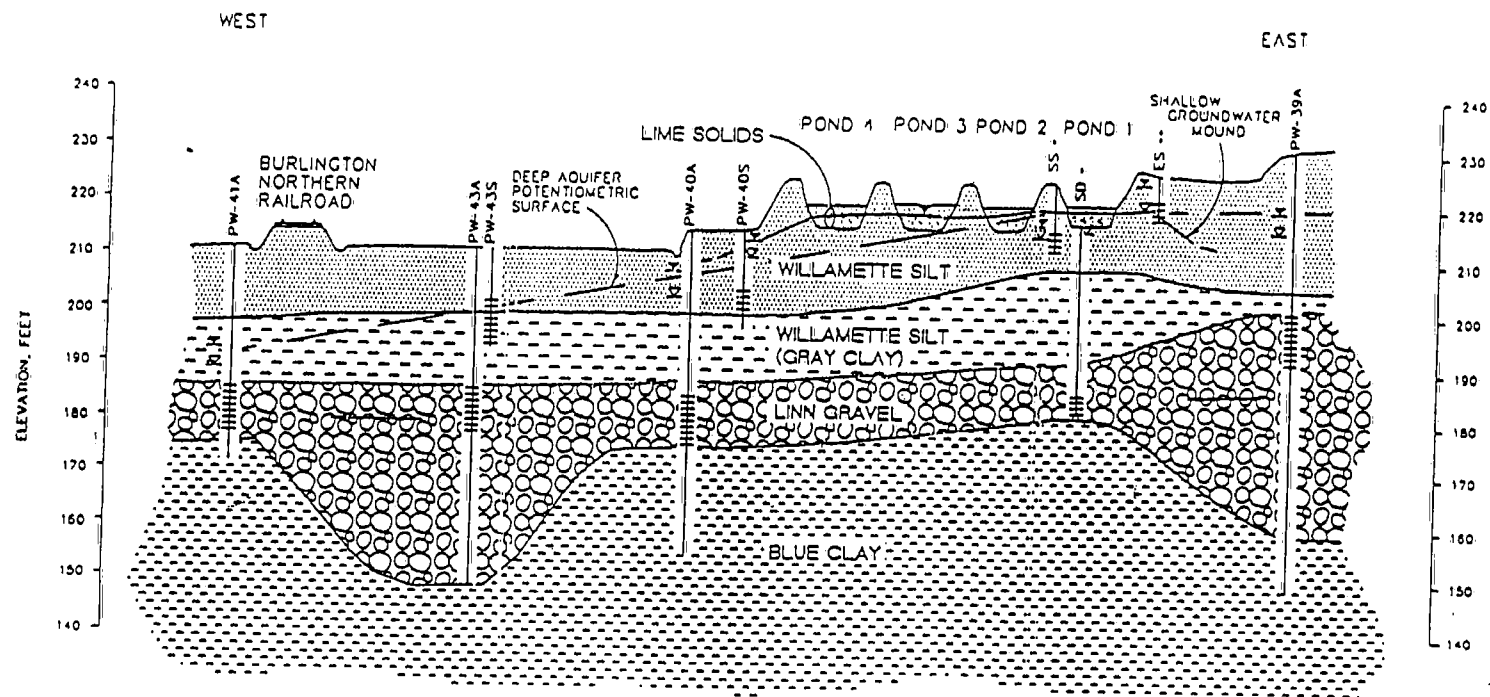


Figure 6-2  
Main Plant Area  
Conceptual Hydrogeologic  
Cross Section



#### LEGEND

- ||||| WELL SCREEN INTERVAL
- GROUNDWATER ELEVATION ON 1/90
- GROUNDWATER ELEVATION ON 5/89
- LOCATED ON PERIMETER OF POND
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- .. ABANDONED, NOT SHOWN IN FIGURE 2-2.

#### NOTES:

1. LOCATIONS SS, SD, AND ES SHOWN IN ORTHOGRAPHIC PERSPECTIVE.
2. SURFACE ELEVATIONS FROM TOPOGRAPHIC MAPS AND SURVEY DATA.



SCALE IN FEET  
VERTICAL EXAGGERATION = 20X

Figure 6-3  
Farm Ponds Area  
Conceptual Hydrogeologic  
Cross Section

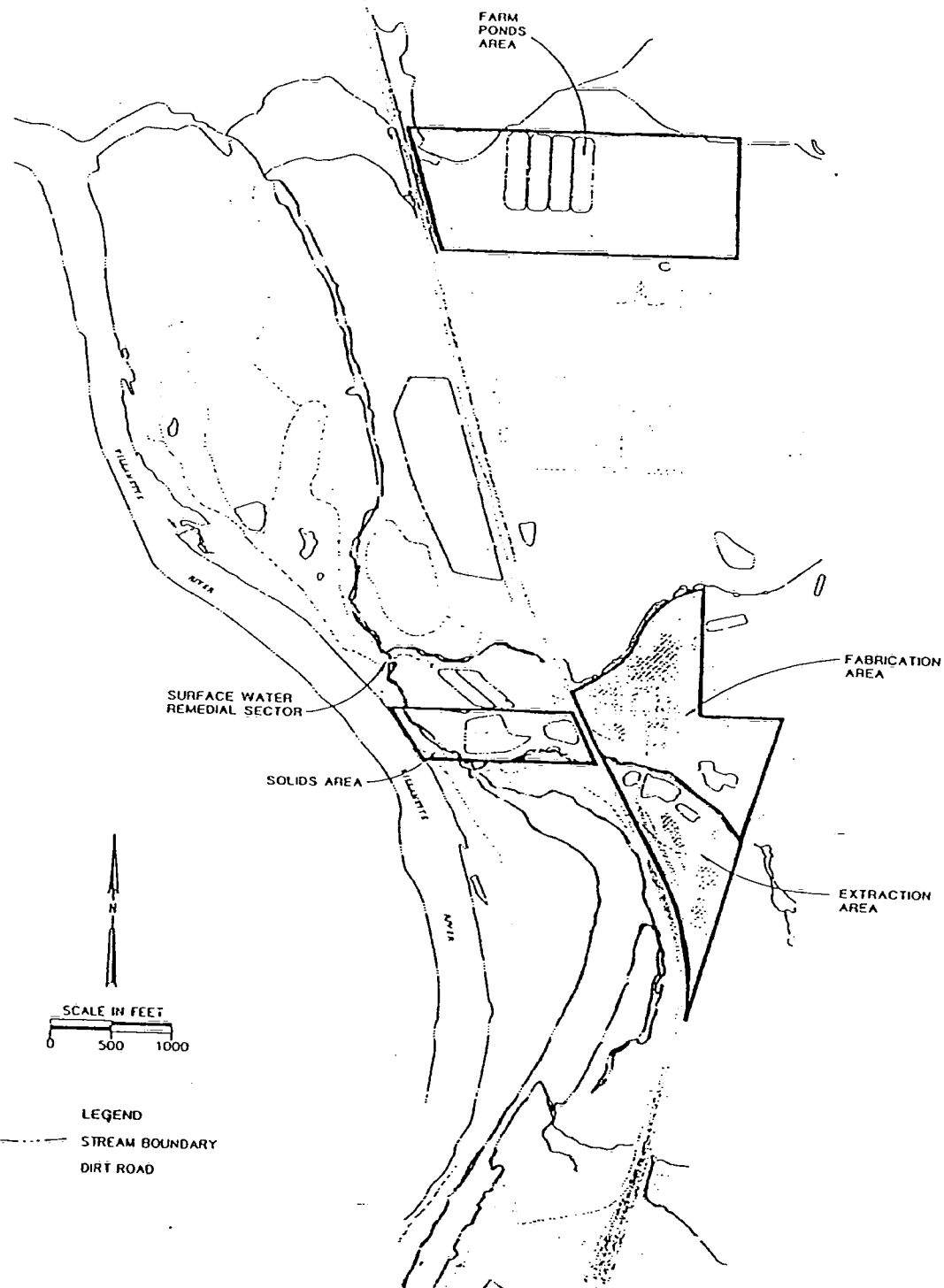
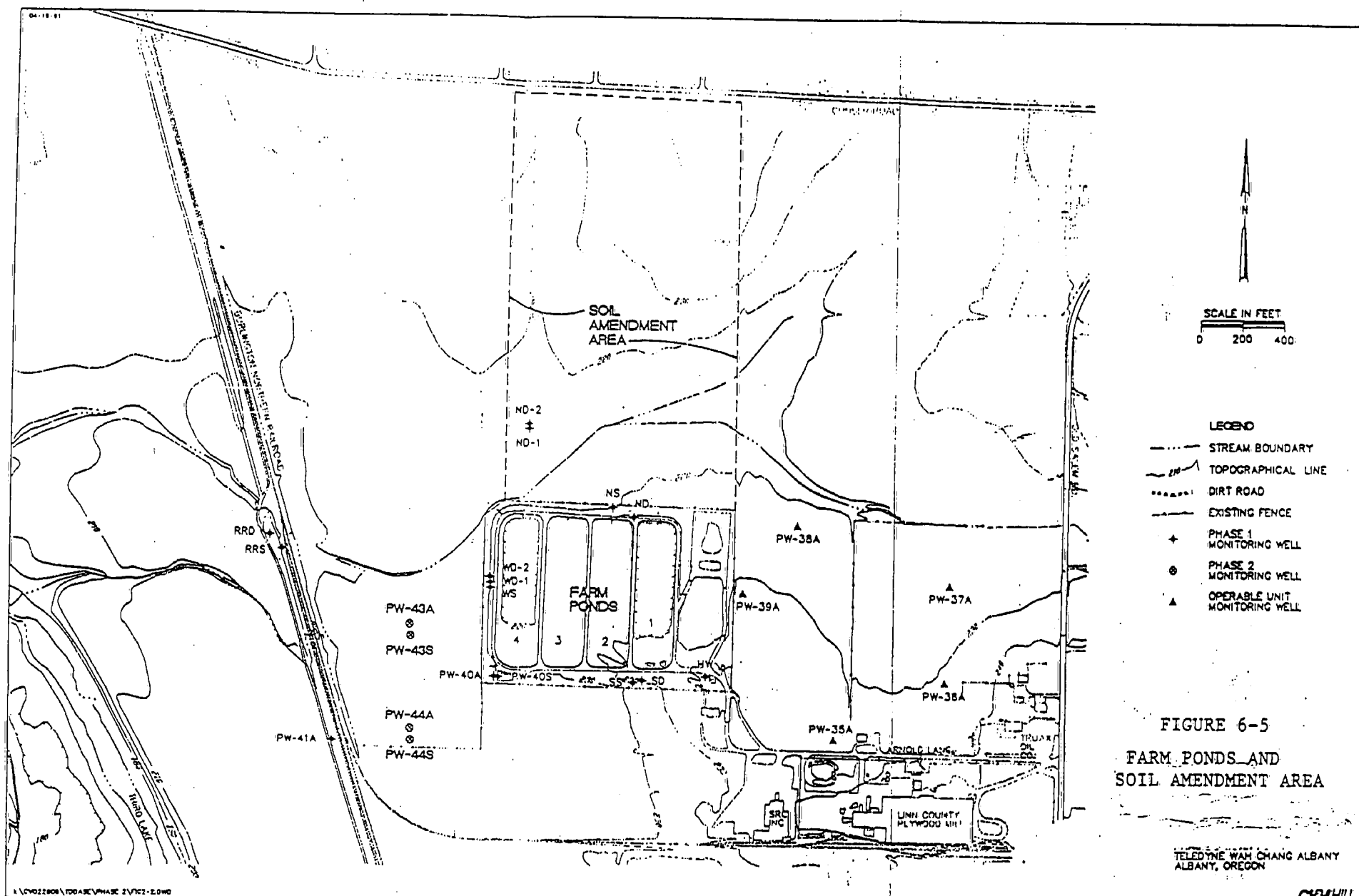


Figure 6-4  
REMEDIAL SECTORS



TELEDYNE WAM CHANG ALBANY,  
ALBANY, OREGON

CDM HILL

The soil amendment area is a 47.8-acre tract located directly north of the Farm Ponds (**Figure 6-5**). In 1975 and 1976, TWCA obtained solid waste permits from DEQ to use solids from the primary wastewater treatment plant experimentally as a soil amendment. These solids were applied once in 1976. The solids were similar in composition to that of the LRSP and Schmidt Lake and probably contained low-level metals, radionuclides, and organic compounds.

#### **6.3.1.1 Groundwater Contamination at the Farm Ponds Remedial Sector**

Shallow groundwater in the Willamette Silt and deeper groundwater in the Linn Gravel downgradient of the Farm Ponds (southwest) contains VOCs including tetrachloroethene (PCE), and vinyl chloride (**Table 6-1**). These contaminants may be coming from pond water which contains less than 1 mg/l of total VOCs and is thought to be leaking through the Farm Ponds clay liner.

Groundwater in the shallow saturated unit to the south, southwest, and west of the Farm Ponds contains elevated concentrations of 1,1-dichloroethylene, tetrachloroethylene, vinyl chloride, radium, thorium, magnesium, and thallium (**Table 6-1**).

#### **6.3.2 Extraction Area**

The Extraction Area comprises the southern portion of the main plant. Its location is shown in **Figure 6-4**. The RI identified five potential contaminant source areas within the Extraction Area: the Feed Makeup area, the chemical unloading area, the V2 Pond, the Spill Treatment Plant, and the southern Extraction Area. Potential sources of contamination in the Extraction and Fabrication Areas of the main plant are shown in **Figure 6-6**.

##### **6.3.2.1 Groundwater Contamination at the Extraction Area**

Groundwater around the Feed Makeup Building (Well PW-28A) is heavily acidic (pH = 1) and is heavily contaminated with metals, uranium, thorium, radionuclides, ammonia, chloride, and sulfates (**Table 3-2**). TWCA process operations at the Feed Makeup Building includes the dissolving of zirconium tetrachloride containing approximately 2 percent hafnium tetrachloride in water. The resulting feed solution is transferred to the separations systems via underground pipes. The RI/FS has identified the probable source of groundwater contamination in this area as being past tank failures and leaks or spills from the feed solution tanks and underground transfer pipes.

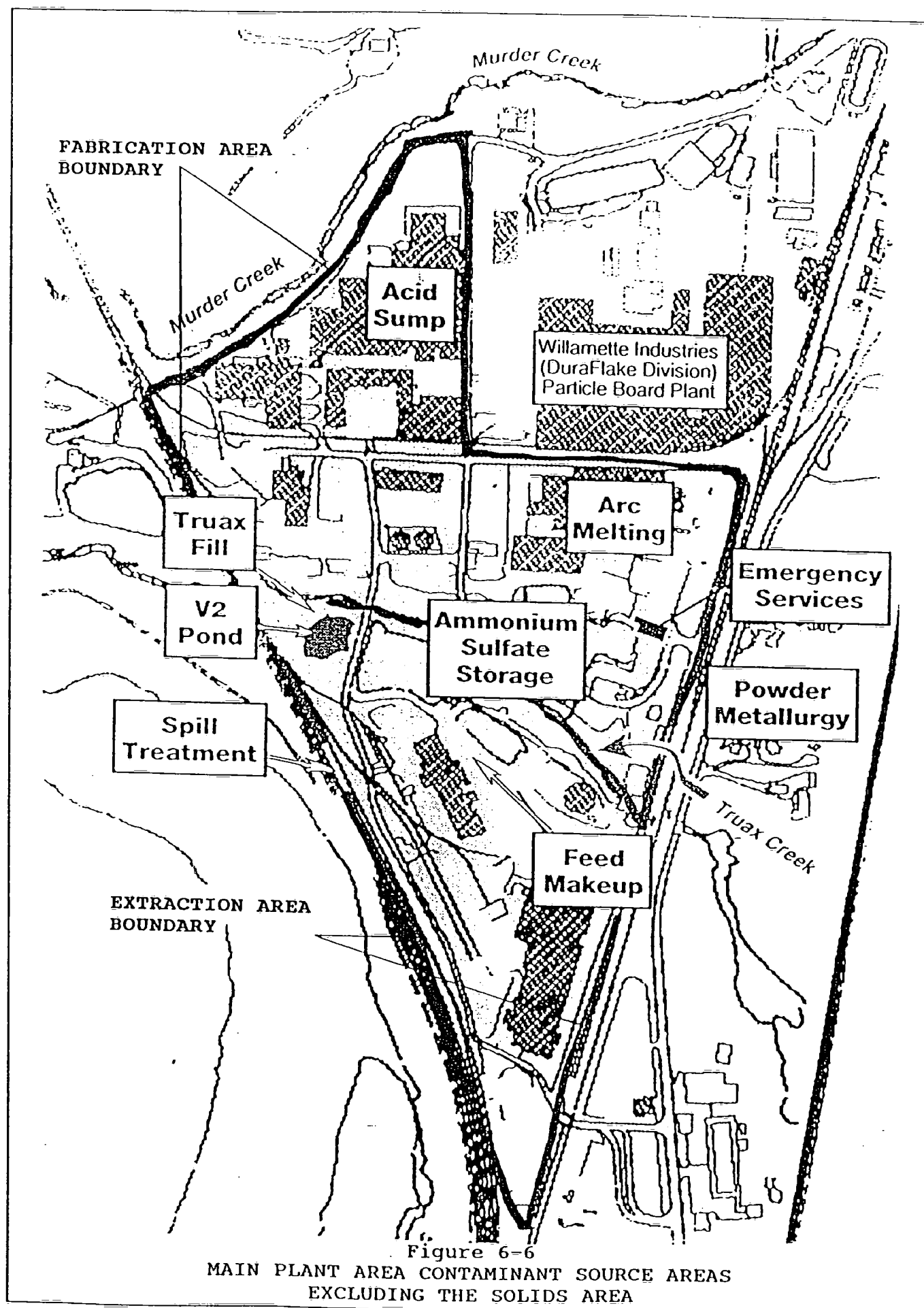
As previously mentioned in Section 3.4.4, for a four month period in 1991-1992, approximately 28,400 gallons of groundwater from well PW-28A were extracted and treated. During this period there was very little change in the pH value of in-situ water.

**Table 6-1**  
**FARM PONDS AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd	Round Maximum Detected
<b>VOLATILE ORGANIC COMPOUNDS (ppb)</b>				
1,1-Dichloroethane	16/54	120	ND	3
1,1-Dichloroethylene	5/54	4J	ND	2,3,4
1,2-Dichloroethane	7/54	6	ND	1,2
1,2-Dichloroethylene	11/54	52	ND	3
1,1,2,2-Tetrachlorethane	5/54	5	ND	2
Tetrachloroethylene	16/54	130	ND	1
1,1,1-Trichloroethane	9/54	13	ND	1
1,1,2-Trichloroethane	11/54	41	ND	1
Trichloroethylene	13/54	66	ND	3
Vinyl Chloride	5/54	11	ND	2
<b>METALS (ppb)</b>				
Aluminum	52/54	154,000	44,750	1
Barium	51/54	958	267	1
Cadmium	24/54	25.8	0.54	1
Calcium	54/54	1,020,000	43,512	4
Chromium (total)	27/54	240	77	3
Copper	45/54	110	97	3
Iron	54/54	139,000L	41,800	3
Lead	24/54	41	15.64	3
Magnesium	54/54	479,000	20,298	4
Manganese	54/54	3,460	8,868	4
Nickel	32/54	152	22.45	3
Sodium	54/54	368,000	37,876	1
Thallium	3/54	5.5	ND	1
Thorium	32/54	30.4L	8	3
Zinc	15/54	6,270	332	2

**Table 6-1  
FARM PONDS AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd	Round Maximum Detected
<b>GENERAL CHEMISTRY (ppm)</b>				
Ammonia	3/54	2	0.87	1, 2
Chloride	34/54	18,000	12.12	1
Fluoride	6/54	3	ND	4
Nitrate	13/54	160	13.7	1
Sulfate	25/54	1,200	40	1
TDS	54/54	35,000	362	3
TSS	22/54	1,400	549	4
<b>RADIONUCLIDES (pCi/l)</b>				
Radium-226	25/54	2.2	1.96	1
Radium-228	33/54	3.4	NA	1
<p>NA = Not Analyzed  ND = Not Detected  J = Estimated value below method detection limits  L = Biased Low</p> <p>Round 1 was sampled during 9/89  Round 2 was sampled during 4/90  Round 3 was sampled during 4/91  Round 4 was sampled during 9/91</p>				





It is possible that little change was seen because the 28,400 gallons represents a small amount of the estimated total volume of water in the perched groundwater zone screened by well PW-28A. However, it is also possible that there may still be a continuous source of contamination to this perched zone as a result of continuous leaks from the underground pipes in this area of the facility.

Groundwater contaminants found in monitoring wells located in the Extraction Area, exclusive of well PW-28A are shown in **Table 6-2**. Groundwater in the vicinity of the Spill Treatment Plant is contaminated with elevated levels of methyl isobutylketone (MIBK), and ammonium. The Spill Treatment Plant receives liquids and liquid byproducts containing MIBK and ammonium generated in the separations process.

Groundwater in facility perimeter wells located in the southern portion of the Extraction Area contains elevated concentrations of trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), vinyl chloride, and manganese. The RI/FS identified the probable source of groundwater contamination in this area as being solvents which are used in a maintenance support function for process operations that are located in this area such as the Coke Ball Mill.

### **6.3.3 Fabrication Area**

The Fabrication Area occupies approximately 50 acres on the northern portion of the main plant (**Figure 6-4**). The area is bounded by Truax Creek to the south, Murder Creek to the north, Burlington Railroad tracks to the west, and Willamette Industries and Southern Pacific railroad tracks to the east.

Potential source areas within the Fabrication Area that were identified in the RI are shown in **Figure 6-6**. These areas include; the acid sump area, the Arc Melting Building, the ammonium sulfate storage area, Truax Fill, the area near the Emergency Services Building (Boring B91-5), and the area near the Powder Metallurgy Building.

#### **6.3.3.1 Groundwater Contamination at the Fabrication Area**

Groundwater contaminants found in monitoring wells located in the Fabrication Area are shown in **Table 6-3**. Groundwater in the vicinity of the acid sump area contains elevated levels of TCE, 1,1-DCE, 1,1,1-trichloroethane (1,1,1-TCA), fluoride, and ammonium. The acid sump area contains manufacturing process facilities where caustics, acids, and solvents are used for cleaning metals. Acid spills have occurred in this area in the past. In July of 1990, 3,000 gallons of nitric acid and 100 pounds of hydrofluoric acid leaked from underground pipes near the acid transfer tanks. Two

**Table 6-2  
EXTRACTION AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd	Round Maximum Detected
<b>VOLATILE ORGANIC COMPOUNDS (ppb)</b>				
Acetone	6/37	230	ND	2
Benzene	7/37	62	ND	1
Carbon Disulfide	3/37	92J	ND	1
Chloroform	12/37	52	4.81	2
1,1-Dichloroethane	19/37	140	4.92	4
1,1-Dichloroethylene	10/37	110	4.09	4
1,2-Dichloroethylene	12/37	36	2.48	1
Methylisobutylketone	9/37	7,500	ND	1
Tetrachloroethylene	10/37	19J	ND	4
1,1,1-Trichloroethane	14/37	600	ND	4
Trichloroethylene	18/37	330	ND	2
<b>METALS (ppb)</b>				
Aluminum	32/37	378,000	44,300	1
Arsenic	26/37	234	15.8	3
Barium	32/37	1,080	243	1
Cadmium	20/37	9.2	0.44	3
Calcium	34/37	420,100	43,960	3
Chromium	26/37	373	48	1
Copper	29/37	289	60	1
Iron	34/37	472,000	48,700	1
Lead	22/37	62.8L	41.9	1
Magnesium	34/37	280,000	25,300	2
Manganese	34/37	20,900	4,450	1
Nickel	24/37	171	29.4	1
Potassium	5/9	20,220	NA	1
Sodium	33/37	500,000	32,100	3
Thorium	23/37	30	7.75	1

**Table 6-2**  
**EXTRACTION AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd	Round Maximum Detected
Uranium	32/37	53.8	3.47	2
Zinc	12/37	638	193	1
<b>GENERAL CHEMISTRY (ppm)</b>				
Ammonia	14/37	1,400	2.35	4
Chloride	29/37	650	59.3	1
Fluoride	20/37	12	2.2	3
Nitrate	25/37	420	31.2	1
Sulfate	28/37	2,300	17.12	1
TDS	33/37	3,400	392	1
TSS	16/18	2,900	406	3
<b>RADIONUCLIDES (pCi/l)</b>				
Radium-226	22/37	4.5	1.47	1
Radium-228	22/37	6.0	2.54	1

NA = Not Analyzed  
 ND = Not Detected  
 J = Estimated value below method detection limits  
 L = Biased Low

Round 1 was sampled during 9/89  
 Round 2 was sampled during 4/90  
 Round 3 was sampled during 4/91  
 Round 4 was sampled during 9/91

**Table 6-3  
FABRICATION AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd	Round Maximum Detected
<b>VOLATILE ORGANIC COMPOUNDS (ppb)</b>				
Acetone	6/72	3,400	ND	2
Benzene	5/72	60	ND	1
Chloroethane	19/72	420D	ND	1
Chloroform	13/72	27J	4.81	4
1,1-Dichloroethane	54/72	4,200	4.92	4
1,1-Dichloroethylene	42/72	24,000	4.09	3
1,2-Dichloroethane	4/72	220J	ND	2
1,2-Dichloroethylene	19/72	83	2.48	2
Methylisobutylketone (MIBK)	7/72	85,000D	ND	1
Tetrachloroethylene	22/72	150	ND	1
1,1,1-Trichloroethane	55/72	45,000	ND	2
1,1,2-Trichloroethane	4/72	5	ND	1
Trichloroethylene	37/72	910J	3.47	4
Vinyl Chloride	15/72	50	ND	4
Xylenes (mixed)	3/72	46	ND	2
<b>METALS (ppb)</b>				
Aluminum	71/72	990,000	44,300	1
Arsenic	53/72	107.0L	15.8	1
Barium	71/72	3,310	243	1
Cadmium	23/72	31.6	0.44	2
Calcium	72/72	426,000	43,960	2
Chromium (total)	43/72	614	48	1
Copper	70/72	3,920	60	2
Iron	72/72	630,000	48,800	1
Lead	51/72	180	41.9	3
Magnesium	72/72	235,500	25,300	3
Manganese	72/72	34,000	4,450	1
Nickel	52/72	2,620	29.4	2
Selenium	11/72	53	2.92	1

**Table 6-3 (Continued)**  
**FABRICATION AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd	Round Maximum Detected
Silver	20/72	40K	2.51	3
Sodium	72/72	140,000	32,100	1
Thallium	4/72	5.1	3.57	1
Thorium	66/72	183L	7.75	4
Tin	8/72	168B	50.6	4
Uranium	32/72	250	3.47	1
Zinc	61/72	1,230	193	1
<b>GENERAL CHEMISTRY (ppm)</b>				
Ammonia	28/72	6,100	2.35	1
Chloride	56/72	14,000	59.3	1
Fluoride	34/72	110	2.2	2
Nitrate	46/72	1,600	31.2	2
Sulfate	48/72	1,300	17.12	1
TDS	72/72	19,000	392	1
TOC	13/72	24	3.6	3
TSS	31/72	3,500	406	3
<b>RADIONUCLIDES (pci/l)</b>				
Radium-226	48/72	8.4	1.47	1
Radium-228	45/72	31.0	2.54	1

NA = Not Analyzed  
 ND = Not Detected  
 J = Estimated value below method detection limits  
 L = Biased Low

Round 1 was sampled during 9/89  
 Round 2 was sampled during 4/90  
 Round 3 was sampled during 4/91  
 Round 4 was sampled during 9/91

solvent drum storage areas were also previously located near the acid sump area.

Groundwater near the Arc Melting Building in the eastern portion of the Fabrication Area contains elevated levels of 1,1-DCE. TCE was used as a solvent in this area until 1982 when it was replaced with 1,1,1-TCA. In 1989, TWCA replaced 1,1,1-TCA with a solvent known as Citra-Safe.

Groundwater near the ammonium sulfate storage area contains high concentrations of MIBK, radium, thorium, ammonium, chloride, and sulfate. In June 1978 a 400,000-gallon tank which was located in this area and contained an unknown quantity of ammonium sulfate solution failed and its contents were spilled.

Groundwater in the vicinity of the Powder Metallurgy Building area in the northeastern corner of the Fabrication Area contains elevated concentrations of PCE, 1,1-DCE, fluoride, manganese, and PCBs. As explained above in Section 3.4.3, a floating oil layer containing up to 8 percent PCBs was identified in Borehole B91-5 located outside the Emergency Services Building. The removal action conducted in 1992 was not able to identify the source of the floating oil layer.

A monitoring well completed in the Truax Fill (see Section 6.3.3.2 below) contains elevated concentrations of 1,1-dichloroethene, and ammonium.

#### **6.3.3.2 Contamination in Truax Fill**

The earthen fill material along Truax Creek's northern bank, known as Truax Fill contains undocumented quantities of construction debris and other solid wastes that were placed in the fill from 1958 until 1978. The fill area is approximately 1,000 feet long by 50 feet wide. Elevated concentrations of radionuclides, metals, PAHs, and PCBs have been detected in the fill (**Table 6-4**).

#### **6.3.4 Solids Area**

The Solids Area covers approximately 20 acres and is located west of the main plant between the Burlington Northern Railroad and the Willamette River (**Figure 6-4**). The area contains four separate potential source areas which are shown in **Figure 6-7**. These potential source areas include the LRSP, Schmidt Lake, the Magnesium Resource Recovery Pile, and the Chlorinator Residue Pile. The LRSP and Schmidt Lake received solids from TWCA's existing wastewater treatment plant from 1967 to 1979. These solids were the subject of a previous operable unit remedial action which is described further in Section 3.4.1 of this ROD.

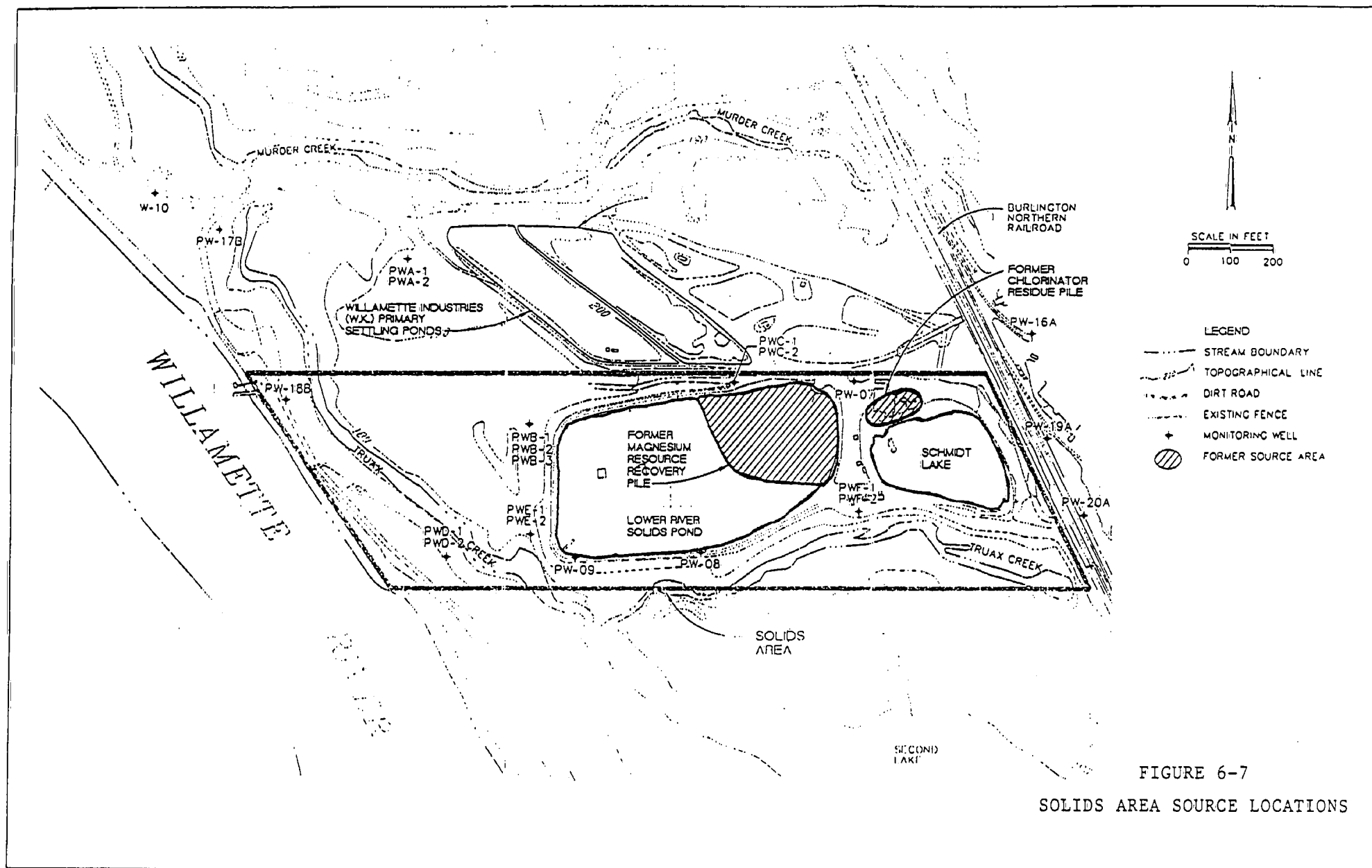
**Table 6-4  
DETECTED CONTAMINANTS IN TRUAX CREEK FILL**

Analytes	Minimum Concentration Detected	Maximum Concentration Detected
PCBs	ppb	ppb
Aroclor-1248	6,800	6,800
Aroclor-1254	340	1,700
Aroclor-1260	250	250
Semi-volatile organics	ppb	ppb
Bis(2- ethylhexyl) phthalate	1,100	8,300
Metals	ppm	ppm
Chromium	40	626
Copper	46	3,270
Zirconium	4,050	39,200
Radionuclides	pCi/g	pCi/g
Radium 226	.54	5.00
Radium 228	.20	1.50

ppm = parts per million

ppb = parts per billion

pCi/g = picocuries per gram





#### **6.3.4.1 Groundwater Contamination at the Solids Area**

Groundwater beneath the Solids Area is contaminated with elevated concentrations of TCE, 1,1-DCE, MIBK, magnesium, manganese, and ammonium (Table 6-5). Leakage through the four unlined ponds is the identified source of all the contaminants in the groundwater except manganese. Most of this source material has been the subject of prior remedial activities as described in Section 3 of this ROD. Manganese is not used in TWCA's processes and therefore the source of this chemical is uncertain.

#### **6.3.4.2 Additional Contaminant Sources in the Solids Area**

In 1991, EPA received information provided by a former TWCA employee that radioactive materials had been buried in Schmidt Lake in the 1970's. These radioactive materials were buried in drums which were allegedly located below the sludges that had been the subject of the operable unit remedial action. Based on this information, EPA requested TWCA to conduct additional geophysical investigations in this area. In 1992, pursuant to the additional work provision of the RI/FS Consent Order with EPA, TWCA conducted an electromagnetic survey in this area. The electromagnetic survey identified potential additional source materials in and around Schmidt Lake. These source materials included several corroded metal drums containing sands with elevated amounts of thorium and uranium, and an underground storage tank containing approximately 1,000 gallons of liquid petroleum product.

In December 1992, 2,016 cubic yards of materials containing zircon sands with elevated levels of thorium and uranium were removed from Schmidt Lake and transported by TWCA to an off-Site low-level radioactive disposal facility. Surface and subsurface soil sampling to confirm that all source material was removed from the LRSP and Schmidt Lake has yet to be conducted.

Soil sampling performed in the vicinity of the former Chlorinator Residue Pile, located north of Schmidt Lake, revealed the presence of barium sulfate and chloride salts. Source materials from the Chlorinator Residue Pile were removed in 1978 and barium sulfate was applied over the area to bind remaining radium that had been found in the residual chlorinator solids.

In 1988, approximately 44,000 cubic yards of magnesium chloride solids were removed by TWCA from the Magnesium Resource Recovery Pile, located at the northeast corner of the LRSP. TWCA then capped this area with asphalt and now uses it for materials handling.

#### **6.3.5 Surface Water Remedial Sector**

The Surface Water Remedial Sector includes the surface water and sediment in the

**Table 6-5  
SOLIDS AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd.	Round Maximum Detected
<b>VOLATILE ORGANIC COMPOUNDS (ppb)</b>				
Acetone	3/56	21	ND	2
2-Butanone (MEK)	2/56	12	ND	2
Chloroform	4/56	5	4.81	2
1,1-Dichloroethane	23/56	23	4.92	2
1,1-Dichloroethylene	4/56	8	4.09	2
1,2-Dichloroethylene	4/56	43	2.48	2
Methylene Chloride	3/56	4J	ND	1
Methylisobutylketone (MIBK)	3/56	7J	ND	1
Tetrachloroethylene	5/56	2J	ND	2
1,1,1-Trichloroethane	7/56	22	ND	2
1,1,2-Trichloroethane	2/56	1J	ND	2
Trichloroethylene	6/56	29	3.47	2
Vinyl Chloride	1/56	11	ND	2
<b>SEMIVOLATILE ORGANIC COMPOUNDS (ppb)</b>				
Bis(2-ethylhexyl)phthalate	5/56	130	8.02	1
Di-n-butylphthalate	1/56	2J	ND	1
Di-n-octyl-phthalate	1/56	10	ND	1
<b>TOTAL METALS (ppb)</b>				
Aluminum	53/56	282,000	44,300	1
Antimony	3/56	18.1B	ND	2
Arsenic	31/56	21.8L	15.8	1
Barium	56/56	2,800	243	2
Cadmium	26/56	40.7	0.44	1
Calcium	56/56	1,990,000	43,960	1
Chromium (Total)	41/56	405	48	1
Copper	35/56	269	60	1
Iron	56/56	504,000	48,800	2
Lead	35/56	61.6J	41.9	1
Magnesium	56/56	11,400,000	25,300	1
Manganese	56/56	72,500	4,450	1

**Table 6-5  
SOLIDS AREA GROUNDWATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd	Round Maximum Detected
Nickel	47/56	660	29.4	1
Selenium	7/56	9.5K	2.92	2
Sodium	56/56	1,160,000	32,100	1
Thallium	6/56	5.5L	3.57	2
Thorium	37/56	45.7	7.75	1
Tin	10/56	2,980	50.6	3
Uranium	41/56	16.2	3.47	1
Zinc	24/56	670L	193	3
<b>GENERAL CHEMISTRY (ppm)</b>				
Ammonia	47/56	580	2.35	2
Chloride	53/56	21,000	59.3	1
Fluoride	24/56	10	2.2	1
Nitrate	22/56	480	31.2	1
Sulfate	45/56	730	17.12	1
TDS	56/56	45,900	39.2	1
TOC	18/56	57	3.6	3
TSS	18/56	9,600	406	3
<b>RADIONUCLIDES (pCi/l)</b>				
Radium-226	40/56	8.5	1.47	1
Radium-228	41/56	4.2	2.54	1

NA = Not Analyzed

ND = Not Detected

J = Estimated value below method detection limits

L = Biased Low

Round 1 was sampled during 9/89

Round 2 was sampled during 4/90

Round 3 was sampled during 4/91

Round 4 was sampled during 9/91

farm drainages, Truax Creek, Murder Creek, Second Lake, Third Lake, Fourth Lake, and Conser Slough (**Figure 6-4**). The Willamette River borders the TWCA facility to the west and is a receptor for both surface water and groundwater discharging from the facility. However, the TWCA RI/FS did not attempt to determine impacts of contamination related to the TWCA facility on the Willamette River.

#### **6.3.5.1 Surface Water Contamination**

Elevated concentrations of total recoverable metals was found in the surface water of the farm drainages (**Table 6-6**). These metals include aluminum, chromium, copper, lead, selenium, silver, and zinc.

Truax Creek flows through the center of the main plant and separates the Fabrication and Extraction Areas while receiving groundwater discharge and surface runoff from both areas. A major inflow of fluids in Truax Creek is the NPDES-permitted discharge from Pond 2. During the RI, elevated concentrations of ammonia and chloride were found downstream of the TWCA NPDES outfall. These elevated concentrations are from samples which were taken within TWCA's currently defined mixing zone. One sample from Second Lake had an elevated concentration of ammonia.

#### **6.3.5.3 Sediment Contamination at the Surface Water Remedial Sector**

PCBs were detected in sediments throughout the Surface Water Remedial Sector (**Figure 6-8**). Sediments downstream of the NPDES outfall in Truax Creek had the highest concentrations of PCBs found in sediments on the TWCA facility.

### **6.4 Transport and Fate of Contaminants**

As a result of TWCA's ongoing and complex chemical processes there are many identified potential sources of contamination at the facility (**Table 6-7**). In addition, the facility has been operating for over 35 years and during that period numerous documented spills, and leaks of chemicals into the environment have occurred. The environmental fate and transport of these chemicals depends on the physical and chemical properties of the chemicals, along with the natural characteristics of the soils and groundwater beneath the facility.

Groundwater generally flows in the direction of the Willamette River. No attempt was made to determine impacts of groundwater contaminant transport from the TWCA Site to the river, because, quantification of off-Site groundwater contamination was not within the scope of the RI/FS.

The RI/FS determined that contaminated groundwater flows into adjacent surface

**Table 6-6  
SURFACE WATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd.	Round Maximum Detected
<b>VOLATILE ORGANIC COMPOUNDS (ppb)</b>				
Acetone	11/45	190	5	2
1,1-Dichloroethane	14/45	6J	ND	1
1,1-Dichloroethylene	7/45	3J	1.52	3
1,2-Dichloroethylene	5/45	3J	ND	3
Methylisobutylketone (MIBK)	10/45	990	3.04	1
1,1,2,2-Tetrachloroethane	2/45	1J	ND	2, 3
Toluene	7/45	29	ND	2
1,1,1-Trichloroethane	17/45	6	1.82	1
Trichloroethene	14/45	5J	2.49	1
<b>SEMIVOLATILE ORGANIC COMPOUNDS (ppb)</b>				
Bis(2-ethylhexyl)phthalate	2/45	6J	ND	2
Diethylphthalate	3/45	6J	ND	2
<b>TOTAL METALS (ppb)</b>				
Aluminum	43/45	35,200	5,285	1
Arsenic	8/45	15.3	4.23	1
Barium	45/45	479	102	2
Cadmium	2/45	0.60L	ND	3
Calcium	49/45	1,320,000	45,877	1
Chromium (Total)	17/45	84	59	2
Copper	18/45	34	3.93	1
Lead	7/45	45	3.38	1
Magnesium	49/45	84,800	18,566	1
Nickel	32/45	55.2	17.4	2
Potassium	49/45	14,800	2,450	1
Selenium	9/45	8.60	7.46	1
Silver	2/45	1.40L	ND	1
Sodium	49/45	301,000K	33,795	1
Thorium	11/45	3.40	0.1	1
Uranium	28/45	19.4	0.22	1
Zinc	20/45	22	153	2

**Table 6-6 (Continued)**  
**SURFACE WATER ANALYTICAL RESULTS SUMMARY**

Analytes	# Detects/ # Samples	Maximum Conc. Detected	Bckgrd.	Round Maximum Detected
<b>GENERAL CHEMISTRY (ppm)</b>				
Ammonia	18/45	11	ND	1
Chloride	35/45	2,700	69.6	1
Conductivity (umhos/cm)	44/45	8,200	502	1
Fluoride	7/45	2	ND	2
Nitrate	23/45	310	10.2	1
Sulfate	32/45	270	26.3	1
TDS	44/45	4,900	39.0	1
TSS	10/45	140	19.9	1
<b>RADIONUCLIDES (pCi/l)</b>				
Radium-226	31/45	1.50	0.29	1
Radium-228	38/45	2.70	1.84	1,2

NA = Not Analyzed

ND = Not Detected

J = Estimated value below method detection limits

L = Biased Low

Round 1 was sampled during 9/89

Round 2 was sampled during 4/90

Round 3 was sampled during 4/91

Round 4 was sampled during 9/91

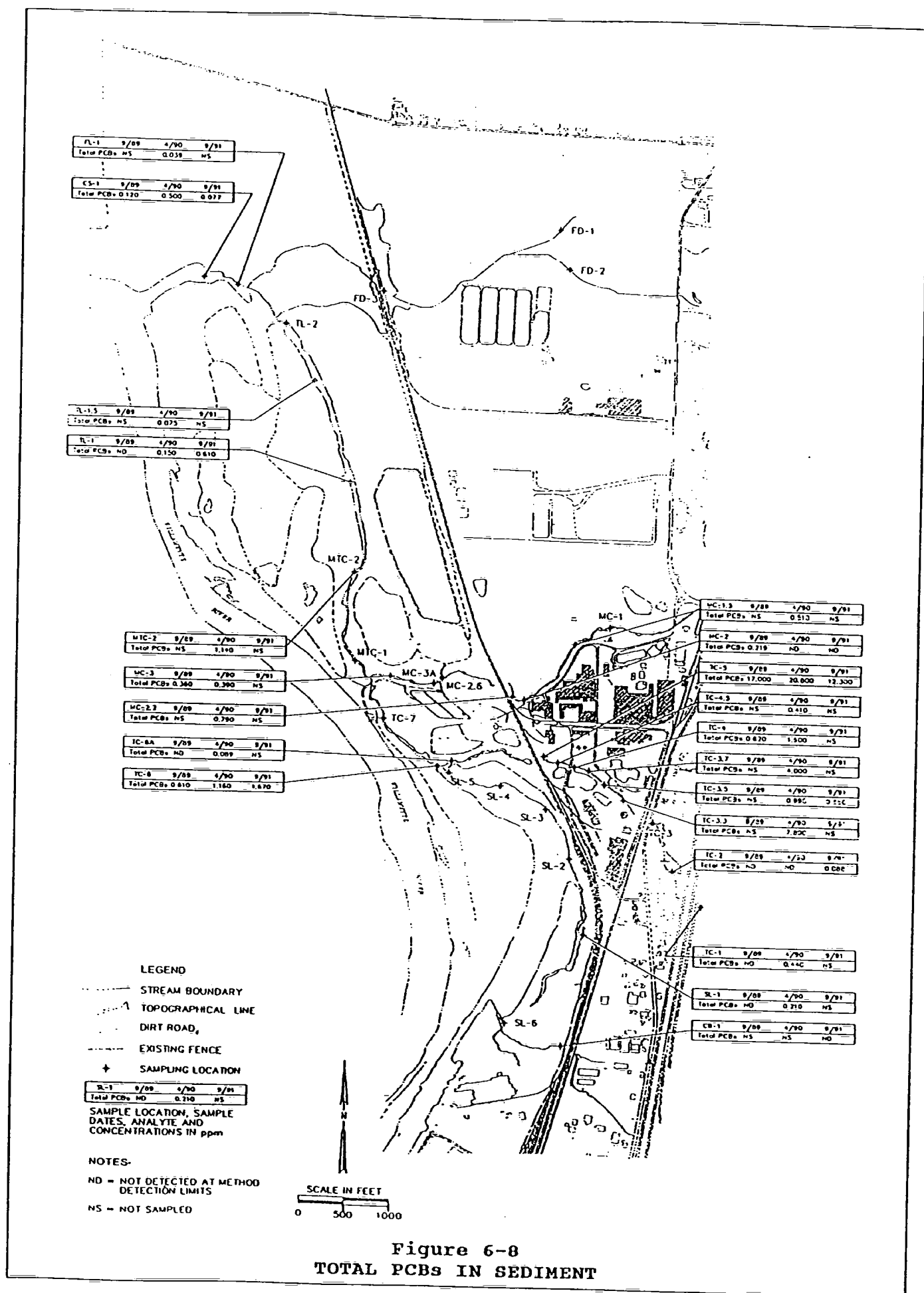


Table 6-7  
Identification of Potential Source Areas  
Teledyne Wah Chang Albany

Remedial Sector	Potential Source Area	Wastes Received or Released	Date of Use and/or Release	Previous Remedial Actions	Volume or Area of Concern; Monitoring Wells of Concern	Notes	Chemicals of Concern
Farm Ponds Area	Farm Ponds	Lime solids from the central wastewater treatment system are stored in four ponds.	1979 - Present	A characterization of the chemical and physical nature of the solids was conducted in 1988 (OU RI/FS Report, CH2M HILL, 1989)	Four 2-1/2 acre ponds: Wells PW-40S, PW-40A, WS, SS, and NS.	Solids pass TCLP and are not a listed or characteristic hazardous waste.	Vinyl chloride, TCE, PCE, magnesium.
	Soil Amendment Area	Area where lime solids were applied in a single event. Solids contained low levels of radionuclides and organic chemicals; high levels of some metals.	1976	None	application rate of 108 tons (dry weight) per acre on 47.8 acres.	Solids passed TCLP and were not a listed or characteristic hazardous waste.	PCBs, thorium, and radium
Extraction Area	Southern Extraction Area	Chlorinated organic solvents used in maintenance functions.	1956 to late 1970s or early 1980s.	None	Wells PW-25A, PW-26A, PW-47A, and PW-49A		DCE, TCE, and vinyl chloride
	Feed Makeup Area	Pre-1078 feed makeup.	Original release occurred before 1978; release to groundwater is continuing.	PW-28A treatability study.	Well PW-28A		Metals, inorganics



Table 6-7 (Continued)  
Identification of Potential Source Areas  
Teledyne Wah Chang Albany

Remedial Sector	Potential Source Area	Wastes Received or Released	Date of Use and/or Release	Previous Remedial Actions	Volume or Area of Concern; Monitoring Wells of Concern	Notes	Chemicals of Concern
Extraction Area (Continued)	V2 Solids Pond	Storage pond for solids from V2 process.	1960-1979	Solids removed to Farm Ponds Area for drying in 1989. The pond was then dewatered, the walls and bottom of the pond were hydraulically scoured, and the pond is currently being backfilled with clean material.	Residual chemicals in subsurface soil.	Residual chemicals in soils were investigated through TCLP and DI leach tests on 0- to 5-foot depth soils. Results showed that residual chemicals in soils were not classified as RCRA waste.	Thorium, radium
	Spill Treatment Plant	Receives liquids and liquid byproducts generated in the separations process. MIBK detected in soil and groundwater near the plant.	1978-1980 Pilot Plant 1980-Present; full operation	None	PW-22A		MIBK, ammonium
Fabrication Area	Acid Sump Area	Process area where caustics and acids are used for cleaning metals. Two drum storage areas were near the acid sump. Location of past documented releases.	1959-Present	Soil was excavated in the vicinity of a 1990 acid spill, the underground piping was replaced with open, epoxy-coated concrete trenches, and the area paved.	Wells PW-10, PW-11, PW-12, and PW-13.		TCE, TCA, DCE, DCA, vinyl chloride, nitrate.
	Arc-Melting Area	TCE was used in the area until 1982, when it was replaced with 1,1,1-TCA. In 1989, 1,1,1-TCA was replaced with Citra-Safe, a nonhazardous solvent.	1959-1989	None	Well OW-42A		DCE, vinyl chloride

Table 6-7 (Continued)  
Identification of Potential Source Areas  
Teledyne Wah Chang Albany

Remedial Sector	Potential Source Area	Wastes Received or Released	Date of Use and/or Release	Previous Remedial Actions	Volume or Area of Concern; Monitoring Wells of Concern	Notes	Chemicals of Concern
Fabrication Area (Continued)	Ammonium Sulfate Storage Area <sup>1</sup>	400,000-gallon plasteel tank containing ammonium sulfate and MIBK failed southeast of Well PW-01A <sup>2</sup> .	June 1978	Residual ammonia levels in Truax Creek are monitored monthly.	Well PW-01A		MIBK, ammonium
	Truax Fill Area	Primarily earthen fill, undocumented quantities of construction debris and other solid wastes were placed along the northern bank of Truax Creek. Low levels of PCBs detected in several fill bank samples.	Wastes were placed 1958-1976; releases may be continuing at present.	None	1,000 lineal feet along north bank of Truax Creek; Well PW-03A.		TCE, DCE, vinyl chloride, PCBs ammonium
	Powder Metallurgy Building Area	Solvents used in a maintenance function.	1959 to Present	None	Wells PW-4, PW-5, PW-30A, PW-45A, and PW-46A.		DCE, vinyl chloride and PCBs
	Emergency Services Building Area	Floating mineral oil with PCBs found on water table.	Detected in 1991; date of release unknown.	Removal action initiated in 1992 to excavate affected soil and source of PCBs.	Soil Boring B91-5.		PCBs

Table 6-7 (Continued)  
Identification of Potential Source Areas  
Teledyne Wah Chang Albany

Remedial Sector	Potential Source Area	Wastes Received or Released	Date of Use and/or Release	Previous Remedial Actions	Volume or Area of Concern; Monitoring Wells of Concern	Notes	Chemicals of Concern
Solids Area	Lower River Solids Pond (LRSP)	Lime solids from wastewater treatment plant.	1967-1979	Solids removed in November 1991 (OURA)	85,000 cubic yards of lime solids.	Solids Area is to be further addressed during remedial design stage of overall project.	Magnesium, manganese, ammonia.
	Schmidt Lake	Lime solids from wastewater treatment plant.	1974-1979	Solids removed in November 1991 (OURA). Area is currently being excavated to investigate buried wastes.	15,000 cubic yards of lime solids.	Solids Area is to be further addressed during remedial design stage of overall project.	Magnesium, manganese, ammonia.
	Magnesium Resource Recovery Pile	Magnesium chloride solids were formerly stored in this area.	May 1983	Pile removed in 1988. Area is capped with asphalt and is used for materials handling. Confirmation samples were taken from soils under pile after the solids were removed.	44,000 cubic yards of solids.	Solids Area to be further addressed during remedial design stage of overall project.	Magnesium
	Chlorinator Residue Pile	Residue from sand chlorination process.	1972-1977	Removed and disposed of at Hanford in 1978. Barium sulfate was applied over the area to bind any remaining radium.	5,000 cubic yards of solids.	Solids Area is to be further addressed during remedial design stage of overall project.	Radium

<sup>1</sup> = Ammonium sulfate is no longer stored at this location.

<sup>2</sup> = Ammonium sulfate tank has been removed; quantity in tank at time of failure is unknown.

water bodies, including the Willamette River. The RI/FS did not quantify those contaminants, because no direct impacts on the surface water bodies was observed.

During the RI, conductivity measurements were taken in surface water adjacent to the TWCA facility. Conductivity measurements were generally high which indicates that metal contaminants which leave the TWCA facility are potentially settling to the bottom of these surface water bodies.

The following discussion highlights the typical environmental behavior of the chemicals that were detected in groundwater, surface water, sediment, and soils at TWCA during the RI. The chemicals are grouped according to the similarities of their physical and chemical properties.

#### **6.4.1 Organic Compounds**

##### **6.4.1.1 Volatile Organic Compounds (VOCs)**

VOCs (e.g. TCA, TCE, DCE, vinyl chloride, MIBK) were detected in groundwater throughout the TWCA facility. VOCs are generally very soluble and mobile in groundwater. Under certain anaerobic conditions, trichlorinated ethanes and ethenes such as TCA and TCE may break down to dichlorinated and monochlorinated compounds such as DCE and vinyl chloride. Anaerobic degradation processes are generally very slow.

##### **6.4.1.2 Semivolatile Organic Compounds (SVOCs)**

SVOCs detected at TWCA include HCB. HCB was detected in sediment in the Surface Water Remedial Sector. Once HCB is released into the sediment it tends to remain for extended periods of time due to its strong adsorption characteristics.

##### **6.4.1.3 Polychlorinated Biphenyls (PCBs)**

PCBs were detected in sediment throughout the TWCA facility. PCBs were also detected in groundwater at one location in the Fabrication Area. PCBs are persistent compounds in the environment, exhibiting a high affinity for particulate adsorption and a resistance to biodegradation. Sorption to organic matter and bioaccumulation in living tissues are expected to be the dominant environmental fate processes. PCBs in groundwater are primarily sorbed to colloidal soil particles. Migration rates of PCBs in sediment will depend on sediment transport conditions.

#### **6.4.2 Metals**

Metals have been found in groundwater in some areas of the TWCA Site (e.g. Feed Makeup Area/Well PW-28A) where the pH of the groundwater is so acidic (low) that

the chelation ability of the metal is inhibited and the metal then leaches from the subsurface soil into the low pH water.

#### **6.4.3 Radionuclides**

Radium-226 and radium-228 are the primary radionuclides found in groundwater, and sediment throughout the TWCA Site. These radionuclides are generally persistent in the environment and have limited mobility in the soil/water system. They will decay over time to the stable element lead, however, the half-life of radium-226 is 1,600 years, and the half-life of radium-228 is 5.7 years.

#### **6.5 Potential Health Impacts of Major Contaminants Found at the TWCA Site**

Following is a description of the potential health effects of major contaminants which have been detected in environmental media at the TWCA Site:

PCE was detected in groundwater at the TWCA Site. PCE has been classified as a probable human carcinogen. PCE can cause liver toxicity. Inhalation of high concentrations of PCE can depress the central nervous system (CNS) of humans and may cause dizziness, headache, sleepiness, and incoordination.

1,1,1-TCA has been found in groundwater at the TWCA Site. High concentrations of 1,1,1-TCA are a CNS depressant and may impair psycho-physiological functions. 1,1,1-TCA can cause liver damage. Acute high-level exposures can adversely affect the cardiovascular system. It is irritating to the skin and liquid can be absorbed through the skin. In the past 1,1,1-TCA has been used as a solvent for various processes at the TWCA facility.

TCE has been found in groundwater at the Site. When inhaled, high concentrations of TCE may cause headache, vertigo, and visual distortion. Studies have shown TCE to be carcinogenic in animals. EPA has previously classified TCE as a possible human carcinogen. EPA is in the process of reevaluating whether TCE should be considered a possible or a probable human carcinogen. TCE has been used in the past as a solvent at the TWCA facility.

1,1-DCE was detected in groundwater at the Site. Inhalation by humans of large concentrations of 1,1-DCE can cause drowsiness, fatigue, and vertigo. Liver damage may occur at relatively low doses. 1,1-DCE is considered a probable human carcinogen.

Vinyl chloride was detected in groundwater at the Site. Vinyl chloride is a known

cancer causing agent in humans. Chronic inhalation of vinyl chloride can result in Renauds syndrome, dermatitis, hepatitis-like changes, thyroid insufficiency, and acro-osteolysis as well as cancer. EPA currently has no evidence of vinyl chloride being used at the TWCA facility. A possible reason for the presence of vinyl chloride in groundwater at the Site is that anaerobic biodegradation of TCE to DCE and then to vinyl chloride may be occurring beneath the Site.

MIBK has been detected in groundwater at the Site. High concentrations of MIBK are a CNS depressant and can produce weakness, headache, nausea, light-headedness, vomiting, dizziness, incoordination, and narcosis. MIBK may cause kidney and liver damage.

HCB has been detected in sediments at the Site. HCB is classified as a possible human carcinogen. Exposure to HCB may also cause liver damage.

PCBs have been detected in elevated concentrations in sediment and groundwater at the TWCA Site. PCBs are classified as probable human carcinogens. Non-carcinogenic adverse health effects are dose-related and high concentrations may include chloracne, skin rashes, burning of the eyes and skin, and liver damage. Low concentrations may cause adverse reproductive and fetal effects, and nervous system toxicity.

Magnesium has been detected in elevated concentrations in sediments, surface water, and groundwater throughout the Site. Exposure to elevated concentrations of magnesium can cause nausea, vomiting, and neuromuscular impairment.

Uranium has been found in elevated concentrations in groundwater at the TWCA Site. Radionuclides of uranium that emit alpha particles can cause bone cancers in humans. Exposure of the skin to, and ingestion of, uranium compounds can cause kidney damage. Radium has been found in groundwater at the Site. Ionizing radiation (alpha particles) from radium can cause bone cancer in humans.

Nitrate has been found in groundwater at the TWCA Site. In the body, nitrate is converted to nitrite. Methemoglobinemia is caused by high levels of nitrite, or indirectly from nitrate. This results in a deficiency of oxygen transport in the blood.

Fluoride has been found in groundwater at the TWCA Site. Intake of excessive fluoride over a long period of time causes damage to bones and teeth (fluorosis). The most sensitive effect, of fluorosis, tooth mottling, may occur at low concentrations.

Ammonia has been found in high concentrations in groundwater at the TWCA Site. Ammonia is a strong alkaline and can cause damage to skin and mucous membranes. An unpleasant taste is a sensitive indicator of ammonia concentrations.

## **7.0 SUMMARY OF SITE RISKS**

CERCLA response actions at the TWCA Site as described in this ROD are intended to protect human health and the environment from risks related to current and potential exposure to hazardous substances at the Site.

To assess the risk posed by Site contamination, a Baseline Risk Assessment was completed by CH2M Hill on behalf of Teledyne Wah Chang Albany, as part of the TWCA RI/FS. The Baseline Risk Assessment evaluated human health risks from exposure to chemically contaminated groundwater. In addition, the RI/FS included a Baseline Environmental Evaluation which evaluated potential effects of sediment and surface water contamination on plants or animals on the Site.

EPA will document all risks due to exposure to contaminated soil at the TWCA Site in a separate operable unit ROD.

### **7.1 Human Health Risks**

#### **7.1.1 Approach to Human Health Risk Assessment**

TWCA is an active operating facility and is expected to remain so in the foreseeable future. The percent of time that workers at an operating facility would spend in a potentially contaminated area is generally less than if the Site were used for residential purposes. Therefore, for purposes of characterizing human health risks on the plant site, the RI/FS used an approach that is less conservative than if the TWCA property were used for residential purposes. This less conservative approach assumed that only workers would be exposed to risks from contaminants at the plant site. Residential exposure may be higher than worker exposure because such exposure is likely to be for 8 hours per work day rather than as much as 24 hours per day.

EPA also agreed with TWCA that, for purposes of the RI/FS, it would not be necessary to interfere with TWCA's ongoing operations to the extent of digging beneath areas underneath existing buildings and structures at the facility in order to characterize the contamination in those areas at that time. Instead, contamination beneath those areas is projected to be characterized on an ongoing basis during the RD/RA stage each time TWCA discontinues use of, paves, or otherwise disturbs any previously uncharacterized pond, area, or building on the Site.

In an attempt to realistically estimate potential human health risks at the TWCA Site based on information presented in the RI, risks were calculated on a sample-specific basis. Mere summation of risks at this Site would not have presented a meaningful approach because of the varied contaminant source areas caused by the large and

complex chemical and manufacturing processes at the TWCA facility. In these circumstances, the sample-specific approach allows more accurate delineation of risks from specific contaminant source areas. This approach also enables retention of information on the geographic distribution of risk throughout the study area. The sample-specific approach to calculating risk has also provided information on the spatial discreteness and concentration of risk which was readily visualized by mapping risks. The sample-specific risks were used to distinguish at the TWCA facility areas that potentially exceed target risk levels from areas where exposure to contaminants results in calculated risk levels below EPA's acceptable risk range.

For contaminants at the TWCA Site, the calculation of risk involved a 4-step process which included the identification of contaminants of concern, an assessment of contaminant toxicity, an exposure assessment of the population at risk, and a characterization of the magnitude of risk.

### **7.1.2 Contaminants of Concern**

A total of 93 chemicals were detected in environmental media at the TWCA Site. Of these, 47 chemicals were identified as chemicals of potential concern in groundwater at the Site. The chemicals of potential concern were selected based on; (1) the chemical exceeded naturally occurring levels, (2) the EPA-derived toxicity value available for the chemical, and (3) the maximum detected concentration exceeded a conservative health-based screening concentration. Chemicals in groundwater were eliminated from consideration if the maximum detected concentration was less than or equal to  $10^{-6}$  excess lifetime cancer risk value, or less than or equal to 0.1 hazard quotient for noncancer effects.

A list of chemicals of potential concern, excluding those detected only in monitoring well PW-28A, is shown in **Table 7-1**. (Refer to Table 3-2 for a list of chemicals detected in monitoring well PW-28A.)

### **7.1.3 Toxicity Assessment**

The Baseline Human Health Evaluation provides toxicity information for the chemicals of concern. Generally, cancer risks are calculated using toxicity factors known as slope factors (SFs), while noncancer risks rely on reference doses (RfDs).

EPA has developed SFs for estimating excess lifetime cancer risks associated with exposure to potential carcinogens. SFs are expressed in units of  $(\text{mg/kg-day})^{-1}$  and are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to



**Table 7-1  
CHEMICALS OF POTENTIAL CONCERN IN GROUNDWATER AND SELECTION  
CRITERIA**

Chemical	Farm Ponds	Plant Site <sup>(a)</sup>
<b>VOLATILE ORGANIC COMPOUNDS</b>		
Acetone		b
Benzene	c	c
Chloroform	c	c
1,1-Dichloroethane	b	b
1,2-Dichloroethane	c	c
1,1-Dichloroethene	c	c
1,2-Dichloroethene	b	
Methylisobutylketone	ND	b
1,1,2,2-Tetrachloroethane	c	ND
Tetrachloroethylene	c	c
1,1,1-Trichloroethane		b
1,1,2-Trichloroethane	c	
Trichloroethylene	c	c
Vinyl Chloride	c	c
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>		
Bis(2-ethylhexyl)phthalate		c
<b>PCBs</b>		
Total Aroclors	NA	c

**Table 7-1 (Continued)**  
**CHEMICALS OF POTENTIAL CONCERN IN GROUNDWATER AND SELECTION**  
**CRITERIA**

Chemical	Farm Ponds	Plant Site(a)
<b>METALS</b>		
Antimony	b	b
Arsenic		c
Barium	b	b
Cadmium	b	b
Copper		b
Magnesium	b	b
Manganese		b
Mercury	ND	b
Nickel	b	b
Thallium	b	b
Thorium		c
Uranium	b	b
Zinc	b	
Zirconium		ND
<b>CONVENTIONAL PARAMETERS</b>		
Ammonia	b	b
Fluoride	b	b
Nitrate	b	b
<b>RADIONUCLIDES</b>		
Radium-226	d	d
Radium-228	d	d

a Does not include PW-28A.

b Selected based on having a reference dose value.

c Selected based on having a cancer slope factor.

d Selected based on having a maximum concentration above 0.2 pCi/l for farm ponds and 0.68 pCi/l for the plant based on a personal communication from Region X EPA, May 5, 1992.

ND= Not detected

provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes it highly unlikely that the actual cancer risk would be underestimated. SFs are derived from the results of human epidemiological studies, or chronic animal bioassay data, to which mathematical extrapolation from high to low dose, and from animal to human dose, have been applied.

RfDs have been developed by EPA to indicate the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure for humans, including sensitive subpopulations likely to be without risk of adverse effect. Estimated intakes of contaminants of concern from environmental media (e.g. the amount of a contaminant of concern ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied.

The Baseline Human Health Evaluation did not analyze risks from dermal exposure to contaminants of concern because toxicity values for the dermal route of exposure do not currently exist. The Baseline Human Health Evaluation relied instead on oral and inhalation SFs and RfDs. The noncancer toxic endpoints (e.g. the affected organs) are similar for dermal and oral exposure. The toxicity factors shown in **Table 7-2** were drawn from the Integrated Risk Information System (IRIS) or, if no IRIS values were available, from the Health Effects Assessment Summary Tables (HEAST). For chemicals which do not have toxicity values available at this time, other criteria, such as the Maximum Contaminant Level Goal (MCLG) promulgated under the Safe Drinking Water Act (SDWA) were used to assess toxicity.

#### **7.1.4 Exposure Assessment**

The exposure assessment identified potential pathways for contaminants of concern to reach the exposed population. Exposure assumptions were based primarily on EPA regional and national guidance, including EPA Superfund Standard Default Exposure Factors, except where tailored to meet specific Site conditions. Current Site use is industrial, except for the Soil Amendment Area (located within the Farm Ponds Remedial Sector) which is currently being used for agricultural purposes. For this reason, the Baseline Human Health Evaluation evaluates exposure to current and future workers on the plant site, and to potential future residents in the Farm Ponds Area. The Soil Amendment Area and adjoining land to the northeast and northwest of the Farm Ponds is currently being used for agricultural purposes. EPA further supplemented the evaluation in the Farm Ponds Area by evaluating an agricultural

**Table 7-2  
TOXICITY FACTORS**

CARCINOGENS COMPOUND	Slope Factor		Unit Risk		Weight of Evidence	
	Oral	Source	Inhalation	Source	Oral	Inhalation
Arsenic	2.00E+00	IRIS	4.30E-01	IRIS	A	A
Benzene	2.90E-02	IRIS	8.30E-06	IRIS	A	A
Chloroform	6.10E-03	IRIS	2.30E-05	IRIS	B2	B2
Chromium VI			1.20E-02	IRIS		A
1,2-Dichlorethane	9.10E-02	IRIS	2.60E-05	IRIS	B2	B2
1,1-Dichloroethene	6.00E-01	IRIS	5.00E-05	IRIS	C	C
Hexachlorobenzene	1.60E+00	IRIS	4.60E-04	IRIS	B2	B2
1,1,2,2-Tetrachloroethane	2.00E-01	IRIS	5.80E-05	IRIS	C	B2
Tetrachloroethene	5.10E-02	HEAST	5.20E-07	HEAST	B2	B2
Trichloroethylene	1.10E-02	HEAST	1.70E-06	HEAST	B2	B2
Vinyl Chloride	1.90E+00	HEAST	8.40E-05	HEAST	A	A
Benzo(a)pyrene	7.30E+00	IRIS	1.70E-03	HEAST	B2	B2
Benzo(a)anthracene	*	*	*	*	*	*
Benzo(b)fluoranthene	*	*	*	*	*	*
Benzo(k)fluoranthene	*	*	*	*	*	*
Chrysene	*	*	*	*	*	*
Dibenz(a,h)anthracene	*	*	*	*	*	*
Indeno(1,2,3-cd)pyrene	*	*	*	*	*	*
Polychlorinated biphenyls	7.70E+00	IRIS			B2	

Slope factor, units - risk per milligram per kilogram of body weight per day {(mg/kg-day)-1}

Unit Risk, units - risk per microgram per cubic meter, {(ug/m3)-1}

\* Indicates that risks were considered equivalent to Benzo(a)pyrene

IRIS - Integrated Risk Information System, USEPA, 1992

HEAST -Health Effects Assessment Summary Tables, Annual Summary, USEPA, 1992

**Table 7-2 (Continued)**  
**TOXICITY FACTORS**

NON-CARCINOGENS	REFERENCE DOSE						CONFIDENCE LEVEL	SYSTEM EFFECTED
	Oral	Source	UF/MF	Inhalation	Source	UF/MF	Oral/ Inhalation	
Acetone	1.00E-01	IRIS	1,000	NA			Low	Liver & Kidney
Chloroform	1.00E-02	IRIS	1,000	NA			Med	Liver
1,1-Dichloroethane	1.00E-01	HEAST	1,000	5.00E-01	HEAST	1,000		Kidney
1,1-Dichloroethene	9.00E-03	IRIS	1,000	NA			Med	Liver
cis1,2-Dichloroethene	1.00E-02	HEAST	3,000	NA				Blood
Methylisobutylketone	2.00E-02	IRIS	1,000	NA				Liver Enzyme
1,1,1-Trichloroethane	9.00E-02	HEAST	1,000	1.00E+00	HEAST	1,000		Liver
1,1,2-Trichloroethane	4.00E-03	IRIS	1,000				Med	Clinical Chemistry
Bis(2-ethylhexyl)Phthalate	2.00E-02	IRIS	1,000					Liver
Hexachlorobenzene	8.00E-04	IRIS	100				Med	Liver
Antimony	4.00E-04	IRIS	1,000				Low	Clinical Chemistry
Arsenic	3.00E-04	IRIS	3				Med	Skin
Barium	7.00E-02	IRIS	3	5.00E-04	HEAST	1,000		Blood, Fetus
Cadmium	5.00E-04	IRIS	10					Kidney
Chromium (total)	1.00E+00	IRIS	500				Low	Not Reported
Copper	3.70E-02	HEAST	NR					GI Tract
Magnesium	9.70E+00	ECAO	1,000					GI Tract
Manganese	1.00E-01	IRIS	1	4.00E-04	IRIS	300	Med/Med	CNS, Respiratory
Mercury	3.00E-04	HEAST	1,000	3.00E-04	HEAST	30		Kidney, Nervous
Nickel	2.00E-02	IRIS	100				Med	Body Weight
Thallium	7.00E-05	HEAST	3,000					Clinical Chemistry
Uranium	3.00E-03	IRIS	1,000					Kidney
Zinc	2.00E-01	HEAST	10					Blood

**Table 7-2 (Continued)**  
**TOXICITY FACTORS**

NON-CARCINOGENS	REFERENCE DOSE						CONFIDENCE LEVEL	SYSTEM EFFECTED
COMPOUND	Oral	Source	UF/MF	Inhalation	Source	UF/MF	Oral/ Inhalation	
Zirconium	3.00E+00	ECAO	1,000					No Effect Level
Ammonia	6.00E-02	HEAST	1					Taste
Fluoride	6.00E-02	IRIS	1				High	Teeth
Nitrate	1.60E+00	IRIS	1				High	Blood

Reference Dose, units - milligrams per kilogram of body weight per day (mg/kg/day)

UF - Uncertainty Factor

MF - Modifying Factor

NA - Not available

NR - Not Reported

IRIS - Integrated Risk Information System, USEPA, 1992

HEAST - Health Effects Assessment Summary Tables, Annual Summary, USEPA, 1992

ECAO - Environmental Criteria and Assessment Office, USEPA, Cincinnati, 1992

RADIONUCLIDES	SLOPE FACTOR		SOURCE	WEIGHT OF EVIDENCE
COMPOUND	Ingestion	Inhalation		
Radium-226D	1.20E-10	3.00E-09	HEAST	A
Radium-228D	1.00E-10	6.90E-10	HEAST	A
Thorium-228	5.50E-11	7.80E-08	HEAST	A
Thorium-230	1.30E-11	2.90E-08	HEAST	A
Thorium-232	1.20E-11	2.80E-08	HEAST	A

D - Risks from decay products also included

Slope Factor, units - risk per unit picocurie intake or exposure (risk/pCi)

HEAST - Health Effects Assessment Summary Tables, Annual Summary, USEPA, 1992

worker scenario in the Soil Amendment Area.

Human exposure to chemicals in groundwater can occur through ingestion of drinking water, by dermal contact during bathing, handwashing etc., or by inhaling chemicals volatilized from water during showering, cooking, or other household activities. The RI/FS determined that groundwater generally flows in a westerly direction below the TWCA Site to the Willamette River. TWCA currently uses water supplied by the local municipal system for drinking water purposes. Water used in TWCA's ongoing manufacturing processes is taken from the Willamette River. In addition, a beneficial use survey conducted during the RI/FS indicated current residences and industries in the vicinity of the TWCA facility do not use groundwater for drinking water purposes. For these reasons, the Baseline Human Health Evaluation concluded that there are no current receptors for groundwater exposures. Therefore, only exposure of contaminated groundwater to future workers on the main plant and potential future residents in the Farm Ponds Area were evaluated.

Exposure point concentrations for the TWCA Site Baseline Human Health Evaluation were derived in a manner consistent with the EPA guidance to evaluate Reasonable Maximum Exposures (RMEs). The RME is defined as the highest exposure that is reasonably expected to occur at a site. In addition the Baseline Human Health Evaluation includes information that incorporates both the average and the high-end RME portions of the risk distribution. Presentation of the plausible range of risk allow risk management decisions to incorporate the relative uncertainty in the risk estimates. The average case exposure assumptions largely represent the 50th percentile values within the population.

The exposure assumptions used to estimate potential RME and average case exposures to chemicals of concern at the TWCA Site are summarized in **Table 7-3** for groundwater.

#### **7.1.5 Risk Characterization**

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated by multiplying the SF (see "Toxicity Assessment" above) by the "chronic daily intake" developed using the exposure assumptions. These risks are probabilities generally expressed in scientific notation (e.g.  $1 \times 10^{-4}$ ). An excess lifetime cancer of  $1 \times 10^{-4}$  means that an individual has a 1 in 10,000 chance of developing cancer as a result of site-related exposure to a carcinogen under the specific exposure conditions assumed.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g. lifetime) with a reference dose (see "Toxicity

**Table 7-3  
EXPOSURE ASSUMPTIONS FOR GROUNDWATER PATHWAYS**

	Plant Area		Farm Ponds Area	
Exposure Parameters	Average	RME	Average	RME
Exposed Individual	Worker	Worker	Resident	Resident
Body Weight (Kg)	70	70	70	70
Ingestion Rate(L/day)	1L/day	1L/day	1.4L/day	2L/day
Inhalation Rate(m <sup>3</sup> /day)	NA	NA	10.3	15
Days/Year Exposed	250	250	275	350
Years Exposed	9	25	9	30
NA = Not Applicable				



Assessment" above) derived for a similar exposure period. Hazard quotients are calculated by dividing the chronic daily intake by the specific RfD. By adding the hazard quotients for all contaminants of concern that affect the same target organ (e.g. liver), the hazard index (HI) can be generated.

The RME provides a conservative but realistic exposure in considering remedial action at a Superfund site. Based on the RME, when the excess lifetime cancer risk estimates are below  $1 \times 10^{-6}$  (1 in 1,000,000), or when the noncancer HI is less than 1, EPA generally considers the potential human health risks to be below levels of concern. Remedial action is generally warranted when excess cancer risks exceed  $1 \times 10^{-4}$ . Between  $1 \times 10^{-6}$  and  $1 \times 10^{-4}$ , cleanup may or may not be selected, depending on individual site conditions including human health and ecological concerns.

The potential human health risks at the TWCA Site were characterized by estimating risks on a sample-specific basis. This approach retains information on the geographic distribution of risk throughout the study area. The sample specific risks were used to distinguish specific areas of the TWCA Site that exceed risk-based levels.

A summary of non-cancer and cancer risks from worker exposure to groundwater from the Farm Ponds, Extraction, Fabrication, and Solids Area Remedial Sectors at the TWCA Site is presented in **Table 7-4**. This table summarizes the sample-specific non-cancer HIs exceeding 1 or cancer risk estimates exceeding or equal to  $1 \times 10^{-4}$ ,  $1 \times 10^{-5}$ , and  $1 \times 10^{-6}$  based on RME scenarios developed for the Site. Cancer risk estimates are independently summarized for chemicals and radionuclides.

As can be seen from **Table 7-4**, groundwater contains chemical concentrations that exceed both the non-cancer HI of 1 and the cancer risk level of  $1 \times 10^{-4}$ . The potential exposure pathway evaluated was ingestion of groundwater.

For the main plant, EPA assumed a less conservative approach in that workers would be potentially exposed to contaminated groundwater. Ingestion of groundwater from the Extraction Area can subject workers to excess lifetime cancer risks of up to  $4 \times 10^{-3}$ . Non-cancer risk estimates for workers ingesting groundwater from the Extraction Area are as high as  $HI = 82.03$ . Excess lifetime cancer risk estimates for workers ingesting groundwater from the Fabrication Area are as high as  $6 \times 10^{-3}$ . Non-cancer risk estimates for workers ingesting groundwater from the Fabrication Area are as high as  $HI = 84.75$ . Ingestion of groundwater from the Solids Area can subject workers to excess lifetime cancer risks of  $1 \times 10^{-4}$ . Non-cancer risk estimates for workers ingesting groundwater from the Solids Area are as high as  $HI = 15.98$ .

For the Farm Ponds Area, EPA utilized a more conservative approach. Since the potential future use of the Farm Ponds Area is uncertain, EPA assumed that potential future residents could be exposed to contaminated groundwater from this area.

**Table 7-4**  
**SUMMARY OF SAMPLE-SPECIFIC RISKS FOR GROUNDWATER<sup>a</sup>**

Remedial Sector	Hazard Index > 1.0		Cancer Risk $\geq 10^{-4}$		Cancer Risk $\geq 10^{-5}$		Cancer Risk $\geq 10^{-6}$	
	Average	RME	Average	RME	Average	RME	Average	RME
<b>Farm Ponds Area</b>								
Chemical Risk - (Ing)	3/19	9/19	0/19	2/19	2/19	3/19	4/19	5/19
- (Inh)	0/19	0/19	0/19	2/19	2/19	4/19	4/19	5/19
Radiation Risk*	NA	NA	0/19	0/19	0/19	3/19	3/19	13/19
<b>Extraction Area</b>								
Chemical Risk	7/10	7/10	1/10	6/10	4/10	7/10	7/10	7/10
Radiation Risk	NA	NA	0/9	1/9	1/9	1/9	3/9	7/9
<b>Fabrication Area</b>								
Chemical Risk	12/18	14/18	8/18	13/18	11/18	16/18	16/18	18/18
Radiation Risk	NA	NA	0/18	0/18	0/18	3/18	3/18	14/18
<b>Solids Area</b>								
Chemical Risk	17/19	18/19	0/19	2/19	1/19	6/19	4/19	8/19
Radiation Risk	NA	NA	0/19	0/19	0/19	1/19	7/19	14/19
<b>Background</b>								
Chemical Risk - Res.	2/5	5/5	0/5	5/5	5/5	5/5	5/5	5/5
- Occ.	1/6	3/6	0/6	3/6	3/6	4/6	6/6	6/6
Radiation Risk - Res.	NA	NA	0/5	0/5	0/5	0/5	0/5	4/5
- Occ.	NA	NA	0/6	0/6	0/6	0/6	0/6	5/6

a = Values listed are the number of groundwater wells in the remedial sector that had sample-specific noncancer hazard index estimates exceeding 1.0 or excess lifetime cancer risk estimates of greater than or equal to  $1 \times 10^{-4}$ ,  $1 \times 10^{-5}$ , or  $1 \times 10^{-6}$  under assumed reasonable maximum or average case exposure conditions.

NA = Not applicable.

\* = Radiation risks were calculated from concentrations of radionuclide compounds in groundwater.

Ingestion of groundwater in the Farm Ponds Area can subject potential future residents to excess lifetime cancer risks as high as  $4 \times 10^{-4}$ . Non-cancer risk estimates for potential future residents ingesting water from the Farm Ponds Area are as high as  $HI = 5.50$ .

Non-cancer risk estimates for groundwater at the TWCA Site indicate that the primary risk contributing chemicals are VOCs such as 1,1-DCE, 1,1,1-TCA, and MIBK; metals such as magnesium and manganese; and inorganic constituents such as ammonia, fluoride, and nitrate. Well PW-28A in the Extraction Area had numerous chemicals with hazard quotients above 1.

Cancer risk estimates for groundwater indicate that VOCs and arsenic are the primary contributors to risks. Arsenic was present in groundwater, however, arsenic concentrations are below the Maximum Contaminant Level (MCL) of 50 parts per billion (ppb) established pursuant to the Safe Drinking Water Act, 42 U.S.C. 300f (SDWA). The VOCs which contribute to cancer risk are 1,1-DCE, 1,2-dichloroethane, TCE, PCE, and vinyl chloride.

## **7.2 Environmental Risk Characterization**

To assess the environmental effects of the contaminants present at the TWCA Site, TWCA conducted an evaluation of potentially affected terrestrial and aquatic species. The environmental evaluation was conducted in three phases which are described below:

In the first phase, chemical concentrations in sediment, surface water, and biota were compared with concentrations demonstrated to be potentially toxic to terrestrial or aquatic wildlife. Potentially toxic concentrations were identified from literature sources or protective federal criteria such as the ambient water quality criteria (AWQC) established pursuant to the Clean Water Act, 42 U.S.C. 1251 et seq. (CWA). Chemicals occurring on Site at potentially toxic concentrations were identified as the most important chemicals of potential concern, and were carried on to subsequent phases.

During the second phase, the possibility of ecological impact at the TWCA Site was measured directly using field studies to evaluate the ecological status of terrestrial and aquatic communities, and by conducting laboratory toxicity tests.

In the third phase, the results from each of the previous two phases were integrated using a weight-of-evidence scheme. Any geographical correlations among media concentrations of chemicals of potential concern, ecological status as determined by

field surveys, toxicity testing results, and measures of exposure (e.g. tissue residues) were examined to identify the likelihood of environmental impact.

### **7.2.1 Potential for Exposure and Toxicity to Ecological Receptors**

Potential exposures to ecological receptors at the Site were estimated using concentrations of contaminants which were detected during the RI. Contaminants detected in surface waters at the TWCA Site include VOCs, metals, and other inorganics such as ammonia and nitrate. Chemicals detected in sediments include VOCs, HCB, PCBs, metals, and other inorganics such as ammonia and fluoride. Exposure pathways with the highest likelihood of being complete include exposure to aquatic organisms through direct contact with chemicals in surface water and sediments, and secondary exposures to predators consuming fish containing body burdens of chemicals. Analyses of tissues of aquatic organisms indicated the presence of HCB and PCBs.

Some chemicals in surface water, sediment, and/or biota collected at the Site are present at levels that may be toxic to aquatic organisms or predators. However, the likelihood of sustained exposure to predators at maximum detected concentrations is low, because the locations with maximum concentrations are the most centrally located within TWCA's manufacturing facility, where the occurrence of predators is least likely.

### **7.2.2 Ecological Response Assessment**

Quantitative biological endpoints were measured during the RI which included benthic organism diversity and abundance, terrestrial vegetative mass, and aquatic toxicity of surface water and sediment. Qualitative biosurveys were conducted to evaluate terrestrial habitat types and vegetation, wetlands, terrestrial wildlife occurrence, and surface water aquatic organism occurrence.

### **7.2.3 Evaluation of Causal Evidence Between Measured Exposures and Ecological Responses**

HCB and PCBs in creek sediments and fish tissues were above levels of concern and were also the only chemicals that showed consistent geographical concentration gradients. Therefore, results of biological effects studies were evaluated to see if responses align with in-field exposure estimates for HCB and PCBs. **Table 7-5** summarizes the results of this comparison. This table shows that there may be a correlation between contaminated sediment from Truax Creek (sample location TC-5) and the acute toxicity seen in aquatic species tested with this contaminated sediment. However, other areas having the greatest potential for exposure in Truax Creek (TCB-2, TCB-3), Third Lake (TLB-1 and TL-1), and Conser Slough (CSB-1) did not show proportionate measures of effect for any response category.

**Table 7-5**  
**COMPARISON OF FIELD OR LAB-DERIVED ECOLOGICAL MEASUREMENTS**  
**WITH EXPOSURE ESTIMATES FOR POLYCHLORINATED BIPHENYLS AND HEXACHLOROBENZENE**

Biosurvey Location	Aquatic Toxicity Testing								Bioaccumulation Study		Sediment Concentration	
	Surface Water				Sediment				Concentrations in Fish Tissue			
	Acute			Chronic	Acute				Total PCBs <sup>a</sup>	HCB <sup>a</sup>	Total PCBs <sup>b</sup>	HCB <sup>b</sup>
	FHM	DM	MT	FHM	FHM	DM	MT	AMPH				
Truax Creek Bank	100	100	>45	0.470	100	95	>100	86.7	510	ND	88	ND
Truax Creek Bank	NT	NT	NT	NT	80	95	>45	91.1	2800	12000	7800	ND
											935	ND
											4000	ND
											1110	94J
Truax Creek Bank	100	100	>100	0.445	95	20 (75) <sup>c</sup>	>100	75.6	3800	28000	410	ND
											16700	1193
											1146	340J
Third Lake Bank	NT	NT	NT	NT	100	90	>100	91.1	800	2400	380	ND
											75	ND
											NS	ND
Conser Slough Bank	100	100	>100	0.520	100	80	>100	88.9	2000	1100	232	ND
											39	ND
Murder Creek Bank	NT	NT	NT	NT	NT	NT	NT	NT	ND	ND	NS	NS
Murder Creek Bank	100	100	>100	0.473	100	100	>100	95.6	310	ND	NS	ND
											510	ND

**Table 7-5**  
**COMPARISON OF FIELD OR LAB-DERIVED ECOLOGICAL MEASUREMENTS**  
**WITH EXPOSURE ESTIMATES FOR POLYCHLORINATED BIPHENYLS AND HEXACHLOROBENZENE**

Biosurvey Location	Aquatic Toxicity Testing								Bioaccumulation Study		Sediment Concentration	
	Surface Water				Sediment				Concentrations in Fish Tissue			
	Acute			Chronic	Acute				Total PCBs <sup>a</sup>	HCB <sup>a</sup>	Total PCBs <sup>b</sup>	HCB <sup>b</sup>
	FHM	DM	MT	FHM	FHM	DM	MT	AMPH				
Murder Creek Bank	NT	NT	NT	NT	100	100	>100	73.3 <sup>d</sup>	320	ND	219	ND
											790	ND
Murder Creek Bank	100	100	>45	0.580	95	100	84.5	88.9	560	ND	NS	ND
											375	ND
Burkhart Creek	NT	NT	NT	NT	100	100	>100	93.3	470	ND	ND	ND
Control	100	100	--	0.503	100	100	--	96.7				

All chemical concentrations in ppb.

ND = Not detected at method detection limits

NT = Not tested

PCB = Polychlorinated biphenyls (reported as total of detected aroclor concentrations.

HCB = Hexachlorobenzene

FHM = Fathead minnow

DM = Daphnia magna

MT = Microtox

AMPH = Amphipod

<sup>a</sup> Maximum detected tissue concentration of total PCBs and HCBs are listed.

<sup>b</sup> Average detected concentration is listed and was calculated from data collected during three sediment sampling rounds.

<sup>c</sup> Second test resulted in 75 percent survival.

<sup>d</sup> A significant (p<0.05) reduction in survival was observed.

### **7.3                      Uncertainty in the Risk Assessment**

The accuracy of the risk characterization depends in large part on the accuracy and representativeness of the sampling, exposure, and toxicological data. Many assumptions are intentionally conservative so the risk assessment will be more likely to over-estimate risk than to under-estimate it.

The sample-specific approach used for the assessment of risks at the TWCA Site could potentially over- or under-estimate risk. Much of the sampling was directed rather than random. This could lead to higher calculated risks for suspected source areas where concentrations of chemicals exceed average on-Site levels. Since the sampling at the Site however was not exhaustive, under-estimation of risk may occur as areas of higher concentration (i.e. "hot spots") may have been missed.

Another source of uncertainty is that the risk assessment assumed that there could be exposure of workers to groundwater in the future. The groundwater beneath the Site is not currently used as a drinking water source. Since the Site is zoned for industrial use it is highly unlikely that groundwater beneath the Site would be used as a source of drinking water in the foreseeable future.

Uncertainty in the toxicity evaluation may over-estimate risks by relying on slope factors that describe the upper confidence limit on cancer risk for carcinogens. Some under-estimation of risk may occur due to lack of quantitative toxicity information for some contaminants detected at the TWCA Site. Qualitative uncertainty (over- or under-estimation) exists when assuming chemicals that cause cancer in animals may also cause cancer in humans.

Groundwater samples were not filtered because filtered samples may underestimate chemical concentrations in water from an unfiltered tap. However, the fact that such samples were not filtered may lead to an over-estimation of the risk at the TWCA Site due to the presence of inorganic contaminants which are not dissolved in the groundwater.

Background concentrations could not be fully characterized, because background locations were chosen, during the RI/FS scoping and prior to characterization of the Site, from areas which are potentially impacted by the Site. Adequate characterization of background would allow risks attributed to the TWCA Site to be distinguished from risks resulting from naturally-occurring chemicals.

A source of uncertainty which could lead to underestimation of risk is that chemical concentrations in environmental media will remain constant over the assumed exposure period. Because TWCA is an active operating facility, leaks or spills of hazardous materials from pipes and structures could pose additional risks at the Site. Analyses of the potential for future leaks and spills at the TWCA facility is beyond the

scope of the Superfund cleanup. In addition, as the RI was only designed to characterize contamination in areas which were not under existing buildings and structures on the TWCA Site, it is uncertain whether contamination which may pose further risks exists in the uncharacterized areas. Such risks could include potential exposure to soil contaminants during remodeling or excavation of these structures. In addition, long-term groundwater risks could be underestimated due to the potential presence of contaminated groundwater beneath these structures. EPA has determined that the uncertainties associated with this possible underestimation of risk may best be dealt with as set forth in Section 10 of this ROD entitled "Selected Remedy."

The assumption that concentrations will remain constant over the assumed exposure period may also lead to over-estimation because some compounds may degrade or disseminate over time.

Method detection limits for some chemicals detected in the RI (e.g. 1,1-DCE, vinyl chloride) were above concentrations that were of potential concern. For these chemicals in this sample-specific risk assessment risks may be underestimated.

#### **7.4 Conclusions**

Worker exposure to groundwater at the Site could result in unacceptable lifetime cancer and non-cancer risks. Worker exposure by ingestion of groundwater at the Site could result in as great as 5 in 100 excess lifetime cancer risk.

Based on the results of the RI/FS, concentrations of contaminants of concern in groundwater at the TWCA Site exceed chemical-specific health-based standards such as the Maximum Contaminant Levels (MCLs) set under the Safe Drinking Water Act (SDWA), 40 C.F.R. Part 141. EPA determined that risks from Site-related contaminated groundwater to potential off-Site receptors need not be evaluated in the RI, because a Groundwater Beneficial Use Survey conducted by TWCA as part of the RI/FS concluded that groundwater wells in the immediate vicinity of the Site were not attractive as drinking water supplies due to the groundwater aquifer's current inability to produce enough water for potable use. The survey showed that off-Site groundwater wells were used solely for industrial purposes. Since the off-Site groundwater wells are not used to provide drinking water, no human exposure from ingestion would occur. However, the RI/FS concluded that on-Site groundwater is contaminated near the property boundary. This contaminated groundwater could potentially migrate to adjacent off-Site areas. In addition, the Groundwater Beneficial Use Survey was limited in scope because it only evaluated adjacent areas to the east of the TWCA facility, because the Willamette River is to the west of the facility and groundwater generally flows towards the river. Groundwater beneath and adjacent to the Site could potentially be used as a drinking water source despite the fact that such is not the current or projected use. Contaminated groundwater beneath the Site also



discharges to adjacent surface water bodies including the Willamette River.

Sediments contaminated with PCBs and HCB were detected in many areas of the Site. Detected concentrations of PCBs in sediments ranged from 88 ppb to 16,700 ppb. Detected concentrations of HCB in sediments ranged from 94 ppb to 1,193 ppb. Truax Fill material contains elevated concentrations of PCBs. Detected concentrations of PCBs in Truax Fill ranged from 250 ppb. to 6,800 ppb. The RI/FS indicated that the highest concentration of HCB and PCB in sediments were found in portions of Truax Creek. Therefore, the sediments of Truax Creek pose the greatest risk to fish and mammals who may inhabit the area.

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Based on the results of the risk assessment, and on the findings of the RI/FS the following remedial action objectives (RAOs) have been established for groundwater, surface water and sediment at the TWCA Site. These remedial action objectives take into account that TWCA is an active facility with ongoing manufacturing operations and seeks to achieve remedial goals while minimizing adverse impacts on TWCA's ongoing operations.

**For groundwater:**

- a) Prevent people from drinking groundwater containing contaminant levels above federal or state drinking water standards.
- b) Prevent contaminated groundwater above federal or state drinking water standards from leaving the TWCA property boundary.
- c) Reduce the concentrations of TWCA-related organic, inorganic, or radionuclide compounds in groundwater to concentrations below federal or state drinking water standards or other risk-based levels.
- d) Prevent groundwater containing TWCA-related organic, inorganic, or radionuclide compounds above federal or state standards from discharging into nearby surface waters.

**For sediments:**

- e) Prevent TWCA-related contaminants from moving into sediments, and from sediments into surface water.
- f) Prevent sediments containing TWCA-related contaminants from leaving the site.

- g) Prevent aquatic organisms from coming in contact with contaminated sediments.
- h) Reduce concentrations of TWCA-related compounds in sediments where necessary, to protect aquatic organisms.

**For surface water:**

- i) Ensure that non-permitted discharges to surface water from the TWCA facility do not exceed federal or state water quality standards.

## 8.0 DESCRIPTION OF ALTERNATIVES

The TWCA Site was divided into two areas in order to facilitate evaluation of remedial alternatives. These areas are the Main Plant Area and the Farm Ponds Area. The Main Plant Area was further subdivided into the Extraction, Fabrication, and the Solids Area. Various remedial alternatives were analyzed in detail for each area of the Site, except for the Solids Area. Sludges from two ponds located within the Solids Area (Schmidt Lake and the LRSP) were removed as part of an operable unit remedial action. Post-removal confirmatory sampling of the former sludge ponds has not yet been completed. Confirmatory sampling of the Solids Area will be conducted and evaluated as part of the soils operable unit to determine if additional cleanup action is required.

Estimated costs for each of the alternatives are accurate within the range of +50 percent to -30 percent. Estimated present worth costs are based on a 30-year life of the remedial alternative using a discount rate of 5 percent.

All of the evaluated alternatives would result in contaminants remaining on-site above health-based levels. Therefore, CERCLA requires that Site conditions be reviewed at intervals of at least every five years. If warranted by the review, additional remedial actions would be initiated at that time.

A total of seven remedial alternatives, including "No Further Action", were considered for cleanup of contaminated ground water, and sediment at the TWCA Site. As part of each alternative, the RI/FS also included an evaluation of options for cleaning up chemically contaminated soil at the Site. These soil cleanup options are not documented or evaluated in this ROD. Soil cleanup options will be evaluated as part of the subsequent soil operable unit ROD.

Elements of the evaluated alternatives, excluding the "No Further Action" Alternative, are summarized in **Table 8-1**. Major federal and state applicable or relevant and appropriate requirements (ARARs) for the Site are listed in **Tables 8-2A and 8-2B**. A description as to how the major ARARs would be met by each alternative is also provided in this Section.

### 8.1 Alternative 1 - No Further Action

The NCP requires that a "no action" alternative be evaluated as a potential remedial alternative for each Superfund site. For this alternative no further action would be taken at the TWCA Site beyond those remedial measures which have already been implemented (see Section 3.4 of this ROD). TWCA is an operating facility, and deed restrictions are already in place which prohibit the use of groundwater below the

**Table 8-1**  
**ELEMENTS OF TWCA SITE CLEANUP ALTERNATIVES**

CLEANUP ELEMENT	ALTERNATIVE					
	2	3	4	5	6	7
Monitoring	X	X	X	X	X	X
Institutional Controls	X	X	X	X	X	X
Ground Water Extraction <sup>1</sup>		X	X	X	X	X
Slope Erosion Protection Truax Creek		X	X	X	X	X
Sediment Removal			X	X	X	X
Capping of Surface Soils				X	X	X
Dilution of Soil Contamination in Feed Makeup Area					X	X
Source Reduction						X
Present Worth Cost-30 Years (\$ Millions)	1.29	2.03	3.80	5.31	6.93	7.50
Time to Implement (Years)	0.25	1	1	1	1	1

<sup>1</sup> = The number of wells in which ground water would be extracted progressively increases from Alternative 3 through Alternative 6. (Alternative 3 = 3 wells; Alternative 4 = 13 wells, Alternative 5 = 22 wells; Alternative 6 = 36 wells.)

**Table 8-2A  
FEDERAL CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARs**

Chemical-Specific	Citation	Prerequisite	Requirement	Location	Alternative
<b>• Applicable Requirement</b>					
1. National Primary Drinking Water Regulations	Safe Drinking Water Act (SDWA) 40 CFR 141	Off-property drinking water supplies, if these wells are community wells that serve more than two residences. MCLs and MCLGs for arsenic, copper, lead, mercury, PCBs, selenium, silver, zinc, nitrate, chlorinated hydrocarbons, and total trihalomethanes.	Maximum permissible level of contaminant which may be delivered to user of public water system.	Sitewide	2, 3, 4, 5, 6, and 7
<b>• Relevant and Appropriate Requirement</b>					
1. Standards for Management of Uranium Byproduct Materials Pursuant to Section 84 of The Atomic Energy Act of 1954, as amended	40 CFR 192 Subpart D	Applies to the management of Uranium byproduct materials under Section 84 of the Atomic Energy Act of 1954, as amended, during and following processing of uranium ores, and to restoration of disposal sites following any use of such site.	Standards for application during processing operations and prior to the end of the closure period.	Sitewide	7
2. National Primary Drinking Water Regulations	Safe Drinking Water Act (SDWA) 40 CFR 141	RAOs for onsite and offsite groundwater. MCLs and MCLGs for arsenic, copper, lead, mercury, PCBs, selenium, silver, zinc, nitrate, chlorinated hydrocarbons, and total trihalomethanes.	Maximum permissible level of contaminant which may be delivered to user of public water system.	Sitewide	2, 3, 4, 5, 6, and 7

**Table 8-2A  
FEDERAL CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Location-Specific	Citation	Prerequisite	Requirement	Location	Alternative
• Applicable Requirement					
1. Waters in and around the site.	Clean Water Act (Section 404) - Dredge of Fill Requirements; 33 U.S.C. 1251-1376; 40 CFR 230, 231	Capping, dike stabilization, construction of berms and levees, and disposal of contaminated soil, waste material or dredged material are examples of activities that may involve a discharge of dredged or fill material.	<p>The four conditions that must be satisfied before dredge and fill is an allowable alternative are:</p> <ul style="list-style-type: none"> <li>• There must be no practical alternative.</li> <li>• Discharge of dredged or fill material must not cause a violation of water quality standards, or pose a threat to aquatic life.</li> <li>• No discharge shall be permitted that will cause or contribute to significant degradation of the water.</li> <li>• Appropriate steps to minimize adverse effects must be taken.</li> </ul>	Surface Water Remedial Sector.	4, 5, 6, and 7
2. Site Located in areas of critical habitat upon which endangered or threatened species depend	40 CFR Part 6.032(b)	Determination of presence of endangered and threatened species.	The remedial action will be designed to conserve endangered or threatened species and their habitat.	Sitewide	2, 3, 4, 5, 6, and 7

**Table 8-2A**  
**FEDERAL CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Location-Specific	Citation	Prerequisite	Requirement	Location	Alternative
3. Area containing fish and wildlife habitat.	Fish and Wildlife Conservation Act of 1980; 16 U.S.C. 2901; 50 CFR Part 83. Fish and Wildlife Conservation Act, 16 U.S.C. §661 <u>et seq.</u>	Activity affecting wildlife and non-game fish.	Remedial action will conserve and promote conservation of non-game fish and wildlife and their habitats.	Surface Water Remedial Sector.	2, 3, 4, 5, 6, and 7
<b>• Relevant and Appropriate Requirement</b>					
1. Site located within a floodplain	Protection of Floodplains - Executive Order 11988; 40 CFR 6, Appendix A	Remedial action will take place within a 100-year floodplain	The remedial action will be designed to avoid adversely impacting the floodplain wherever possible to ensure that the action's planning and budget reflects consideration of the flood hazards and floodplain management.	Main Plant	3, 4, 5, 6, and 7
2. Closure Requirements	RCRA 40 CFR Part 264, Subpart G	Closure of hazardous waste repositories must meet protective standards.	Regulations to minimize contaminant migration, provide leachate collection, and prevent contaminant exposure will be met.	Former sludge ponds in the Solids Area; V2 Pond	3, 4, 5, 6, and 7
3. Post-Closure Requirements	RCRA 40 CFR Part 264, Subpart G	Closure of hazardous waste repositories must meet protective standards.	Protectiveness will be achieved through capping and institutional controls.	Former sludge ponds in the Solids Area; V2 Pond	3, 4, 5, 6, and 7

**Table 8-2A  
FEDERAL CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Action-Specific	Citation	Prerequisite	Requirement	Location	Alternative
• Applicable Requirement					
1. CWA-NPDES  Industrial and/or Stormwater Discharge Permits Regulations	NPDES 40 CFR §122	Discharges to waters of U.S. must meet standards established under NPDES program	Treatment of water to meet new permit requirements	Onsite surface water services and ponds	3, 4, 5, 6, and 7.
2. PCB Storage and Disposal	40 CFR §761.60	When PCBs and PCB items are removed from service and disposed of, disposal must be undertaken in accordance with regulations	PCBs at concentrations of 50 ppm or greater must be disposed of in an incinerator which comply with 40 CFR 761.70.	Sitewide	4, 5, 6, and 7
3. RCRA Land Disposal Treatment Standards	40 CFR Part 268, Subpart D	Determine whether excavated soils and debris exhibit RCRA hazardous waste characteristics	A restricted waste may be land disposed only if an extract of the waste or of the treatment residue of the waste developed using the test method in Appendix II of Part 261 does not exceed the value shown in Table CCWE.	Sitewide	3, 4, 5, 6, and 7
4. RCRA Transportation Regulations	40 CFR Part 263	Determine whether excavated soils and debris exhibit RCRA hazardous waste characteristics	Establishes standards which apply to persons transporting hazardous waste within the United States if the transportation requires a manifest and 40 CFR Part 262.	Sitewide	4, 5, 6, and 7



**Table 8-2A**  
**FEDERAL CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Action-Specific	Citation	Prerequisite	Requirement	Location	Alternative
5. Occupational Safety and Health Act (OSHA)	29 U.S.C. §651	Congress finds that personal injuries and illness arising out of work situations impose a substantial burden upon, and hindrance to, interstate commerce in terms of lost production, wage loss, medical expenses, and disability compensation payments.	Congress' purpose and policy, through the exercise of its powers to regulate commerce among the several States with foreign nations and to provide for the general welfare and healthy working conditions and to preserve our human resources.	Sitewide	2, 3, 4, 5, 6, and 7
6. The implementing regulations under OSHA	29 CFR Parts 1910 and 1926	For on-site workers implementing remedial/cleanup actions.	No contractor or subcontractor for any part of the contract work shall require and laborer or mechanic employed in the performance of other contract in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health or safety.	Sitewide	2, 3, 4, 5, 6, and 7
7. Ambient Water Quality Criteria	40 CFR Part 131	A water quality standard defines the water quality goals of a water body, or portion thereof by designating the use or uses to be made of the water and by setting criteria necessary to protect the users.	Describes the requirements and procedures for developing, reviewing, revisiting, and approving water quality standards by the States as authorized by Section 303(c) of the Clean Water Act.	Surface Water Remedial Sector.	2, 3, 4, 5, 6, and 7

**Table 8-2A**  
**FEDERAL CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Action-Specific	Citation	Prerequisite	Requirement	Location	Alternative
8. Clean Air Act (CAA)  New Source Performance Standards	40 CFR Part 61	For control of dust particles emitted into the air during remediation activities.	Emissions to the atmosphere from stationary sources subject to the provisions of this Part.	Main Plant	2, 3, 4, 5, 6, and 7
9. RCRA Air Emission Standards for Process Vents	40 CFR Part 264 Subpart AA	For onsite air emissions from groundwater treatment systems.	Owner or operator of the facility with process vents associated with distillation, fractionation, thin film evaporation, solvent extraction, or air or steam stripping operations managing hazardous waste with organic concentrations of at least 10 ppmw shall either reduce total organic emissions from all affected process vents at the facility below 1.4 kg/h or 2.8 Mg/yr or by 95 weight percent.	Main Plant	2, 3, 4, 5, 6, and 7
<b>• To Be Considered Materials</b>					
1. EPA Guidance on Selecting Remedies at Superfund Sites with PCB Contamination	OSWER Directive No. 9355.4-01  40 CFR §264.552  40 CFR §264.521	A Corrective Action Management Unit (CAMU) may be considered at the TWCA Site for the purpose of temporarily managing hazardous wastes that are associated with soil removal at the Site.	The RCRA CAMUs Provisions may be used to manage wastes that are generated at a RCRA facility for the purpose of implementing remedial actions required at that facility.	Sitewide	4, 5, 6, and 7

**Table 8-2A**  
**FEDERAL CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARs**

Action-Specific	Citation	Prerequisite	Requirement	Location	Alternative
2. TSCA Spill Cleanup Policy	40 CFR §761.120	TSCA PCB Spill Cleanup Policy provides guidance on recommended cleanup levels under certain access scenarios.	The Superfund PCB Guidance recommends cleanup criteria for remediation for PCB-contaminated soil and sediment. The guidance also recommends cap designs which are consistent with RCRA guidance, and specifies long-term management controls for PCB-contaminated media.	Sitewide	4, 5, 6, and 7

**Table 8-2B**  
**STATE OF OREGON CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Chemical-Specific	Citation	Prerequisite	Requirement	Location	Alternative
• Applicable Requirement					
1. Oregon Environmental Cleanup Law	ORS 465.315	Any removal or remedial action performed.	Remedial action that attains a degree of cleanup protective of human health and the environment, is cost-effective and uses permanent solutions and alternative treatment technologies or resource recovery technologies.	Sitewide	2, 3, 4, 5, 6, and 7
2. Oregon Environmental Cleanup Rules and Standards	OAR 340-122-040	Determination of removal, remedial action and degree of cleanup necessary to assure protection of the present and future public health and safety.	Oregon's Environmental Cleanup rules require the environmental shall be restored to background level, unless the Director determines that remedial actions designed to attain background level do not meet the "feasibility" requirement of OAR 340-122-090(1)(b), in which event the environment shall be restored to the lowest concentration level in accordance with OAR 340-122-090.	Sitewide	2, 3, 4, 5, 6, and 7
3. Oregon Water Quality Criteria for the Willamette Basin	OAR 340-41-445	Extracted groundwater which is discharge to surface water.	Discharges to surface water shall be protective of human health and aquatic life.	Sitewide	2, 3, 4, 5, 6, and 7
4. Oregon Health Division's Radiation Standards	OAR 333-104		Establishes cleanup standards for radionuclides in environmental media	Sitewide	2, 3, 4, 5, 6, and 7

**Table 8-2B**  
**STATE OF OREGON CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Chemical-Specific	Citation	Prerequisite	Requirement	Location	Alternative
1. Oregon's Air Program	ODEQ Air Quality Division's Toxic Air Pollutant Program Significant Emission Rates.	ODEQ's Air Quality Program are used as a screening tool to determine if air emissions from a facility are Toxic Air Pollutants, and if the quantity is significant to cause a potential harmful health effect.	Air emissions resulting from Superfund remediation activities at the TWCA Site will be monitored to ensure that levels of air emissions are not of concern.	Sitewide	2, 3, 4, 5, 6, and 7
Location-Specific	Citation	Prerequisite	Requirement	Location	Alternative
<b>• Applicable Requirement</b>					
1. Oregon's Statewide Planning Goals	Goal 5, Goal 6, Goal 7, and Goal 15	Those portions of the TWCA Site that lie within the Willamette River Floodplain	Remedial actions planned for these areas will need to be cleared through the City of Millersburg under its Floodplain Ordinance	Sitewide	2, 3, 4, 5, 6, and 7
<b>• Relevant and Appropriate Requirement</b>					
1. The Oregon Removal-Fill Law	ORS 196.800-196.990	Removal and remedial actions at the site associated with soil and sediment remediation	Requires a permit from Oregon Division of State Lands if 50 or more cubic yards of material are removed or filled in wetlands, streams, ponds or other waters. Although Section 121(e)(1) of CERCLA specifies that permits are not required for remedial actions conducted onsite, the substantive requirements of the Oregon Removal-Fill Law will be complied with.	Sitewide	4, 5, 6, and 7

**Table 8-2B**  
**STATE OF OREGON CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC ARARS**

Action-Specific	Citation	Prerequisite	Requirement	Location	Alternative
<b>• Applicable Requirement</b>					
1. Oregon Hazardous Waste Management Rules for PCBs	OAR 340-110	To establish requirements for storage, treatment, and disposal and marking prior to disposal.	Persons must consult 40 CFR §761 in addition to this Division and Division 120 of this chapter to determine all applicable PCB management requirements.	Sitewide	2, 3, 4, 5, 6, and 7
2. Oregon Hazardous Waste Management Rules for PCBs	OAR 340-100	Control hazardous waste from time of generation through transportation, storage, disposal, and treatment	Persons must also consult 40 CFR Parts 124 Subpart A, 260-266, 268, and 270, which are incorporated by reference in OAR 340-100-002, to determine all applicable hazardous waste management requirements.	Sitewide	2, 3, 4, 5, 6, and 7
3. Oregon Standard Applicable to Generator of Hazardous Wastes	OAR 340-101	To identify those residues which are subject to regulations of hazardous waste.	Persons must also consult 40 CFR Parts 124, 261-266, and 270 which are incorporated by reference in OAR 340-100-002, to determine all applicable hazardous waste management requirements.	Main Plant	2, 3, 4, 5, 6, and 7
4. Identification and Listing of Hazardous Wastes	OAR 340-102	Establish standards for generators of hazardous waste.	Persons must also consult 40 CFR Parts 124, 260-266, 268, and 270, which are incorporated by reference in OAR 340-100-002, to determine all applicable hazardous waste management requirements.	Main Plant	2, 3, 4, 5, 6, and 7
<b>• Relevant and Appropriate Requirement</b>					
1. Oregon Standards for Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities		Capping and excavation of soils, groundwater pretreatment, and decontamination of waste residuals.		Sitewide	2, 3, 4, 5, 6, and 7

operable unit sludge ponds for drinking water purposes. In addition, the TWCA property is zoned for industrial use, and no zoning changes are planned for the foreseeable future. The no further action alternative would not comply with the remedial action objectives for the Site, as concentrations of contaminants which are above acceptable risk levels would remain on Site.

## **8.2 Alternative 2 - Monitoring and Institutional Controls**

Alternative 2 focuses on reducing or controlling risk exposure pathways. Identified risks to human health would be addressed through institutional controls and monitoring. Assuming no further releases, it is anticipated that reduction of chemical concentrations in Site groundwater and sediments would occur over time through natural attenuation. Monitoring would be used to determine when institutional controls on groundwater use could be modified.

### **8.2.1 Institutional Controls**

Both the main plant and Farm Ponds Area are currently zoned by the City of Millersburg for heavy industrial use. TWCA's main plant has limited access. Access to the main plant is controlled 24 hours per day by security guards.

Additional institutional controls in the form of deed restrictions on the construction and use of groundwater wells for drinking water supply would be implemented on TWCA's main plant. This type of control would eliminate the potential for ingestion exposure while contaminants in groundwater are above risk-based levels.

Access controls at the Farm Ponds Area currently prevent contact with and exposure to contaminants in the area. Access controls will continue to be used at the Farm Ponds Area for as long as the area is used to manage TWCA's wastewater treatment plant sludge. Restrictions on the use of groundwater at the Farm Ponds could also be implemented by TWCA.

### **8.2.2 Monitoring**

A ground water monitoring program would be implemented as part of this Alternative to track the rate of chemical attenuation over time and follow changes in plume characteristics. The monitoring program would include semi-annual monitoring of 16 perimeter and 17 source area wells located at TWCA. All of the samples except samples from well PW-28A would be analyzed for volatile organics. Inorganic and radionuclides would be monitored in all wells on a semi-annual basis.

The monitoring program for surface water and sediment would include collecting samples at predesignated sampling stations on the plant site. The data would be

used to evaluate the impact that natural attenuation of the chemicals in the sediment may be having on surface water and sediment quality.

The surface water/sediment monitoring program identified for this alternative would consist of annual monitoring of four surface water locations and three sediment sampling locations at TWCA. The annual samples would be analyzed for HCB and PCBs.

### **8.2.3 Estimated Cost**

The present worth cost of the alternative for a 30-year period is estimated to be \$1,289,000. The estimated time to implement this alternative is 3 months.

## **8.3 Alternative 3 - Groundwater Extraction, Slope Erosion Protection, Institutional Controls and Monitoring.**

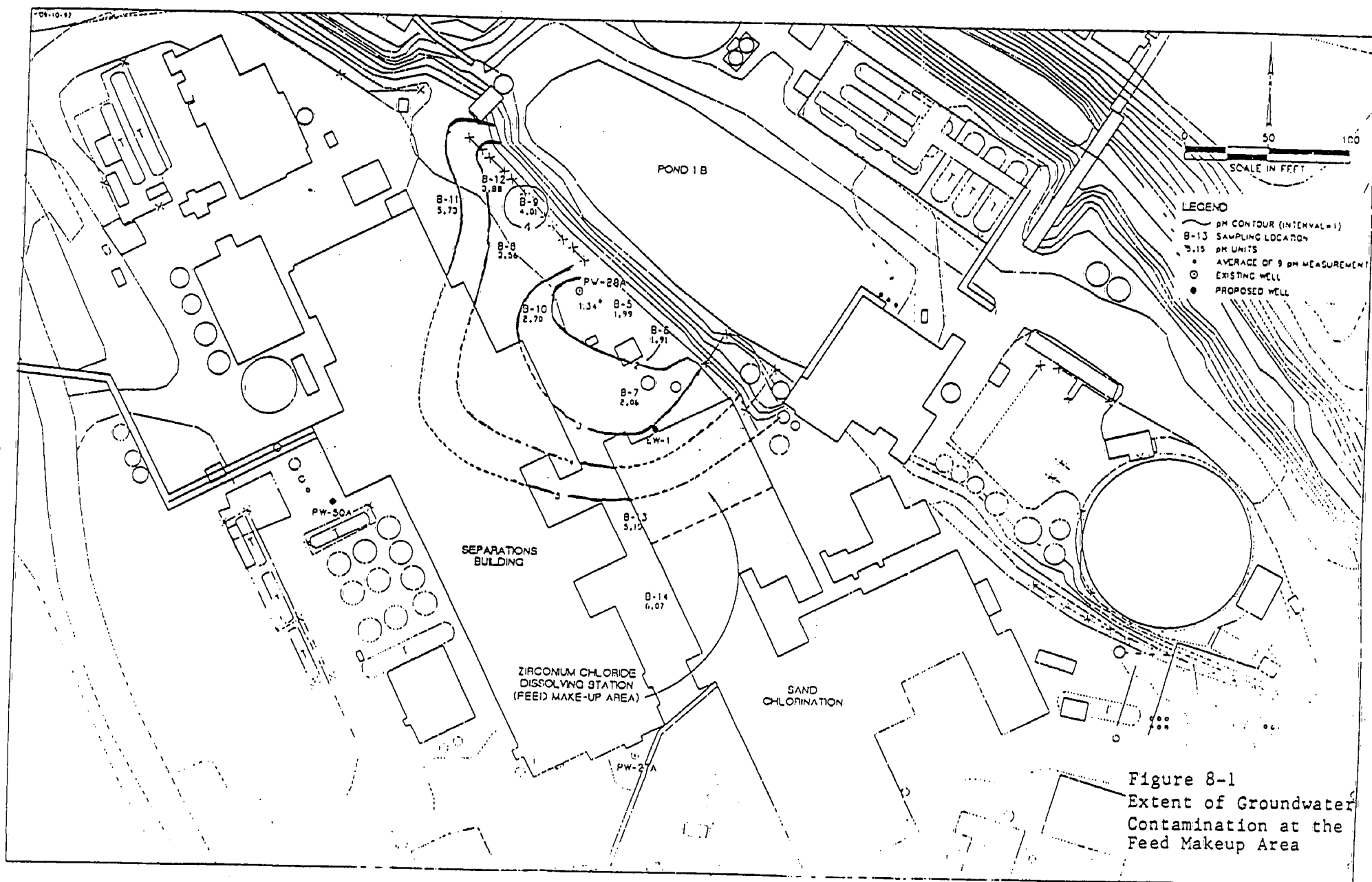
Alternative 3 includes the previously described components of Alternative 2 and adds source control at the Feed Makeup Area (PW-28A) along with groundwater extraction from specific wells in the Farm Ponds Area. Well PW-28A is believed to be in an area where releases from the feed makeup process occurred prior to 1978. Groundwater extraction from Wells PW-40S and SS located at the Farm Ponds Area would also be included to address potential risks in that area. The components of Alternative 3 not included in Alternative 2 are described below.

### **8.3.1 Extraction of Feed Makeup Groundwater**

The currently approximated extent of groundwater contamination in the Feed Makeup area is shown in **Figure 8-1**. The source of the chemicals detected in Monitoring Well PW-28A is thought to be old process feed material (pre-1978) from spills and leaks in the Feed Makeup area. With this alternative, the high levels of zirconium in groundwater from well PW-28A will be recovered for resource utilization. Under current plant operating conditions, river water is added to zirconium tetrachloride in the feed makeup process to attain the desired solution strength prior to separating out the zirconium. Using extracted groundwater from well PW-28A in place of some of the river water will enable the zirconium in the groundwater to be recovered as part of TWCA's normal plant operations.

The groundwater may not have to be treated prior to use in TWCA's feed makeup process because other hazardous substances contained in the groundwater should be removed during the feed makeup process and eventually discharged and treated with one of the wastewater streams in the existing wastewater treatment plant.





The existing wastewater treatment would include adjustment of the low pH of the extracted water from well PW-28A. The only potential limiting factor would be the levels of radium and thorium in the groundwater. An assessment of the levels of radionuclides which would enter the wastewater treatment system would be made during remedial design.

Two extraction wells, PW-28A and a new extraction well installed adjacent to the Feed Makeup Building, would be used to extract the groundwater. The two extraction wells would pump the groundwater to a holding tank located near the Feed Makeup area. The extracted groundwater would be fed into the feed makeup process as needed and available. Extraction rates are expected to be approximately 1 gallon per minute (gpm). An evaluation of the effectiveness of the extraction of groundwater in the Feed Makeup area would be made within two years of implementation.

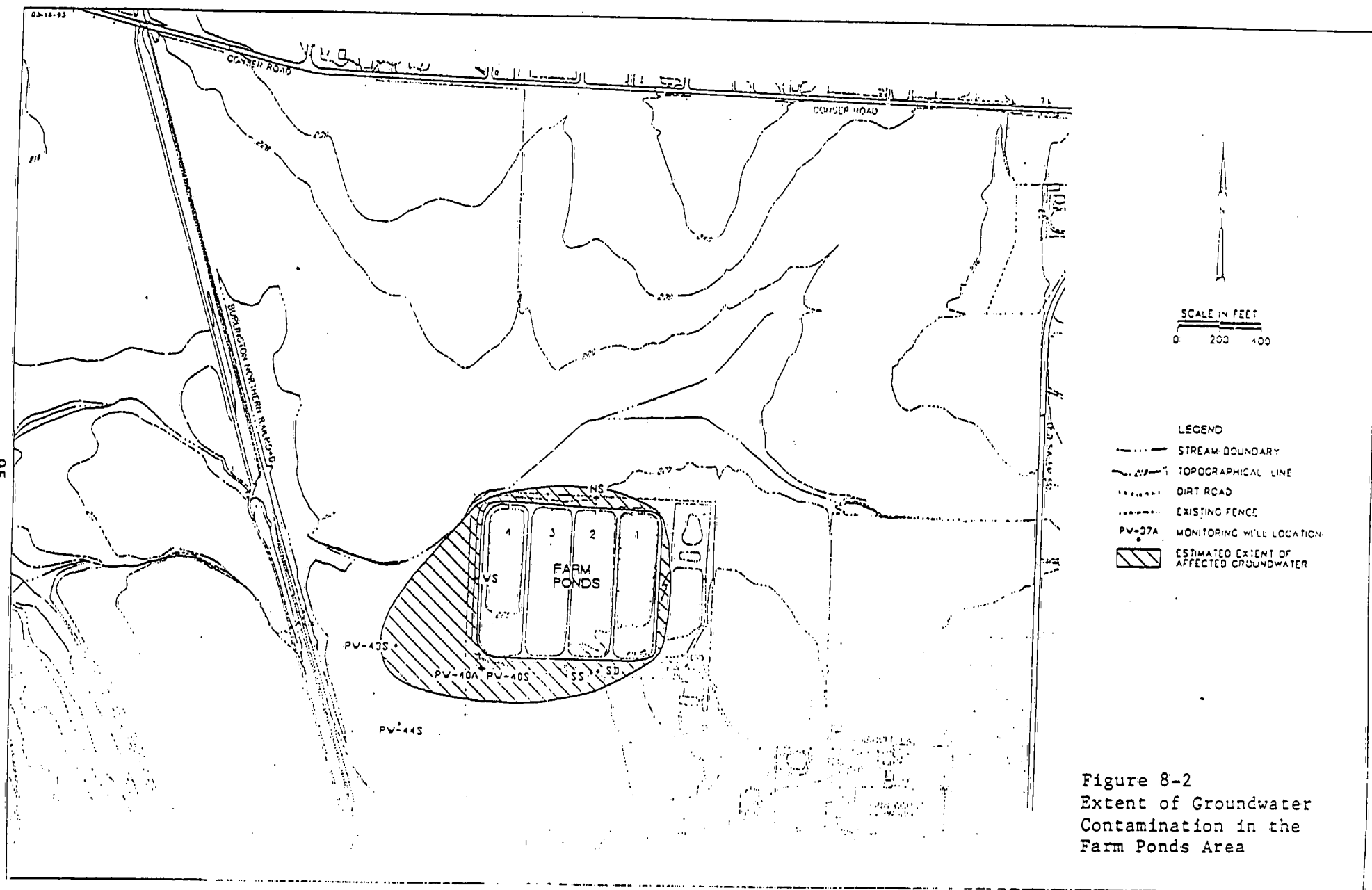
### **8.3.2 Groundwater Extraction at the Farm Ponds**

The approximate extent of groundwater contamination in the Farm Ponds area is shown in **Figure 8-2**. The proposed groundwater extraction system for removing the organic compounds from the groundwater at the Farm Ponds would utilize existing monitoring well PW-40S located near the southwest corner of the Farm Ponds, and a new extraction well installed to the east of well PW-40S near well SS. Submersible pumps would be installed in the two wells and the extraction lines would be piped to the existing Farm Ponds system return flow sump. The extracted groundwater would then flow with the Farm Ponds return flow to TWCA's wastewater treatment plant for treatment and eventual discharge to surface water.

### **8.3.3 Slope Erosion Protection Along the North Bank of Truax Creek**

This component of Alternative 3 seeks to prevent contaminated fill material on the bank along the north side of Truax Creek from being eroded and carried into Truax Creek. Geotextile covered by riprap would be used to provide slope erosion protection. The slope erosion protection has been assumed to extend approximately 980 lineal feet along the north bank of Truax Creek, from where the creek enters the TWCA plant to the road crossing just west of Pond 2 (**Figure 8-3**).

Vegetative cover would be removed from the slope with an articulated mower. After the vegetation was removed, loose soil and soil high in organic matter would be stripped from the slope with a track-mounted backhoe to provide a good base for the geotextile. Any soil removed may contain PCBs and may, therefore, require special handling and disposal. All removed PCB-contaminated material would be disposed of in accordance with all applicable requirements.



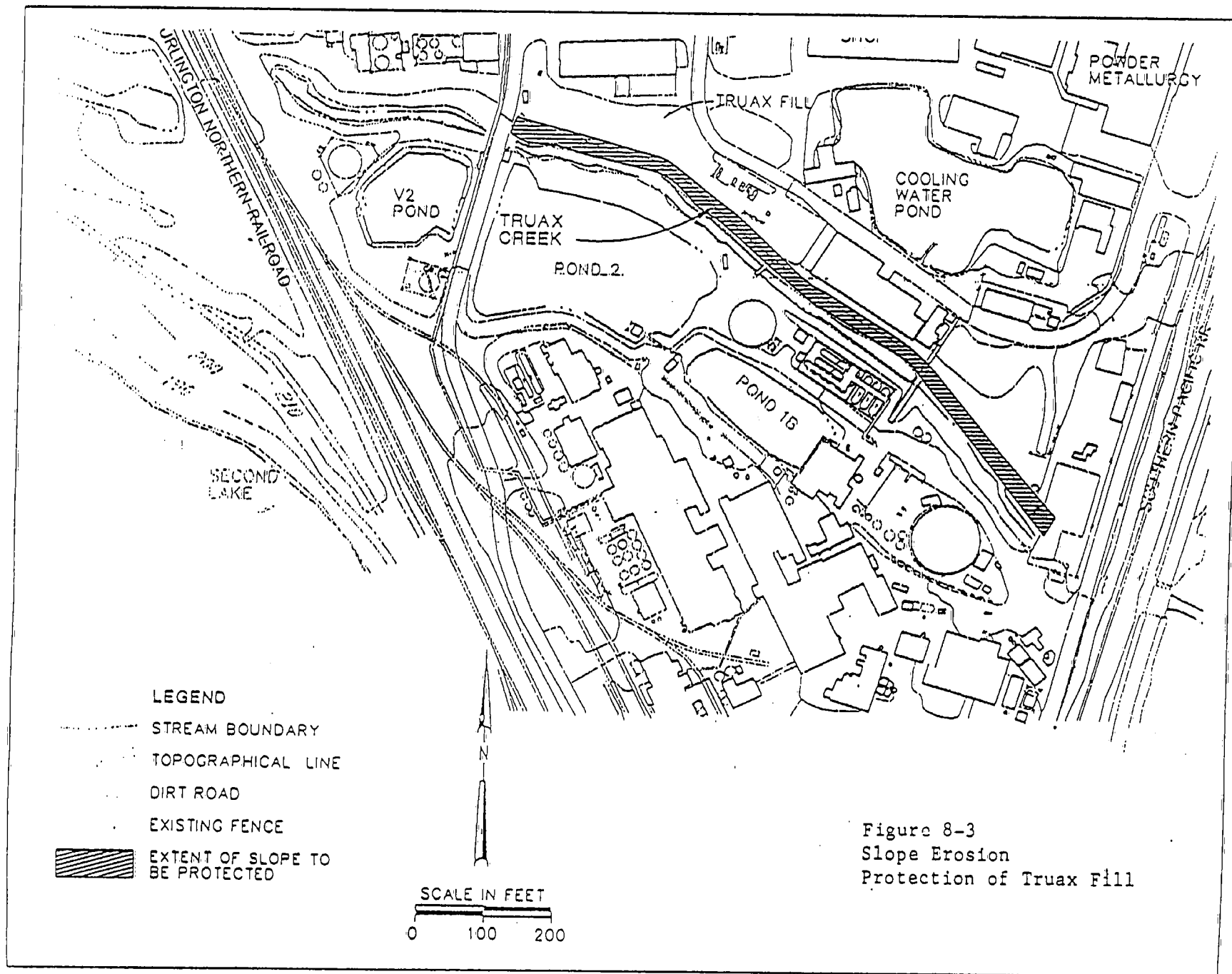
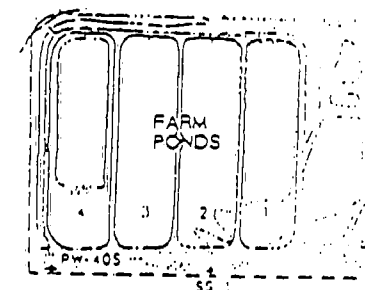


Figure 8-3  
 Slope Erosion  
 Protection of Truax Fill



Note: The Farm Ponds Area is located 3/4 mile north of the Main Plant

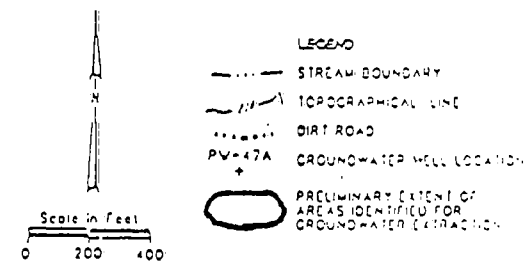


Figure 8-4  
GROUNDWATER EXTRACTION FROM WELLS EXCEEDING  $10^{-4}$  RISK LEVELS

### **8.3.4 Estimated Cost**

The present worth cost of the alternative for a 30-year period is estimated to be \$2,030,000. The estimated time to implement this alternative is 1 year.

### **8.4 Alternative 4 - Groundwater Extraction, Slope Erosion Protection, Removal of Hot Spot Sediments in Truax Creek, Institutional Controls and Monitoring.**

Alternative 4 contains the same elements as Alternative 3 and adds groundwater extraction from all areas or hotspots where groundwater concentrations exceed a  $10^{-4}$  increased cancer risk, and sediment removal from a Truax Creek hot spot. The extraction of groundwater from all wells where concentrations exceed a  $10^{-4}$  risk addresses the primary source areas or hotspots at TWCA, including the Acid Sump, the Arc Melting Area, the area south of the Powder Metallurgy Building, Truax Fill, and the southern Extraction Area. Feed Makeup and the Farm Ponds Area are addressed as previously described under Alternative 3. Removing sediments from Truax Creek addresses the primary location of contaminated sediments at TWCA, reducing or eliminating the threat of off-Site migration or further environmental exposure.

The components not described in Alternatives 2 or 3 are described below.

#### **8.4.1 Groundwater Extraction From Areas Exceeding $10^{-4}$ Health-Based Risk Goals**

The Risk Assessment identified seven distinct areas with chemical concentrations in at least one groundwater monitoring well exceeding a  $10^{-4}$  health-based risk goal. These areas are the areas southwest of the Farm Ponds, Feed Makeup area, acid sump area, Truax Fill, Arc Melting area, the area south of the Powder Metallurgy Building, and the southern Extraction Area (**Figure 8-4**).

Groundwater extraction at the Feed Makeup area and the southwestern portion of the Farm Ponds (PW-40S and SS) has been described previously; the planned approach for groundwater extraction under this alternative at each of the remaining areas is presented below by area. In most cases, groundwater would be extracted from existing monitoring wells and, except where noted, the groundwater would be discharged directly through TWCA's existing wastewater treatment plant. The addition of groundwater from all of these areas (approximately 20 gpm) would not affect the existing operation of the wastewater treatment facility.

Groundwater from wells near the Acid Sump area would be pretreated via air stripping

to remove VOCs prior to being discharged to the wastewater treatment facility. Groundwater from the Powder Metallurgy Building area would be pretreated to remove PCBs via filtration and liquid-phase carbon adsorption prior to discharge to the wastewater treatment plant. Contaminated groundwater from wells in the southern Extraction Area, Arc Melting area, and in Truax Fill would not be pretreated, but instead the water would be discharged directly to the nearest wastewater drain. An evaluation of the effectiveness of extraction would be conducted two years after implementation. If extraction is not effective, the extraction system may be adjusted, and/or additional remedial actions may be required.

#### **8.4.2 Sediment Removal from Truax Creek Hot Spot**

This element of Alternative 4 includes provisions for removing sediment from a hot spot in Truax Creek (TC-5, **Figure 8-5**). This area has the highest PCB concentrations in the sediment at the Site. This element consists of removal of approximately 500 cubic yards of sediment from TC-5, dewatering it (if necessary), and disposing of it in accordance with all applicable requirements. During the removal action, the water in Truax Creek would have to be diverted and the groundwater in the vicinity of the removal would have to be contained or controlled. Minimizing the amount of water in the work area would reduce the possibility of spreading chemical constituents through flowing water during sediment removal.

The ultimate disposition of the removed sediment will depend on its PCB concentration. Removed sediment will be sampled and analyzed to determine the PCB concentration level and then disposed of in accordance with all ARARs.

Following the removal of the contaminated sediments, the waterway would be reconstructed or reclaimed to the extent necessary and practical. The disturbed area around the creek and access road would be regraded and revegetated to reduce the impact of the remediation.

#### **8.4.3 Estimated Cost**

The present worth cost of the alternative for a 30-year period is estimated to be \$3,641,000. The estimated time to implement this alternative is 1 year.

### **8.5 Alternative 5 - Groundwater Extraction, Slope Erosion Protection, Removal of Hot Spot Sediments In Truax Creek, Institutional Controls and Monitoring.**

Alternative 5 addresses contaminated groundwater and sediment at the TWCA facility with estimated risk levels exceeding  $10^{-5}$ . The primary element of this alternative is

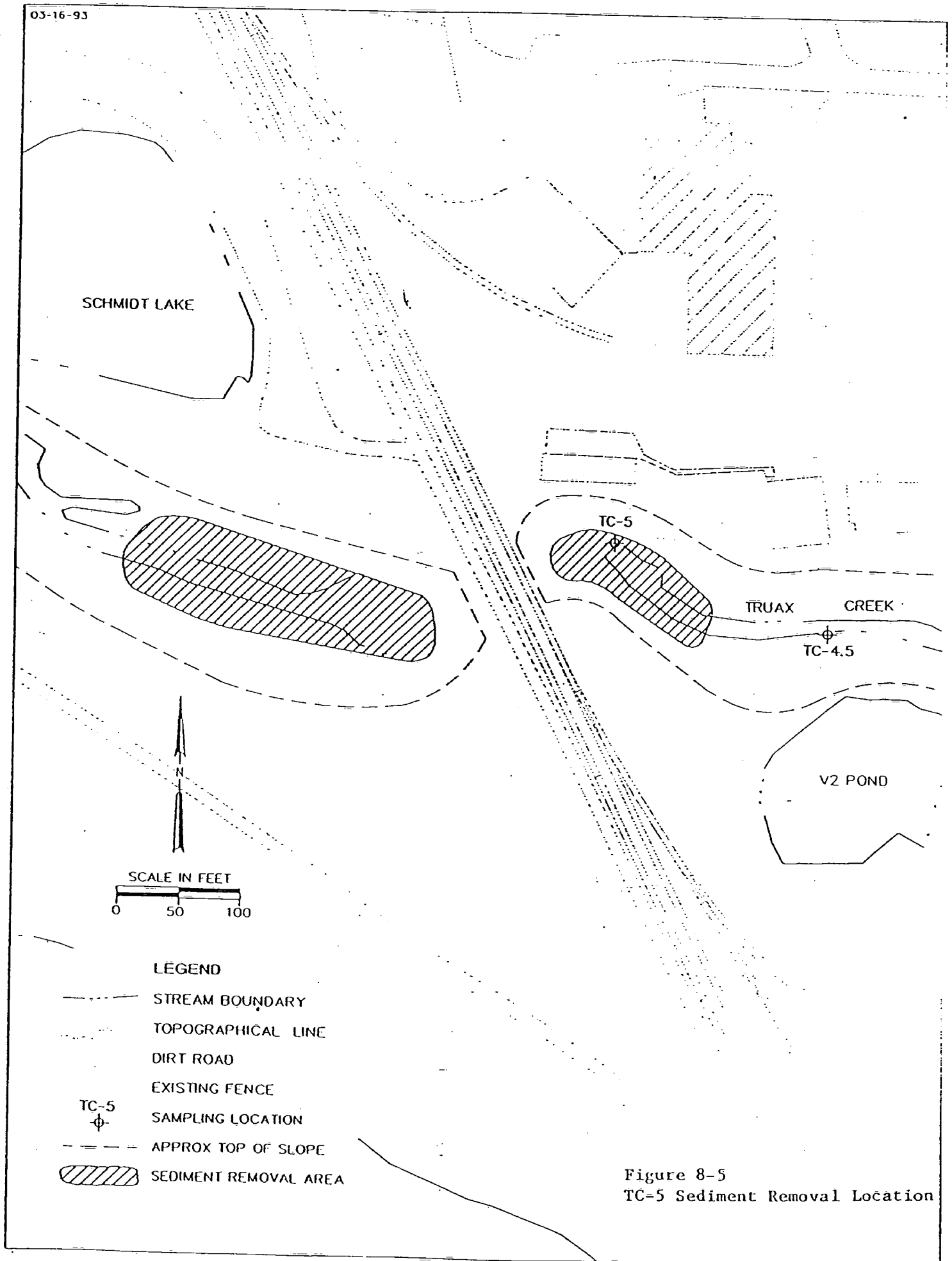


Figure 8-5  
TC-5 Sediment Removal Location



groundwater extraction at wells within potential source areas or hot spots on the Site found to be exceeding the  $10^{-5}$  health-based risk levels. Alternative 5 would include the following actions:

- Ground water and sediment monitoring
- Institutional controls to prevent contact with chemicals in ground water
- Slope erosion protection along the northern bank of Truax Creek
- Removal and disposal of sediments from TC-5, an identified Truax Creek hot spot
- Ground water extraction from all wells with chemical concentrations at levels exceeding a  $10^{-5}$  increased cancer risk level

The first three components of this alternative have been described under Alternatives 2, 3, and 4; the one new component of this alternative is discussed below.

#### **8.5.1 Groundwater Extraction from Wells Exceeding $10^{-5}$ Health-Based Risk Goal**

Under this alternative, all of the wells identified in the risk assessment as having an estimated cancer risk level exceeding  $10^{-5}$  would be addressed using groundwater extraction and treatment. Areas of the Site with groundwater concentrations that exceed  $10^{-5}$  are shown on **Figure 8-6**.

As was the case in Alternative 4, groundwater would be extracted mostly from existing monitoring wells and discharged to TWCA's existing wastewater treatment facility. Pretreatment of extracted groundwater from specific areas as described in Alternative 4 would also occur under this alternative. However, additional groundwater which would be extracted under Alternative 5 may meet existing surface water criteria established pursuant to the CWA, and would not be pretreated prior to being discharged. The additional groundwater which would be discharged under this alternative would not affect current treatment plant operations. An evaluation of the effectiveness of extraction would be conducted two years after implementation. If extraction is not effective, the extraction system may be adjusted, and/or additional remedial actions may be required.

#### **8.5.2 Estimated Cost**

The present worth cost of the alternative for a 30-year period is estimated to be \$4,825,000. The estimated time to implement this alternative is 1 year.

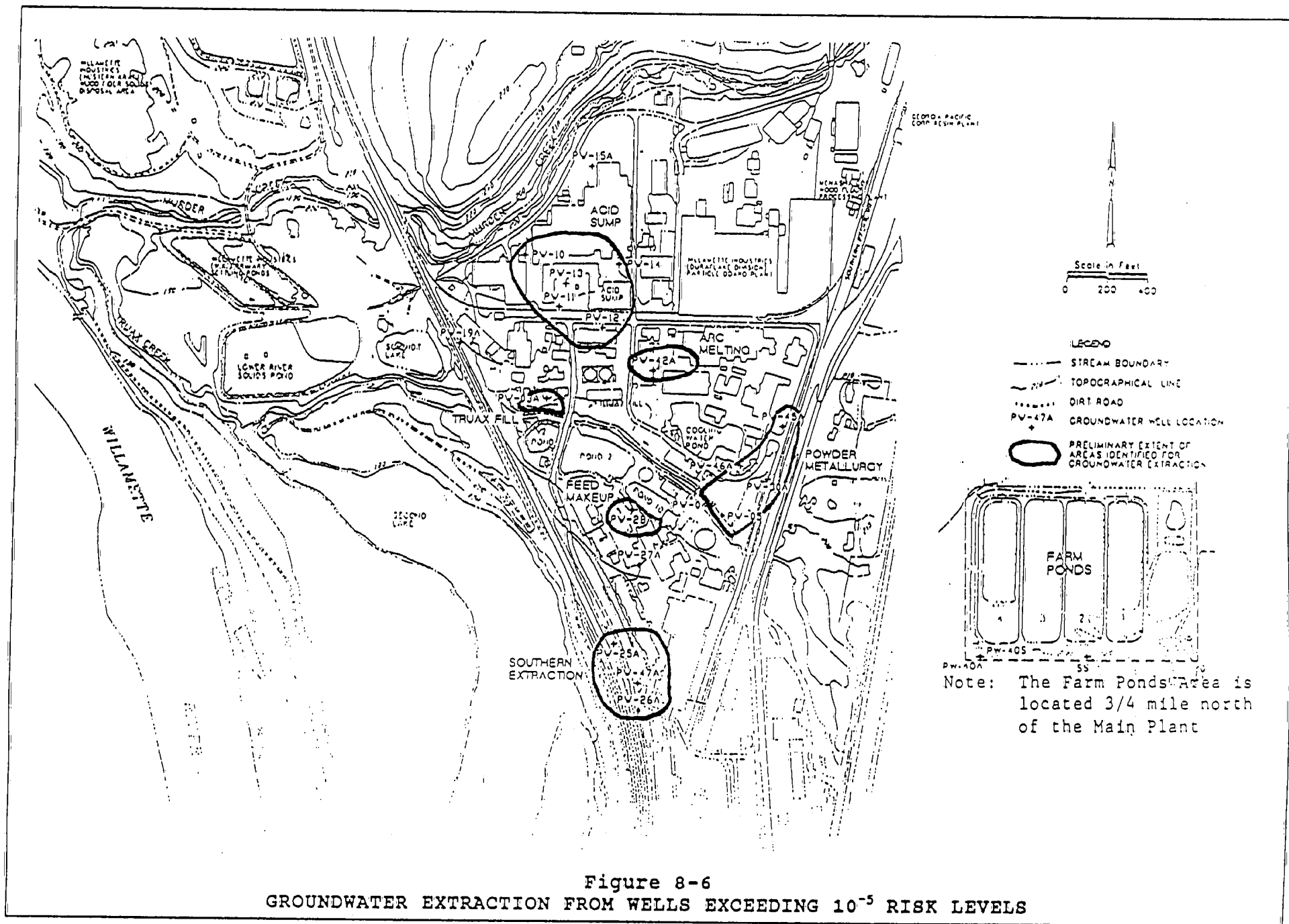


Figure 8-6  
GROUNDWATER EXTRACTION FROM WELLS EXCEEDING  $10^{-5}$  RISK LEVELS

## **8.6 Alternative 6 - Groundwater Extraction, Slope Erosion Protection, Removal of Hot Spot Sediments In Truax Creek, Removal of Sediments In Surface Water Remedial Sector, Soil Washing in Feed Makeup Area, Institutional Controls and Monitoring.**

Alternative 6 addresses all chemically impacted groundwater at the TWCA facility with estimated risk levels exceeding  $10^{-6}$ . It also addresses groundwater, and sediment contamination at the Site that exceed risk-based ARARs or have hazard quotients exceeding one. Alternative 6 would include all of the components described under Alternative 5, plus:

- Ground water extraction and treatment from all of the wells exceeding a  $10^{-6}$  risk level, a hazard index of 1, or risk-based ARARs.
- Removal of all sediments found to exceed sediment remedial goals.
- In situ flushing of source material at the Feed Makeup area (PW-28A) to enhance and quicken groundwater remediation of that area.

### **8.6.1 Groundwater Extraction From Areas Exceeding Risk Goals or ARARs**

Based on sampling results from the RI field work, 36 groundwater monitoring wells were determined to have calculated RME risk values equal to or exceeding  $10^{-6}$ , hazard index (HI) values exceeding 1, and/or at least one average chemical concentration exceeding MCLs or nonzero MCLGs.

All 36 of the wells would be addressed under this alternative. Of the 36 wells, 22 have been previously described under either Alternatives 3, 4, or 5. All 36 wells are listed on **Table 8-3** with an indication of their RME risk level, radioactive RME risk value, HI value, any ARAR exceedance, and the remedial alternatives within which extraction from the well is included. Only the wells not previously addressed are described further as part of this alternative.

Groundwater from the additional wells would be extracted from existing monitoring wells. With the exception of groundwater beneath the Ammonium Sulfate Storage Area, as described below, the extracted groundwater would be sent to TWCA's industrial wastewater treatment plant for treatment and discharge.

Groundwater located beneath the Ammonium Sulfate Storage Area in the Fabrication Area contains significant amounts of ammonium and MIBK, which can be recovered for reuse. Under this alternative, the current monitoring well in the area would be used as an extraction well to recover the chemicals in the groundwater. The extracted groundwater would then be discharged directly into one of two TWCA existing process

**Table 8-3**  
**MONITORING WELLS EXCEEDING RISK VALUES OR ARARs**

Location (Well).	RME Risk Value <sup>a</sup>			Radionuclides RME Risk Value <sup>b</sup>		HI≥1	ARAR Exceedance(s) <sup>c</sup>	Alternatives Addressed Under				
	>10 <sup>-4</sup>	10 <sup>-4</sup> -10 <sup>-5</sup>	10 <sup>-5</sup> -10 <sup>-6</sup>	>10 <sup>-4</sup>	10 <sup>-4</sup> -10 <sup>-5</sup>			3	4	5	6	7
Ammonium Sulfate Storage (PW-01A)			X		X	X	X				X	X
Truax Fill (PW-03A)	X					X	X		X	X	X	X
Powder Metallurgy (PW-04)	X				X	X	X		X	X	X	X
Powder Metallurgy (PW-05)		X			X	X	X			X	X	X
Acid Sump (PW-10)	X					X	X		X	X	X	X
Acid Sump PW-11)	X				X	X	X		X	X	X	X
Acid Sump (PW-12)	X					X	X		X	X	X	X
Acid Sump (PW-13)	X					X	X		X	X	X	X
Fabrication Area (PW-14)		X					X			X	X	X
Fabrication Area (PW-15A)		X				X	X			X	X	X
Fabrication Area (PW-16A)			X		X		X				X	X
Fabrication Area (PW-19A)		X					X			X	X	X
Fabrication Area (PW-20A)						X	X				X	X
V2 Pond (PW-21A)						X					X	X
Spill Treatment (PW-22A)						X	X				X	X
Chemical Unloading (PW-23A)						X	X				X	X
Chemical Unloading (PW-24A)						X	X				X	X
Southern Extraction Area (PW-25A)		X					X			X	X	X

**Table 8-3 (Continued)**  
**MONITORING WELLS EXCEEDING RISK VALUES OR ARARS**

Location	RME Risk Value <sup>a</sup>			Radionuclides RME Risk Value <sup>b</sup>		HI≥1	ARAR Exceedance(s) <sup>c</sup>	Alternatives Addressed Under				
	>10 <sup>-4</sup>	10 <sup>-4</sup> -10 <sup>-5</sup>	10 <sup>-5</sup> -10 <sup>-6</sup>	>10 <sup>-4</sup>	10 <sup>-4</sup> -10 <sup>-5</sup>			3	4	5	6	7
Southern Extraction Area (PW-26A)		X				X	X			X	X	X
Extraction Area (PW-27A)		X				X	X			X	X	X
Feed Makeup (PW-28A)	X			X		X	X	X	X	X	X	X
Powder Metallurgy (PW-30A)	X						X		X	X	X	X
Farm Ponds (PW-40A)		X				X				X	X	X
Farm Ponds (PW-40S)	X					X		X	X	X	X	X
Arc Melting (PW-42A)	X						X		X	X	X	X
Farm Ponds (PW-43S)					X	X					X	X
Farm Ponds (PW-44S)					X	X					X	X
Powder Metallurgy (PW-45A)	X						X		X	X	X	X
Powder Metallurgy (PW-46A)		X					X			X	X	X
Southern Extraction Area (PW-47A)	X						X		X	X	X	X
Southern Extraction Area (PW-49A)			X				X				X	X
Acid Sump (PZ-1)			X			X	X				X	X
Farm Ponds (NS)			X			X	X				X	X
Farm Ponds (SD)						X					X	X
Farm Ponds (SS)	X					X		X	X	X	X	X
Farm Ponds (WS)			X		X	X					X	X

treatment systems. A schematic flowdiagram of the V2 treatment system is shown in **Figure 8-7**.

Effluent from the V2 treatment system and the overhead stream from the treatment systems discharge to TWCA's ammonium stripping towers for ammonium recovery. The bottoms from the stripping towers are discharged to the wastewater treatment plant for additional treatment and surface water discharge.

### **8.6.2 Removal and Disposal of PCB-Contaminated Sediments**

This element would consist of removing approximately 5100 cubic yards of PCB contaminated sediment from several areas throughout the Site (**Figure 8-8**). Approximately 3,600 cubic yards of sediment would be removed from the shallow water bodies as described in Alternative 4.

The sediment in Conser Slough would require a deep water sediment remediation approach. Dredging the sediment would produce some turbidity. The movement of silt outside of the work area could be minimized by the installation of a silt curtain. A silt curtain consists of a vertical permeable fabric erected in a vertical orientation around the work area. The sediment would be removed using a floating hydraulic dredge. The sediment would be piped to a series of portable sedimentation tanks where the liquid and solid materials would separate to the maximum extent practicable. The liquid would be pumped to TWCA's wastewater treatment plant and the solids in the tanks would be handled and disposed in accordance with all ARARs.

### **8.6.3 In Situ Flushing of Source Material at Feed Makeup (PW-28A)**

Flushing of low-pH source material would be implemented in the area of the Feed Makeup Building near well PW-28A to enhance the removal of a major source of groundwater contamination at the Site. Water would be introduced into the area using shallow infiltration trenches. The water would then flow through the impacted soil to be recovered and treated as described previously in Section 8.3.1 of this ROD.

Additional subsurface source sampling would be conducted first in order to further define the extent of subsurface contamination in the area. Pilot testing would simultaneously be conducted to evaluate the effectiveness of flushing of source material. Effectiveness will be determined by the systems ability to increase pH levels in contaminated source material, and subsequently in groundwater. The increase in pH levels should result in accelerated and efficient removal or recovery of metal contaminants. Assuming that this technology proves effective, infiltration trenches would be excavated along the northwest and southeast boundaries of the affected zone. Clean water would be introduced through the infiltration trenches and allowed to migrate into the affected subsurface source material. An extraction well would be drilled through the middle of the affected area which would be used to extract the

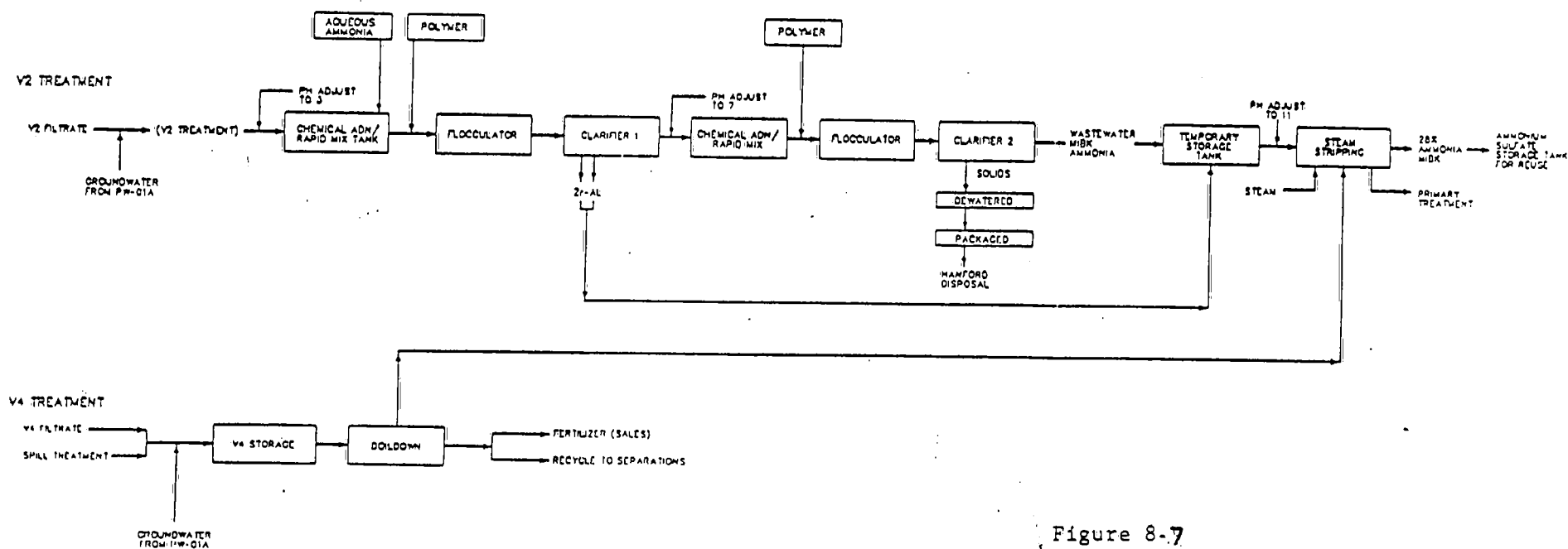


Figure 8-7  
Schematic Flow  
Diagram of V2 Treatment System

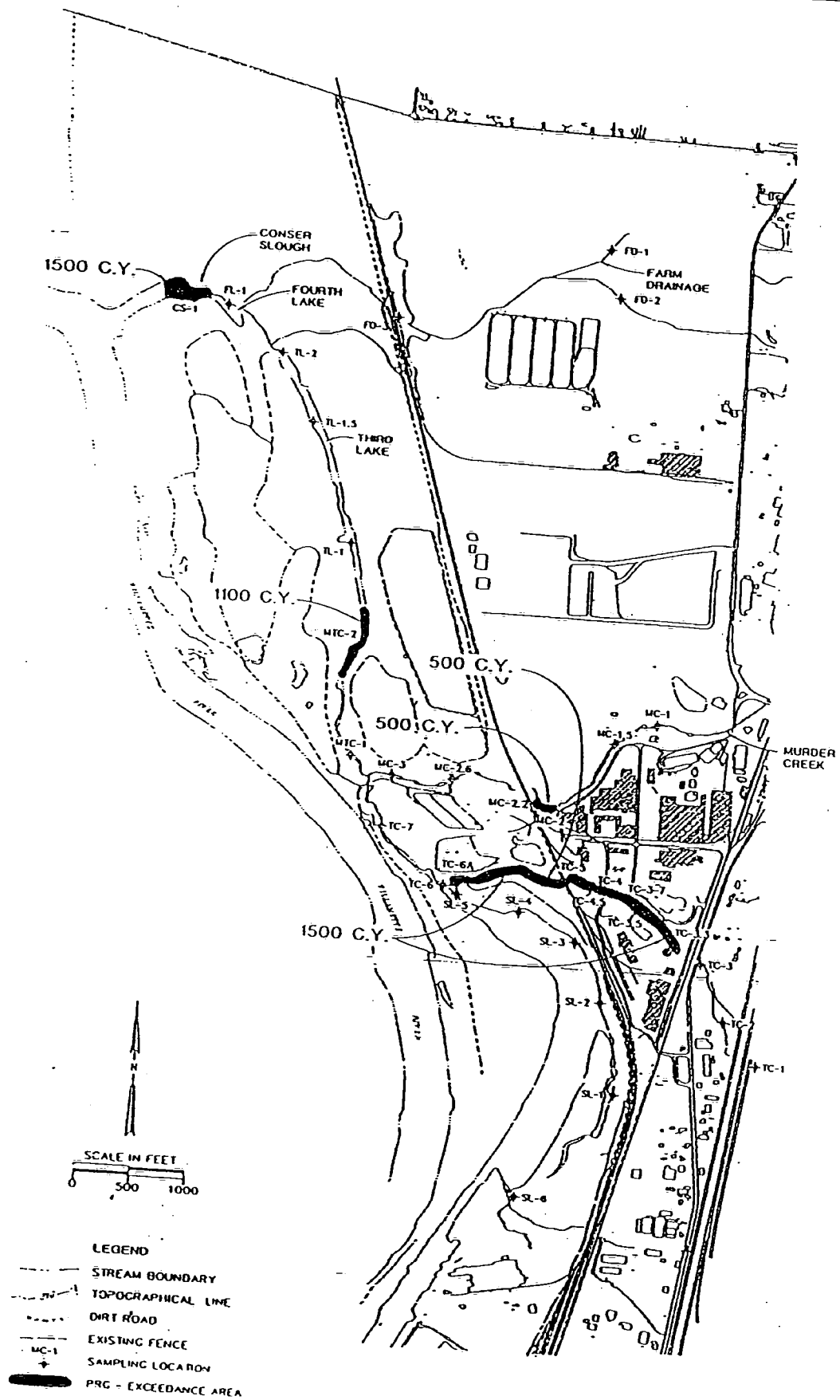


Figure 8-F  
AFFECTED AREAS AND  
ESTIMATED VOLUME OF SEDIMENT



added water and any contaminants which may be dissolved. Clean water for the system would be obtained from existing piping in the Feed Makeup Building.

#### **8.6.4 Estimated Cost**

The present worth cost of the alternative for a 30-year period is estimated to be \$6,779,000. The estimated time to implement this alternative is 1 year.

#### **8.7 Alternative 7 - Source Reduction, Groundwater Extraction, Slope Erosion Protection, Removal of Sediments in Portions of Surface Water Remedial Sector, Flushing of Source Material in the Feed Makeup Area, Stringent Institutional Controls and Monitoring.**

In consideration of TWCA's request, and so as to minimize adverse impact on TWCA's ongoing manufacturing processes, EPA agreed to allow the RI/FS to be scoped and conducted so as to exclude those areas of the TWCA facility where there were ongoing operations. It was projected that investigation of those areas could be conducted later in the process either at the RD/RA stage or as a continuing process integrated into TWCA's ongoing operations each time a building or structure would be razed or remodeled. Due to this approach, designed to allow TWCA to continue its business activities relatively uninterrupted during the RI/FS stage, several limitations on the scope of the RI/FS necessarily resulted. Those limitations included data gaps for areas underneath existing buildings and structures on the facility which could not be investigated for potential environmental damage without seriously disrupting the facility's operations. Because of those data gaps, Alternatives 1 through 6 do not take into account potential negative environmental impacts of spills and leaks from ongoing operations and from existing structures on the Site. In addition, EPA is concerned that the discharge of extracted groundwater to TWCA's existing wastewater treatment facility (as proposed by Alternatives 3 through 6) could potentially violate CWA ARARs. Because of these concerns, EPA recognized that implementation of Alternatives 1 through 6 might not prove to be effective as a comprehensive long-term remedy for groundwater at the TWCA Site. Therefore, EPA evaluated a seventh alternative.

Alternative 7 would incorporate all the elements of Alternative 6 with the following additions and modifications:

##### **8.7.1 Source Reduction**

In order to ensure that negative impacts on the remedial action from potential future leaks and spills from existing structures are minimized, an evaluation of source reduction techniques to reduce or eliminate current and potential future releases of contamination would be conducted. Potential sources of contamination from ongoing

operations would be identified and process changes implemented to reduce or eliminate the sources. These process changes would include, but may not be limited to, identification and repair of spills and leaks in pipes, and improving maintenance scheduling, and improved record keeping.

### **8.7.2 Pretreatment of Groundwater**

Additional pretreatment of groundwater other than that already described for Alternatives 4 and 5 may be necessary to meet ARARs prior to being sent to TWCA's wastewater treatment facility. Section 402 of the CWA requires that effluent limitations in NPDES permits be based in part upon treatment using the best practicable control technology (BPT) currently available. TWCA's existing NPDES permit does not require effluent limitations for VOCs. The RI/FS evaluated alternatives which include discharge of some VOC-contaminated groundwater to TWCA's wastewater treatment facility without pretreatment prior to discharge. This element of Alternative 7 would require an analysis of BPT prior to discharge of contaminated water. BPT would then be implemented to pretreat VOC-contaminated groundwater prior to discharge to TWCA's wastewater treatment facility. It is anticipated that BPT currently available for treatment of VOC-contaminated water would consist of air stripping and/or carbon adsorption.

### **8.7.3 Supplemental Source Evaluation at Feed Makeup Area**

Additional source characterization and remediation in the Feed Makeup Area would be conducted under this element of Alternative 7. In 1991, a pilot test and treatability study was implemented by TWCA to determine the feasibility of extracting and treating the contaminated groundwater from Well PW-28A. Approximately 28,400 gallons of groundwater were extracted with no increase in pH (i.e. no decrease in the acidity of the groundwater). Based on the chemical composition in the contaminated groundwater, the RI/FS concluded that the source of the contamination in well PW-28A was pre-1978 feed material. The pilot test however has raised questions as to whether there is a continual source of groundwater contamination. In addition, the groundwater contaminant plume associated with well PW-28A extends beneath various buildings, and ponds which are associated with TWCA's wastewater treatment facility. The RI/FS concluded that soil flushing may not be effective in achieving cleanup goals. However, because the RI/FS did not present adequate technical data to support this conclusion, this element of Alternative 7 would require that additional source remediation techniques be evaluated for the Feed Makeup Area which would ensure that the entire contaminant plume and source is cleaned up to the cleanup goals. Pilot and/or treatability tests would be conducted if necessary, to demonstrate which technique would be most effective in remediating the source of contaminated groundwater in this area. Upon conclusion of the pilot or treatability test, EPA in consultation with DEQ, and after receiving public comment, would select the technology that would be implemented to remediate the source.

#### **8.7.4 Environmental Evaluation of Uninvestigated Areas**

In order to ensure that cleanup goals for groundwater at the Site are achieved, an environmental evaluation of previously uninvestigated areas beneath buildings and structures would need to be conducted whenever TWCA discontinues use of any pond, area, building, or structure on the TWCA site. Potential contamination from these uninvestigated areas could possibly serve as a source to groundwater contamination. The scope of the environmental evaluation would be designed to determine whether there have been releases of contamination into the groundwater beneath these structures. Potential releases of contamination from previously uninvestigated areas could impede the ability of selected groundwater remedial actions to achieve the established cleanup goals. Examples of ponds and areas that would require an environmental evaluation include the unlined ponds at the facility, including the Farm Ponds, ponds within the wastewater treatment plant, and areas under buildings or pavement. The timing of these environmental evaluations would accommodate TWCA's need to continue its ongoing manufacturing operations with minimal interruption while also ensuring that continuing sources of contamination to groundwater do not remain undetected.

EPA and DEQ would review and approve any sampling and analyses plan submitted prior to conduct of the environmental evaluation. EPA and DEQ would also review the results and conclusions of the reports submitted as a result of environmental evaluations which are conducted at the Site. EPA and DEQ review would occur at least every two years until cleanup goals are achieved. The RI/FS estimated that it would take approximately 50 years to achieve the cleanup goals for groundwater at the Site, regardless of which alternative was implemented. EPA has determined that characterization and remediation of currently uncharacterized areas could potentially expedite the achievement of groundwater cleanup goals. The environmental evaluation reports would need to outline any sampling analyses, conclusions, and cleanup actions that were conducted as a result of the environmental evaluations of the previously uninvestigated areas.

#### **8.7.5 Off-Site Groundwater Monitoring**

Installation and sampling of off-Site monitoring wells would be conducted to ensure that site-related contaminants which are above health-based levels and/or ARARs have not migrated beyond the facility boundary. Should Site-related contamination above health-based levels and/or ARARs be found in off-Site wells, groundwater containment and/or contaminant reduction measures may be implemented. In addition, should Site-related contamination be found in either an off-Site potable or industrial well, an alternate source of water supply may need to be provided for those affected community members.

#### **8.7.6 Estimated Cost**

The present worth cost of the alternative for a 30-year period is estimated to be \$7,500,000. These costs do not include costs for additional pretreatment of groundwater, should additional pretreatment be required. Pretreatment is expected to be via BPT. Additional pretreatment costs, if any, will be determined during remedial design. The estimated time to implement this alternative is 1 year.

## **9.0 COMPARATIVE ANALYSIS OF ALTERNATIVES**

The NCP requires that each remedial alternative analyzed in detail in the Feasibility Study be evaluated according to specific criteria. The purpose of this evaluation is to promote consistent identification of the relative advantages and disadvantages of each alternative, thereby guiding selection of remedies offering the most effective and efficient means of achieving Site cleanup goals. There are nine criteria by which feasible remedial alternatives are evaluated. While all nine criteria are important, they are weighed differently in the decision-making process depending on whether they describe a required level of performance (threshold criteria), provide for consideration of technical or socioeconomic merits (primary balancing criteria), or involve the evaluation of non-EPA reviewers that may influence an EPA decision (modifying criteria). The nine criteria are summarized in **Table 9-1**.

### **9.1 Threshold Criteria**

The remedial alternatives were first evaluated by comparison with the threshold criteria: overall protection of human health and the environment and compliance with ARARs. The threshold criteria must be fully satisfied by candidate alternatives before the alternatives can be given further consideration in remedy selection.

#### **9.1.1 Overall Protection of Human Health and the Environment**

This criterion addresses whether the remedial actions provide adequate protection, and describes the mechanism for controlling risks for the different exposure pathways.

Alternatives 3 through 6 are all protective of human health and the environment to varying degrees but are not as protective as Alternative 7. Alternative 7 is the most protective because it employs groundwater extraction and treatment to reduce the risks associated with VOCs, metals, and radionuclide contamination in groundwater; removes PCB contamination in sediments; decreases the potential for future contamination of sediments in Truax Creek due to slope erosion protection; decreases the potential for further contamination of groundwater through environmental evaluations of previously uninvestigated areas and source reduction measures; and reduces the likelihood of groundwater or surface water contamination migrating off Site. Alternative 7 is the only alternative that includes provisions for identifying and minimizing the potential impacts of TWCA's ongoing operations on the protectiveness of a selected remedial action.

Alternatives 3 through 6 would protect human health and the environment to varying degrees. Alternative 6 would remove or destroy the currently known principal

**Table 9-1**  
**GLOSSARY OF EVALUATION CRITERIA**

EPA ranks the alternatives considered against the following nine evaluation criteria:

**THRESHOLD CRITERIA:**

- 1) Overall protection of human health and the environment - How well does the alternative protect human health and the environment, both during and after construction?
- 2) Compliance with applicable or relevant and appropriate standards (ARARs) - Does the alternative meet all applicable or relevant and appropriate state and federal laws?

**BALANCING CRITERIA:**

- 3) Long-term effectiveness and permanence - How well does the alternative protect human health and the environment after completion of cleanup? What, if any, risks will remain at the Site?
- 4) Reduction of toxicity, mobility, and volume through treatment - Does the alternative effectively treat the contamination to significantly reduce the toxicity, mobility, and volume of the hazardous substance?
- 5) Short-term effectiveness - Are there potential adverse effects to either human health or the environment during construction or implementation of the alternative? How fast does the alternative reach the cleanup goals?
- 6) Implementability - Is the alternative both technically and administratively feasible? Has the technology been used successfully on other similar sites?
- 7) Cost - What are the estimated costs of the alternative? How do costs of the alternative being evaluated compare with costs of the other alternatives?

**MODIFYING CRITERIA:**

- 8) State acceptance - What are the state's comments or concerns about the alternatives considered and about EPA's preferred alternative? Does the state support or oppose the preferred alternative?
- 9) Community acceptance - What are the community's comments or concerns about the preferred alternative? Does the community generally support or oppose the preferred alternative?

contaminants found in groundwater, and sediments at the Site. Alternative 6 includes removal of contaminated sediments which would mitigate threats to aquatic life. Alternative 6 may mitigate a principal threat to groundwater contamination in the Feed Makeup Area via flushing of source material. Alternatives 3 through 6 do not provide for source reduction and for environmental evaluations of previously uninvestigated areas. Source reductions and environmental evaluations are measures that would ensure that protection of public health and the environment remains in effect in the future because the effects of potential additional or uninvestigated sources of contamination to groundwater would be minimized.

Alternatives 4, and 5 may be only partially protective because contaminants in groundwater would still remain above health-based risk levels. Alternative 4 would remediate groundwater above the  $10^{-4}$  risk level. Alternative 5 would remediate groundwater above the  $10^{-5}$  risk level. Under Alternative 3, groundwater contaminants would remain in place which are above the threshold risk level of  $10^{-4}$ .

The "no further action" (Alternative 1) and the alternative requiring only monitoring and institutional controls (Alternative 2) are not protective because the principal threats to groundwater, surface water, and sediment would still remain uncontrolled.

#### **9.1.2 Compliance with ARARs**

The purpose of this analysis is to evaluate the alternatives for compliance with the major ARARs.

CERCLA requires that remedial actions satisfy all identified ARARs. These laws may include among others, the Safe Drinking Water Act, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, the Clean Water Act, and state laws with promulgated standards more stringent than the corresponding federal law.

An "applicable" requirement directly and fully addresses the situation at the site. It would legally apply to the response action if that action were undertaken independently from any CERCLA authority. A "relevant and appropriate" requirement is one that is designed to apply to problems which are sufficiently similar to the problem being addressed at the site, that its use is well suited to the particular site.

The TWCA Site presently exceeds chemical specific ARARs in groundwater (**Table 8-3**). The Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) established under the federal Safe Drinking Water Act (40 C.F.R. 141) are the primary ARARs for groundwater cleanup at the TWCA Site.

Alternative 7 can meet all identified ARARs. The inclusion of a provision for pretreatment in Alternative 7 ensures that this alternative would meet all identified ARARs. Alternatives 3 through 6, proposed by TWCA, do not adequately provide for

meeting treatment and performance standards established in 40 C.F.R. §122 pursuant to the CWA. Under Alternatives 3 through 6, groundwater extracted and discharged to TWCA's existing wastewater treatment facility would be untreated. Discharge of untreated groundwater with elevated concentrations of VOCs could exceed AWQC for protection of human health and aquatic life (40 C.F.R. §131).

Alternatives 2 through 5 do not adequately provide for meeting chemical-specific ARARs for groundwater because those alternatives allow groundwater contamination to remain above federal MCLs at some locations. Those alternatives rely on the assumption that natural dilution of groundwater would reduce contaminants to cleanup levels. However, the RI/FS does not lay an adequate foundation to demonstrate whether natural dilution would indeed be effective or to demonstrate how long natural dilution would take, if ever, to reduce contaminants to MCLs. The mere assumption that groundwater contamination above MCLs could be addressed by natural dilution, without aggressive groundwater remediation, is an insufficient basis on which to build the remedy.

The "no further action" (Alternative 1) would not be in compliance with chemical-specific ARARs because groundwater contamination would remain above SDWA MCLs.

The "no further action" alternative (Alternative 1) will not be considered further as it does not meet the threshold criteria.

## **9.2 Primary Balancing Criteria**

For those alternatives satisfying the threshold criteria (Alternatives 2 through 7), five primary balancing criteria are used to evaluate other aspects of the potential remedies. No single alternative will necessarily receive the highest evaluation for every balancing criterion. This phase of the comparative analysis is useful in refining the relative merits of candidate alternatives for cleanup. The five primary balancing criteria are: Long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.

### **9.2.1 Long-Term Effectiveness and Permanence**

This criterion evaluates the ability of a remedial alternative to maintain reliable protection of human health and the environment over time, once cleanup goals have been achieved.

Alternative 7 would be the most effective alternative over the long-term because it considers the impacts of potential contamination from uninvestigated areas, and from ongoing operations at the TWCA facility. Under Alternative 7, uninvestigated areas



would be remediated, if necessary. Releases of hazardous substances from ongoing operations would also be mitigated under Alternative 7. Potential additional sources of contamination would not be released into the environment thus ensuring that cleanup goals are maintained.

Alternatives 4 through 7 would permanently remove chemical contaminants from currently identified groundwater sources. In addition, Alternatives 6 and 7 would eliminate a contaminant source in the Feed Makeup Area via flushing. Alternative 3 only addresses two identified sources of groundwater contamination. Identified sources of groundwater not addressed by Alternative 3 include; the Ammonium Sulfate Storage Area, the Powder Metallurgy, Building Area, the Emergency Services Building Area, the Acid Sump area, the Arc-Melting Area, and the Soil Amendment Area. Alternative 2 would not address any of the identified source areas.

The RI/FS did not lay an adequate foundation on which to make a determination regarding whether natural attenuation, alone, would be an effective or timely means of reducing groundwater contaminant concentrations to cleanup levels at the Site. Alternatives 3 through 5 to some extent rely on natural attenuation to reduce groundwater contaminant concentrations to cleanup levels. Alternatives 2 through 5 also rely on natural attenuation to maintain groundwater contaminant levels below cleanup levels, once the cleanup levels are achieved. However, the mere assumption that natural attenuation would, without aggressive groundwater remediation, be an effective means of reducing groundwater contaminant concentrations is an insufficient basis for the remedy.

Alternatives 4 through 7 would permanently mitigate ecological risks by removal of contaminated sediments.

Institutional controls and monitoring (Alternative 2), without more, would not assure permanence. Those actions alone (while useful in timely detection and prevention of further contamination that might impact on the remedy) would not serve to reduce the levels of contaminants at the Site. Effectiveness of institutional controls and monitoring would require coupling those actions with other actions designed to reduce the contaminant levels. The RI/FS does not provide adequate foundation to demonstrate whether natural dilution would be effective nor how long it would take, if ever, for natural dilution to reduce groundwater contamination to MCLs. Institutional controls and monitoring coupled with reliance on natural dilution (without additional contaminant reduction measures) would be insufficient to assure a permanently effective remedy.

### **9.2.2 Reduction of Toxicity, Mobility, or Volume Through Treatment**

This criterion evaluates the anticipated performance of the various treatment technologies and addresses the statutory preference for selecting remedial actions

that employ treatment technologies which permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances. This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, irreversible reductions in contaminant mobility, or reductions in the total volume of contaminated media.

Alternatives 3 through 7 utilize groundwater extraction and treatment for resource recovery to reduce contaminant volume. Alternatives 4 through 7 would employ some pretreatment of groundwater contaminants via air stripping or filtration and liquid-phase carbon adsorption prior to surface water discharge. Alternatives 6 and 7 utilize flushing techniques to reduce the toxicity of contaminants in the Feed Makeup area.

Alternative 2 does not employ treatment as a component of the remedy. With Alternative 2 toxicity, mobility, and volume of the contaminants would remain unchanged.

### **9.2.3 Short-Term Effectiveness**

The short-term effectiveness criterion focuses on the period of time needed to achieve protection of human health and the environment, and adverse impacts which may occur during remedial construction and remedial action, until cleanup goals are achieved.

All the alternatives would require a number of years to achieve groundwater cleanup goals. However, Alternatives 6 and 7 would utilize the most aggressive extraction and treatment methods for groundwater remediation and the length of time needed to achieve groundwater cleanup goals would be the shortest.

Cleanup goals for sediment would be achieved in the shortest period of time via the sediment removal elements which would be conducted under Alternatives 6 and 7. Slope erosion protection of Truax Creek via placement of riprap along the creek bank (Alternatives 3 through 7) would achieve the goal of prevention of further contamination of sediment in Truax Creek within one construction season.

All the alternatives, with the exception of Alternative 2 (monitoring and institutional controls) would create some level of short-term risk to workers during the period in which construction occurs. Groundwater in the Feed Makeup Area is extremely acidic and it would be necessary for workers to wear protective clothing while construction activities are being conducted in this area. Since TWCA is a restricted access industrial plant, the nearby community should not be impacted by construction activities.

The short term risks to human health are primarily those associated with dust and air emissions resulting from sediment excavation, debris handling, and off-Site disposal.

These risks could be minimized by control of air emissions during construction activities.

Removal of sediments (Alternatives 4 through 7) may pose a short term risk to sediment and surface water ecosystems in the immediate vicinity of the disturbed sediments. Reconstruction may be necessary and recovery of the ecosystem could take several years. These potential effects can be minimized by using careful excavation techniques.

#### **9.2.4 Implementability**

This evaluation addresses the technical and administrative feasibility of implementing the alternatives, including the availability of materials and services required to construct the remedy.

All of the alternatives can be implemented with varying degrees of difficulty. Alternative 2 (monitoring and institutional controls) would be the fastest and easiest to implement. Alternatives 3 through 5 would be the next easiest to implement because all three alternatives would require minimal materials handling from sediment removal. Alternatives 6 and 7 would be the most difficult to implement due to the following: (1) sediment excavation and removal would require extensive materials handling; (2) flushing in the Feed Makeup area would require pilot testing prior to full scale implementation; (3) sediment removal would require additional ecological characterization prior to implementation to determine potential impacts to the local ecosystem. Implementation of source reduction methods under Alternative 7 would require a detailed assessment of TWCA's ongoing processes. The scope and frequency of environmental evaluations would need to be determined under Alternative 7.

Groundwater extraction, treatment, and monitoring systems are readily implementable. Groundwater extraction is a proven technology and process services and equipment are readily available. Discharge of pretreated and untreated groundwater to TWCA's existing wastewater treatment system (Alternatives 3 through 7) would be readily implementable and would not have an impact on the ability or capacity of the wastewater treatment system to accept and treat the additional water.

#### **9.2.5 Projected Costs**

Present worth costs are used to evaluate and compare the estimated monetary value of each remedial alternative. Present worth costs are determined by summing the estimated capital costs and estimates of the discounted operation and maintenance (O&M) costs over the projected lifetime of the remedial alternative. Estimated present worth costs are based on a 30-year life of the remedial alternative using a discount rate of 5 percent. The costs for each alternative are summarized below:

Alternative 2	Capital cost Annual O&M Present worth	\$101,100 \$77,250 \$1,289,000
Alternative 3	Capital cost Annual O&M Present worth	\$500,000 \$99,250 \$2,030,000
Alternative 4	Capital cost Annual O&M Present worth	\$851,000 \$181,620 \$3,641,000
Alternative 5	Capital cost Annual O&M Present worth	\$975,000 \$250,650 \$4,825,000
Alternative 6	Capital cost Annual O&M Present worth	\$2,229,008 \$295,950 \$6,779,800
Alternative 7	Capital cost Annual O&M Present worth	\$2,417,800 \$300,000 \$7,500,000

Alternatives that include comprehensive remediation of contaminated on-Site groundwater, and sediment (Alternatives 6 and 7) have the most associated capital and present worth costs. Alternatives that have the minimal amount of remedial work associated with them (Alternatives 2 and 3) have the lowest capital and present worth costs.

### 9.3 Modifying Criteria

The modifying criteria are used in the final analysis of remedial alternatives and are generally considered in altering an otherwise viable alternative rather than deciding between very different alternatives. The two modifying criteria are state and community acceptance.

#### 9.3.1 State Acceptance

The Oregon Department of Environmental Quality (DEQ) has been involved with the development and review of the Remedial Investigation, Feasibility Study and Proposed Plan for the Site. DEQ's comments have resulted in substantive changes to these documents. DEQ has also been integrally involved in determining the cleanup goals

for the TWCA Site. DEQ has indicated that the selected remedy as modified from the Proposed Plan is acceptable.

### **9.3.2 Community Acceptance**

EPA has carefully considered all comments submitted during the public comment period, and has taken them into account during the selection of the remedy for the TWCA Site.

Members of the community are most concerned about the economic impacts that selected remedial actions would have on TWCA and on the community. TWCA and community members are concerned that the selected remedy be cost effective relative to the actual health benefit. Most members of the community have expressed concern that a costly selected remedy would have a detrimental effect on TWCA's ability to compete and maintain its status as a viable local employer.

EPA responses to comments received during the public comment period are included in the attached Responsiveness Summary.

## 10.0 SELECTED REMEDY

Based on CERCLA, the NCP, the administrative record, the comparative analysis of alternatives, and public comments, EPA has decided to select a Superfund remedy for groundwater and sediment at the TWCA Site which is EPA's Proposed Plan (Alternative 7) as modified in response to public comment. Because TWCA is an active facility with ongoing operations, the RI/FS, prepared by TWCA, did not address several major areas potentially affected by releases from the Site. Therefore, those areas are not addressed by the selected remedy. Examples of unaddressed areas include process areas currently within or beneath buildings and structures in which hazardous substances may have entered the environment via past leaks or spillages.

The ensuing list of modifications to the Proposed Plan is further detailed in Section 12 of this ROD entitled "Documentation of Significant Differences." The selected remedy is modified from the Proposed Plan as follows:

- Active groundwater extraction shall only be required for identified hot spots and source areas at the Site, unless it is determined, via groundwater monitoring and extraction system performance data that groundwater RAOs and cleanup levels cannot be achieved within the projected timeframe.
- Pretreatment of groundwater prior to discharge to TWCA's existing wastewater treatment plant shall be required if such pretreatment is necessary to meet CWA requirements.
- Remediation of surface and subsurface soil contamination at the Site will be addressed in a subsequent Operable Unit ROD, Operable Unit Three.
- Environmental evaluations of previously uninvestigated areas shall be designed so as to minimize interference with TWCA's ongoing operations while achieving the stated RAOs for the Site.
- Evaluation and implementation of source reduction techniques has been eliminated. EPA and DEQ expect that TWCA will voluntarily and responsibly work to reduce or eliminate all potential sources of contamination in order to prevent further contamination and to help ensure the effectiveness of the selected remedy.

Because of Site-specific conditions, as elaborated in Sections 3, 6 and 7 of this ROD, and presented by the fact that TWCA is an active, operating facility, EPA has determined that the selected remedy is the most appropriate means of achieving the groundwater, surface water, and sediment RAOs described in Section 7.4. The selected remedy combines containment, source remediation, and treatment measures

to reduce risks to human health and the environment posed by contaminated groundwater and sediments at the TWCA Site. The selected remedy consists of the following:

**For Contaminated Groundwater:**

- Remediation of groundwater via groundwater extraction in the Feed Makeup area and at areas on Site where contaminant concentrations exceed lifetime cancer risk levels of  $10^{-4}$  and/or substantially exceed noncancer HI of 1 for worker exposure. Extraction shall continue until contaminant concentrations in groundwater throughout the Site are reduced to below SDWA MCLs, non-zero MCLGs, or cancer risk levels of  $10^{-6}$  and noncancer risk HI  $< 1$  for worker exposure, or until EPA in consultation with DEQ determines that continued groundwater extraction would not be expected to result in additional cost effective reduction in contaminant concentrations at the Site. Contaminated groundwater in exceedance of SDWA MCLs, non-zero MCLs, or cancer risk levels of  $10^{-6}$  and noncancer risk HI  $> 1$  for residential use shall be prevented from migrating off the plant site, or beyond the current boundary of the groundwater contaminant plume at the Farm Ponds Area.
- Discharge of extracted groundwater to Teledyne Wah Chang Albany's wastewater treatment plant. Pretreatment of groundwater to comply with CWA requirements prior to discharge to the wastewater treatment plant.
- Treatment or removal of subsurface source material near the Feed Makeup Building on the main plant.

**For Contaminated Sediments:**

- Slope erosion protection consisting of a geotextile covered by riprap placed along the banks of Truax Creek to prevent contaminated fill material from entering the creek.
- Removal of approximately 3,600 cubic yards of contaminated sediments from the surface water bodies adjacent to, or flowing through the Site. Additional ecological characterization prior to removal to determine potential impacts of sediment removal to the local ecosystem and to provide mechanisms to mitigate those impacts.

**Site-Wide Actions:**

- Deed restrictions and institutional controls on land and groundwater use for both the main plant and Farm Ponds area. The objective of this

component of the remedy is to ensure that the property and groundwater are used only for purposes appropriate to the cleanup levels achieved.

- Environmental evaluations of currently uncharacterized potential contaminant source areas, as needed to ensure achievement of groundwater RAOs. The objective of this component of the remedy is to ensure that contaminant source areas do not adversely impact the remedy.
- Long-term on-Site and off-Site groundwater, surface water, and sediment monitoring which shall include at a minimum the monitoring of on-Site wells which are in exceedance of MCLs and non-zero MCLGs, cancer risk levels of  $10^{-6}$ , and noncancer risk  $HI > 1$  for residential exposure.
- Review of selected remedy at least once every five years to ensure protection of human health and the environment.

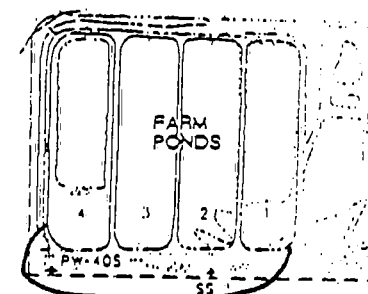
## **10.1 Contaminated Groundwater**

### **10.1.1 Groundwater Extraction and Containment**

This element of the selected remedy utilizes a combination of volume reduction and containment measures to manage and mitigate risks posed by groundwater contamination at the TWCA Site. RAOs for groundwater at the TWCA Site have been established in the RI/FS and Proposed Plan which include the reduction of concentrations of TWCA-related contaminants in groundwater to concentrations below ARARs or other risk-based levels. Additional RAOs for groundwater at the TWCA Site include: preventing contaminated groundwater above ARARs and risk-based levels from migrating off Site, preventing human and environmental exposure to contaminated groundwater, and preventing contaminated groundwater from discharging into nearby surface waters. Cleanup levels which shall be obtained for groundwater at the TWCA Site are shown in **Table 10-1**.

Eight hot spots at the TWCA Site have been identified with groundwater contamination above the lifetime cancer risk level of  $10^{-4}$  and/or a noncancer HI which is substantially greater than 1. These areas are shown in **Figure 10-1**. The eight areas may also serve as potential source areas to Site-wide groundwater contamination. These potential source areas if not actively remediated will continue to contaminate surrounding groundwater. Therefore, in order to achieve the RAOs for groundwater, and reduce risk of exposure to contaminated groundwater, extraction shall be implemented in the eight potential source areas. If additional areas are subsequently found to exhibit groundwater contamination at or above the lifetime cancer risk level of  $1 \times 10^{-4}$  and noncancer hazard index of 1, groundwater extraction shall be implemented at those additional areas.





Note: The Farm Ponds Area is located 3/4 mile north of the Main Plant

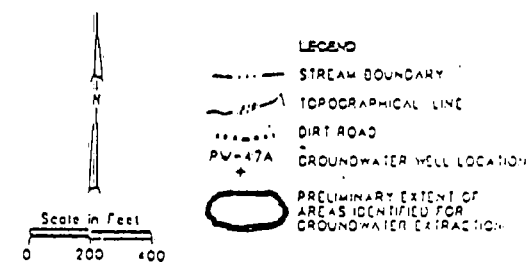


Figure 10-1  
IDENTIFIED HOT SPOTS OR SOURCE AREAS OF GROUNDWATER CONTAMINATION WHICH EXCEEDS LIFETIME  
CANCER RISK LEVELS OF  $10^{-4}$  AND/OR SUBSTANTIALLY EXCEEDS LIFETIME NONCANCER HAZARD INDEX OF 1

**Table 10-1**  
**CLEANUP LEVELS FOR GROUND WATER AT THE TWCA SITE**

HAZARDOUS SUBSTANCE	CONCENTRATION $\mu\text{g/l}$	BASIS
Benzene	5	MCL
1,2-Dichloroethane (1,2-DCA)	5	MCL
1,1-Dichloroethene (1,1-DCE)	7	MCL
Methylisobutylketone (MIBK)	5000	HI = 1
1,1,2,2-Tetrachloroethane	0.175 <sup>a</sup>	10 <sup>-6</sup> Risk
Tetrachloroethene (PCE)	5	MCL
1,1,1-Trichloroethane (1,1,1-TCA)	200	MCL
1,1,2-Trichloroethane (1,1,2-TCA)	3	Non-zero MCLG
Trichloroethene (TCE)	5	MCL
Vinyl Chloride	2	MCL
Hexachlorobenzene	1	MCL
PAHs	0.2	MCL
Beryllium	1	MCL
Copper	1000	SMCL
Manganese	50	SMCL
Uranium	20	MCL
TOTAL PCBs	0.5	MCL
Radium-226	5	MCL
Radium-228	5	MCL
Ammonium <sup>b</sup>	250,000	°OAR
Fluoride	2,000	°OAR

**Table 10-1 (continued)**  
**CLEANUP LEVELS FOR GROUND WATER AT THE TWCA SITE**

HAZARDOUS SUBSTANCE	CONCENTRATION $\mu\text{g/l}$	BASIS
Nitrate	10,000	MCL

**Note:** The following long-term cleanup levels have been established for groundwater throughout the TWCA Site. These cleanup levels have been established in order to achieve groundwater RAOs and ARARs. They are either the SDWA MCLs, non-zero MCLGs, or Oregon Drinking Water Standards. Hazardous substances detected on the main plant which are shown on this list and for which no MCL, MCLG, or state standard exists shall be remediated to the concentration which is equivalent to the lifetime cancer risk level of  $10^{-6}$  or noncancer hazard index (HI) of 1 for industrial exposure. Hazardous substances detected at the Farm Ponds Area or off Site which are shown on this list and for which no MCL, MCLG, or state standard exists shall be remediated to the concentration which is equivalent to the lifetime cancer risk level of  $10^{-6}$  or noncancer hazard index (HI) of 1 for residential exposure.

Hazardous substances which are not on this list, but which have been previously detected at the TWCA main plant, or which may be detected at the TWCA main plant in the future, must be remediated to the concentration which is equivalent to the lifetime cancer risk level of  $10^{-6}$ , or non-cancer HI = 1 for industrial exposure.

Cancer risk shall not exceed  $10^{-6}$  for industrial exposure at the main plant, and for residential exposure at the Farm Ponds and off-Site areas.

The MCL for combined Radium-226 and Radium-228 is 5 picocuries per liter (pCi/l).

SMCL = Secondary Maximum Contaminant Level (40 C.F.R. §143.3)

In addition, the pH of ground water at the TWCA Site shall be between 6.5 and 8.5 in accordance with the SMCL.

<sup>a</sup> - This level may be below the Practical Quantitation Limit. Concentrations of this hazardous substance must not be detected in ground water monitoring wells.

<sup>b</sup> = This contaminant is regulated as ammonium sulfate.

<sup>c</sup> = OAR 333-61-030 = State Drinking Water Standards.

This element of the remedial action would be designed to achieve groundwater RAOs. Based on information obtained during the RI and on the analysis of all seven remedial alternatives, EPA and DEQ have determined that the selected remedy would be most likely to meet RAOs throughout the Site.

Groundwater contamination may be especially persistent in the immediate vicinity of contaminant sources, such as the Feed Makeup area where concentrations are relatively high. The ability to achieve RAOs and cleanup levels at all points throughout the affected areas cannot be determined until the extraction system has been implemented and modified as necessary, and the plume response monitored over time. If this element of the selected remedy is unable to fully achieve all the specified RAOs and cleanup levels, at any or all of the monitoring points during implementation, the contingency measures and standards described in Section 10.1.1.2 ("Attainment of Groundwater Cleanup Levels") may be used to replace this element of the selected remedy for those portions of the affected areas. Such contingency measures will assure protectiveness by, at a minimum, preventing further migration of groundwater contaminants. These contingency measures may include a combination of containment technologies such as groundwater extraction and treatment and institutional controls as needed to protect human health and the environment.

EPA considers these measures to be protective of human health and the environment.

#### **10.1.1.1 Point of Compliance for Groundwater Remediation**

In order to achieve the RAOs and cleanup levels established for groundwater at the TWCA Site, groundwater extraction will be implemented at the Site using the following conditions:

The preamble to the NCP (55 FR 8752), specifies that cleanup levels should be attained throughout the contaminated plume, or at and beyond the edge of the area where waste is left in place. As applied to the TWCA Site, cleanup levels shall be attained throughout the contaminated plume. However, as TWCA is a complex site with complex groundwater contamination due to the fact that it is an operating facility, the approach to groundwater cleanup will differ within the main plant property boundary as opposed to at or outside the property boundary. A point of compliance shall be established at the main plant property boundary (**Figure 10-2**). The point of compliance for the Farm Ponds Area shall be the edge of the Farm Ponds themselves.

EPA has determined that the risks associated with areas of groundwater that fall within the risk range of  $10^{-4}$  to  $10^{-6}$  can be effectively managed by groundwater containment via gradient control, along with active remediation of identified source areas, without such massive disruption of operations at the TWCA site.

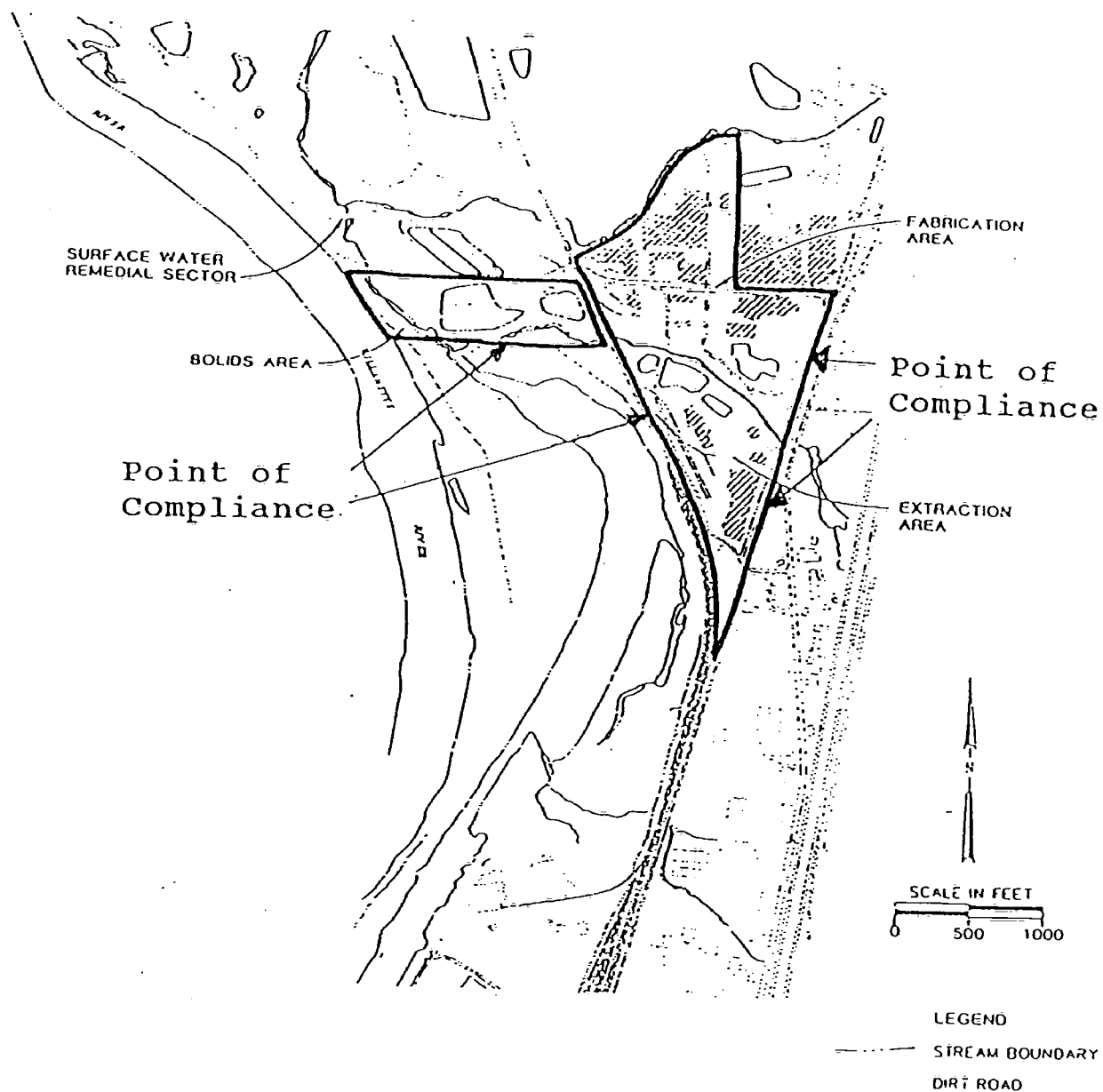


Figure 10-2  
POINT OF COMPLIANCE FOR  
MAIN PLANT GROUNDWATER REMEDIATION

In balancing TWCA's need to continue uninterrupted operations against the need for a groundwater remedy that is effective and protective, EPA has determined that the most feasible groundwater cleanup strategy is to initially require that active groundwater remediation on the Site be applied only to certain areas that have been identified as sources or hot spots. Therefore, the potentially responsible party (PRP) shall actively remediate source areas and hot spots within the point of compliance to the cleanup levels listed in **Table 10-1**. The PRP shall address the primary source areas or hotspots identified in the RI/FS by extraction of groundwater from all wells where concentrations exceed a lifetime cancer risk level of  $10^{-4}$  and/or noncancer HI substantially greater than 1, including but not limited to the Feed Makeup area, the Farm Ponds Area, the acid sump area, the Arc Melting Area, the area south of the Powder Metallurgy Building, Truax Fill, and the southern Extraction Area. If additional groundwater source areas or hot spots are identified during remedial design or remedial action, then the PRP shall also actively remediate those areas to the cleanup levels listed in **Table 10-1**. At and outside the compliance points, the PRP shall initiate groundwater extraction anywhere the cleanup levels are exceeded, or as needed to meet RAOs. The ability of this initial approach of extraction of groundwater only at primary source areas and hot spots to meet cleanup levels and RAOs shall be evaluated periodically as described in Sections 10.1.1.2 and 10.1.1.3 of this ROD.

Results of the RI/FS have shown that groundwater in the Site perimeter monitoring wells, outside of identified source areas, is above the cleanup levels listed in **Table 10-1**. Therefore, the PRP shall implement containment actions to ensure that the contaminated groundwater does not migrate off-Site or into adjoining surface water bodies. Containment of contamination shall be achieved via hydrodynamic controls such as long-term groundwater gradient control provided by low level pumping.

For the purposes of the Superfund remedial action the groundwater cleanup levels shall be those levels as stated in **Table 10-1**. However, under certain circumstances, other regulatory authorities may require that more stringent groundwater standards be achieved within the TWCA property boundary. Such regulatory authorities would include, but not necessarily be limited to, RCRA, which might require groundwater corrective action as a result of any releases from RCRA regulated units at the TWCA facility. Should releases from a RCRA regulated unit, or any other unit, impact the Superfund remedial action, Superfund groundwater cleanup standards shall be consistent with the more stringent requirement.

#### **10.1.1.2 Attainment of Groundwater Cleanup Levels**

The purpose of the groundwater extraction is to expedite the eventual attainment of Site-wide groundwater cleanup levels. The PRP shall continue groundwater extraction

until cleanup levels are achieved. The projected timeframe for such groundwater extraction is an estimated period of 15 years. This timeframe may be modified as additional data is collected and the contaminant plume response is evaluated during groundwater remediation. Determination to improve, modify, or augment the groundwater remedy, or as to whether groundwater cleanup levels are achievable, shall be made by EPA, in consultation with DEQ, as described below.

Three years after commencing operation of the extraction system an EPA-approved historical and statistical analysis of groundwater contaminant concentrations shall be conducted by the PRP. If this or any later analysis indicates that contaminant concentrations in groundwater at any location on the Site are not likely to decline to cleanup levels within 15 years after commencement of operation of the extraction system, the existing extraction system may be modified, at EPA's discretion after consultation with DEQ, as described below:

- a) At individual wells where cleanup levels have been attained, pumping may be discontinued;
- b) Alternating pumping may be conducted at wells to eliminate stagnation points;
- c) Pulse pumping may be conducted at wells to allow aquifer equilibration and to allow adsorbed contaminants to partition into groundwater;
- d) Additional extraction wells may be installed at EPA-approved locations to facilitate or accelerate cleanup of the contaminant plume and help ensure achievement of groundwater RAOs within the projected 15-year remediation timeframe;
- e) Additional extraction measures may be conducted in source areas or hot spots which are delineated as a result of environmental evaluations or as a result of any other additional sampling which is required by the selected remedy.

If EPA in consultation with DEQ determines on the basis of the system performance data that certain portions of the affected groundwater areas cannot be fully restored to cleanup levels, some or all of the following measures involving long-term management may be required to be implemented by the PRP for an indefinite period of time as a modification of the existing system:

- a) If groundwater contaminant concentrations increase, and/or the contaminant plume expands, and/or contaminant concentrations are not being reduced by remedial actions already in place, the PRP shall institute engineering controls, including measures such as physical barriers, or long-term gradient

control provided by low level pumping, as containment measures;

b) If contaminant concentrations are not reduced to cleanup levels, the PRP shall maintain institutional controls to restrict access to portions of the affected groundwater which remain above cleanup levels;

c) If, based upon the sample monitoring data EPA in consultation with DEQ determines that it is necessary in order to ensure attainment of cleanup levels, the PRP shall continue monitoring of specified wells; and

d) If groundwater cleanup levels cannot be achieved by remedial actions already in place, the PRP shall conduct periodic reevaluation of remedial technologies for groundwater restoration.

For those on-Site areas in which groundwater contamination is above cleanup levels but EPA in consultation with DEQ has determined that active groundwater remediation (i.e. extraction) is not required, the PRP may then rely on natural attenuation to aid reduction of the chemical concentrations in these areas to cleanup levels. During periodic review of the groundwater extraction system, the PRP shall conduct evaluations to determine the rate of natural attenuation and to determine whether the RAOs and cleanup levels are likely to be reached through natural attenuation within the projected 15 year groundwater remediation timeframe. If those evaluations indicate by historical sampling and analysis of extraction and monitoring wells that natural attenuation is unlikely to achieve the desired objectives, the PRP shall then implement increased extraction.

Groundwater contamination above cleanup levels must be contained on Site. Natural attenuation can only be relied upon to reduce those non-source areas of on-Site groundwater contamination with lifetime cancer risk levels less than  $10^{-4}$  and noncancer HI = 1.

#### **10.1.1.3 Groundwater Extraction System Monitoring**

The PRP shall monitor the groundwater extraction system's performance initially on at least a quarterly basis. On approval by EPA after consultation with DEQ, the PRP may be permitted to reduce the frequency of monitoring. The PRP shall conduct monitoring of the groundwater extraction system until cleanup levels are achieved. The PRP shall design the monitoring system to evaluate the effectiveness of the groundwater extraction system with respect to the following:

a) horizontal and vertical extent of the plume(s) and contaminant concentration gradients;



- b) rate and direction of contaminant migration;
- c) changes in contaminant concentrations or distribution over time; and,
- d) effects of any modifications on the ability of the extraction system to achieve cleanup levels.

To ensure maintenance of cleanup levels, the PRP shall continue to monitor groundwater at least yearly for a minimum period of 5 years after cleanup levels are achieved at those wells where pumping has ceased.

#### **10.1.1.4 Decision to Modify Groundwater Remedial Actions**

The decision to pursue any or all of the modifications to the remedial actions described in Section 10.1.1 of this ROD shall be made at the discretion of EPA in consultation with DEQ.

#### **10.1.2 Pretreatment and Discharge of Extracted Groundwater**

Under this element of the selected remedy, extracted groundwater may be discharged to TWCA's wastewater treatment plant. This treatment plant currently treats and discharges wastewater from TWCA's ongoing processes to Truax Creek under an NPDES permit. Truax Creek discharges into the Willamette River.

Section 301(b)(1) of the CWA requires the establishment of limitations in permits necessary to meet water quality standards. Discharges to Oregon state waters must also comply with limitations imposed by the state as part of its certification of NPDES permits under section 401 of the CWA.

The NPDES regulations at 40 C.F.R. 122.44(d)(1) require that permits include limits on all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality" (54 Fed. Reg. 23868-23899; June 2, 1989). Oregon Water Quality Criteria (promulgated in Table 20 of OAR 340-41-445) for certain contaminants found in groundwater at the TWCA Site are shown in **Table 10-2**.

Section 402 of the CWA requires that effluent limitations in NPDES permits be based in part upon treatment using the best practicable control technology (BPT) currently available. Because discharge of VOCs was not envisioned at the time the existing TWCA NPDES permit was issued, the permit does not require effluent limitations for VOCs. However, the RI/FS evaluated alternatives which include discharge of some VOC-contaminated groundwater to TWCA's wastewater treatment facility without pretreatment prior to discharge. Therefore, in order to comply with Section 402 of the

**Table 10-2**  
**\*OREGON WATER QUALITY CRITERIA FOR**  
**SELECTED CONTAMINANTS AT THE TWCA SITE**

HAZARDOUS SUBSTANCE	CONCENTRATION
1,1-Dichloroethene (1,1-DCE)	0.033 $\mu\text{g/l}^{\text{b}}$
1,1,2-Trichloroethane (1,1,2-TCA)	0.6 $\mu\text{g/l}$
Vinyl chloride	2 $\mu\text{g/l}$
Total PCBs	0.079 $\text{ng/l}^{\text{c}}$
Fluoride	4,000 $\mu\text{g/l}$
Nitrate	10,000 $\mu\text{g/l}$

<sup>a</sup> = Water Quality Criteria are for protection of human health (OAR 340-41-445, Table 10 and Table 20).

<sup>b</sup>  $\mu\text{g/l}$  = micrograms per liter

<sup>c</sup>  $\text{ng/l}$  = nanograms per liter

Discharge of radionuclides (radium-226, radium-228, isotopes of uranium) shall be no greater than concentrations allowed for unrestricted area limits in accordance with Appendix A, OAR 333-104-015.

CWA, this element of the selected remedy requires that the PRP conduct an analysis of BPT during remedial design. The PRP shall recommend the BPT to be used for pretreatment, which EPA in consultation with DEQ shall approve. Upon EPA approval, the PRP shall then implement BPT to pretreat VOC-contaminated groundwater prior to discharge to TWCA's wastewater treatment facility. Examples of areas of the Site where pretreatment of extracted groundwater using BPT may be necessary include the Feed Makeup area located in the Extraction Area of the main plant, and the Acid Sump area and area near the Powder Metallurgy Building located in the Fabrication Area of the main plant. At this time, based on the information currently available, it is projected that BPT for treatment of VOC-contaminated water would likely consist of air stripping and/or liquid-phase carbon adsorption.

Based on the information currently available, another example of BPT that is projected to be utilized at the Site as part of the selected remedy is resource recovery. Resource recovery would involve using extracted groundwater from the Feed Makeup area in place of surface water that is currently being used by TWCA in its ongoing processes. Placing the extracted groundwater from the Feed Makeup area into TWCA's process stream would enable recovery of zirconium that is currently in solution in the groundwater. Additional contaminants such as VOCs which could not be treated or recovered by this process would be pretreated prior to discharge to surface water.

#### **10.1.3 Removal/Treatment of Subsurface Source Material Near the Feed Makeup Building**

This element of the selected remedy seeks to reduce the levels of contaminants in the Feed Makeup source area in order to protect groundwater. Based on the results of the RI, the source of the extremely low pH in the groundwater at well PW-28A has been postulated to be buried pre-1978 feed solution which was previously used in TWCA's ongoing processes.

The PRP shall first conduct additional sampling in order to further define the extent of subsurface contamination in the area. The PRP shall simultaneously conduct pilot testing to evaluate the effectiveness of removal of contaminants in the subsurface source material via flushing of the source material with water. The criteria for determining effectiveness shall be the ability of the flushing technology to increase pH levels in contaminated source material in the short term, and subsequently decrease contaminant concentrations in groundwater over the long term. In addition, there would be a short term increase in the solubility and mobility of metal contaminants in source material which would then result in flushing of those contaminants from the source material to the extraction well. Once the contaminants are flushed from the source material a decrease in contaminant concentrations in the groundwater would then result. If the pilot test proves effective, the PRP shall excavate infiltration trenches along the boundaries of, or within the affected zone. The PRP shall introduce clean

water through the infiltration trenches and allow the clean water to migrate into the affected area. The PRP shall drill an extraction well through the middle of the affected area and shall use the extraction well to extract the added water and any contaminants which may be dissolved in the water. The PRP may pretreat this extracted water and/or utilize the water for recovery of zirconium, prior to discharge to TWCA's wastewater treatment plant.

The PRP may obtain clean water for the system from existing piping in the Feed Makeup Building. The PRP shall monitor the system to ensure that the additional water does not spread contamination outside of the capture zone. Should contamination spread, containment via gradient control and/or source removal actions shall be implemented by the PRP.

The PRP shall conduct an evaluation of the effectiveness of the flushing technology three years after implementation of this element of the selected remedy. EPA and DEQ, in consultation with TWCA, will determine the feasibility and/or effectiveness of flushing which shall be determined based upon the results of sampling and monitoring data and the ability of the flushing technology to achieve RAOs.

Should pilot testing show that flushing of the source material is not feasible, or should the three-year evaluation show that implementation of source flushing is not effective in achieving RAOs, EPA may determine that additional remedial actions must be implemented. These additional remedial actions could include, but would not necessarily be limited to, source treatment or removal.

## **10.2 Contaminated Sediment**

### **10.2.1 Slope Erosion Protection Along the Banks of Truax Creek**

An RAO for sediment at the TWCA Site includes the prevention of further release of additional TWCA-related contaminated sediment. This element of the selected remedy seeks to contain and prevent contaminated material in Truax Fill on the north side of Truax Creek from being eroded and carried into Truax Creek. Geotextile covered by riprap could be used to provide slope erosion protection. The slope erosion protection shall extend approximately 980 lineal feet along the north bank of Truax Creek, from where the creek enters the TWCA plant to the road crossing just west of Pond 2 (**Figure 8-3**).

The PRP shall remove vegetative cover from the slope. After removing the vegetation, the PRP shall strip loose debris and material high in organic matter from the slope to provide a good base for the geotextile. The PRP shall ensure that any debris or material removed that may contain PCBs shall be handled and disposed of appropriately. The PRP shall take preventative measures such as completion of work

during low flow periods to ensure that PCB-contaminated material does not enter Truax Creek during construction activities. As per EPA's Guidance on Remedial Actions for Superfund Sites with PCB Contamination (Office of Solid Waste and Emergency Response (OSWER) Directive No. 9355.4.01), the PRP shall ensure that all material containing greater than 10 ppm PCBs is disposed of in accordance with all ARARs.

After stripping any soft or loose material from the slope, the PRP shall place a medium-to heavy-weight geotextile on the slope. The PRP shall provide that the geotextile meets the engineering specifications required by the state of Oregon as protected riprap.

### **10.2.2 Sediment Removal**

This element of the selected remedy seeks to prevent migration of contamination from sediments to surface water, reduce the levels of contaminants in sediments at the TWCA Site and protect aquatic organisms from exposure to contaminated sediments. The PRP shall remove approximately 3,600 cubic yards of PCB-contaminated sediment from Murder and Truax Creeks. Areas of sediment removal are shown in **Figure 10-3**.

Prior to removal, the PRP shall characterize the creeks in order to determine how to minimize short-term and long-term impacts to the local ecosystem. The PRP shall also characterize Conser Slough in order to determine potential effects of removal of contaminated sediments from this deeper water body. If the Conser Slough characterization determines that sediment removal will cause no long-term or significant detrimental effects on the Conser Slough ecosystem, then the PRP shall remove approximately 1,500 cubic yards of contaminated sediment from the slough.

If necessary to minimize the spreading of contaminants by flowing water during removal, the creeks shall be diverted, and groundwater within the vicinity of the removal shall be contained or controlled. In order to be protective of aquatic organisms, the cleanup level for PCBs in sediments at the TWCA Site shall be 1 ppm. This cleanup level is based upon an equilibrium partitioning approach as per EPA's Guidance on Remedial Actions for Superfund Sites with PCB Contamination (OSWER Directive No. 9355.4.01) using an average Site-specific total organic carbon content of 5% for the freshwater sediments found at the Site. Removed sediment shall be sampled and analyzed to determine PCB concentrations and sediments with PCB concentrations of 1 ppm or greater shall be disposed of off Site in accordance with all applicable requirements.



### **10.3 Site-Wide Actions**

#### **10.3.1 Deed Restrictions and Institutional Controls**

This element of the selected remedy is designed to prevent workers on the main plant, and potential workers in the Farm Ponds area from being exposed to contaminated groundwater at the Site. The PRP shall implement institutional controls in the form of deed restrictions on the construction and use of groundwater wells for drinking water supply on the entire Site. The PRP shall implement access controls on the portions of the Farm Ponds area that are owned by TWCA. The PRP shall implement deed restrictions and institutional controls on the main plant and in the Farm Ponds area as long as TWCA remains an active facility, and/or until cleanup levels are achieved.

#### **10.3.2 Environmental Evaluations of Uninvestigated Areas**

In order to ensure that RAOs for groundwater at the Site are being achieved, the PRP shall conduct an environmental evaluation of previously uninvestigated areas beneath buildings and structures whenever TWCA discontinues use of, paves, or otherwise disturbs any pond, area, or building on the TWCA Site. The PRP shall design the scope of the environmental evaluation to determine whether there have been releases of contamination into the groundwater beneath these structures. Potential releases of contamination from previously uninvestigated areas could impede the ability of selected remedial actions to achieve the established cleanup levels.

Examples of ponds and areas that would require an environmental evaluation include the unlined ponds at the facility, including the Farm Ponds, ponds within the wastewater treatment plant, and areas under buildings or pavement, excluding fences. The PRP may design the scope of environmental evaluations so as to minimize interference with TWCA's ongoing operations while achieving the stated purpose. EPA in consultation with DEQ shall work with the PRP to establish sampling and analysis protocols which do not adversely impact TWCA's ongoing operations. However, at a minimum, the environmental evaluations shall consist of analyses of surficial soil samples for chemical and radiological contaminants. If the results of the surficial soil sampling or other factors indicate elevated levels of chemical or radiological contamination, the PRP would be required to conduct subsurface soil and groundwater sampling for that currently uncharacterized portion of the Site.

Environmental evaluations of currently uncharacterized source areas shall be scheduled for those times when TWCA makes changes in those existing buildings and structures in order to ensure that remediation of such sources will be integrated into the schedule of TWCA's ongoing operations and will interfere only minimally with TWCA's ongoing processes.

The PRP shall submit environmental evaluation reports to EPA and DEQ once every

two years until cleanup levels are achieved. The PRP's submission of environmental evaluation reports shall begin by September 30th of the second year after EPA approval of the remedial design work plan and shall be due by September 30th every other year thereafter. The PRP shall summarize in the environmental evaluation reports any sampling analyses, conclusions, and cleanup actions of previously uninvestigated areas throughout the Site that are conducted during each reporting period.

EPA and DEQ will consider the information presented in the environmental evaluation reports when evaluating remediation progress and the need for additional action. Impacts on the selected remedy of contamination from previously uncharacterized sources may be utilized by EPA and DEQ in review of the effectiveness of the selected remedy.

### **10.3.3 Long Term On-Site and Off-Site Groundwater, Surface Water and Sediment Monitoring**

The PRP shall implement long-term on-Site surface water, and on-Site and off-Site groundwater monitoring, to provide an ongoing assessment of water quality and determine the effectiveness of remedial actions. The PRP shall submit a surface water and groundwater monitoring plan for EPA and DEQ approval during remedial design. The monitoring program described under this Section shall be distinct from the extraction system monitoring program described in Section 10.1.1.3 of this ROD. At a minimum, the monitoring program shall initially include monitoring of all on-Site wells which are above cancer risk levels of  $10^{-6}$  and noncancer HI of 1. For the first year, the monitoring program shall include quarterly sampling of groundwater monitoring wells beneath and adjacent to the Site, plus semi-annual monitoring of on-Site and adjacent surface water bodies. Sediments in Murder Creek, Truax Creek, and Conser Slough shall be monitored on an annual basis for a minimum period of five years after which time the frequency of sediment monitoring shall be reviewed by EPA in consultation with DEQ. With respect to long-term groundwater and surface water monitoring, after the first full year of monitoring, or anytime thereafter, EPA in consultation with DEQ may determine that the frequency of monitoring may be reduced.

The PRP shall begin the monitoring program upon implementation of the selected remedy and shall continue the monitoring program for a minimum of 5 years after cleanup levels are achieved.

### **10.3.4 CERCLA Five-Year Review**

Section 121(c) of CERCLA and Section 300.430(f)(4)(ii) of the NCP require a review of the remedial action no less often than once every five years if the selected remedy



"results in hazardous substances, pollutants, or contaminants remaining on the site above levels that allow for unlimited use and unrestricted exposure". Statutory reviews must continue at least every five years until contaminant levels allow for unlimited use and unrestricted exposure.

As contaminants will remain on Site that are above risk-based levels, the selected remedy requires that statutory reviews be conducted at least every five years. This element of the selected remedy also recognizes that TWCA is an active facility with ongoing operations which have impacted and limited the scope of the RI/FS, and which may continue to influence the effectiveness of remedial actions.

#### **10.4 Costs**

Estimated costs associated with the selected remedy are summarized in **Table 10-3**. The extent of pretreatment of extracted groundwater will be refined during the remedial design phase, and costs may change accordingly. The scope of environmental evaluations may also be refined during remedial design and estimated costs may be further adjusted.

The present worth cost estimates provided are intended to be within +50% and -30% of the actual costs of remediation, and are based on volume estimates established during the FS along with the following key assumptions.

- Groundwater extraction would be implemented at approximately 35 on-Site wells.
- Approximately 15 environmental evaluations beneath buildings and structures would be conducted. Each evaluation would consist of sampling and analyses of approximately two groundwater monitoring wells to be drilled to a total depth of 40 feet, three subsurface soil borings to be drilled to a depth of 10 feet each, and five surficial soil samples.
- Approximately 3,600 cubic yards of sediment would be removed from the Site.

Based on these assumptions, total capital costs for the selected remedy are estimated to be \$2.4 million. Present worth costs for a 30-year remedy at a 5% discount rate are estimated to be \$7.5 million.

**Table 10-3**  
**ESTIMATED COSTS FOR TWCA SITE SELECTED REMEDY**

<b>CAPITAL COSTS</b>	
Ground Water Extraction (Includes extraction at Feed Makeup area)	\$ 292,000
Pretreatment of Extracted Ground Water <sup>a</sup>	\$ 7,200
Slope Erosion Protection	\$ 125,300
Soil Flushing at Feed Makeup Area	\$ 3,000
Sediment Removal	\$ 396,000
Institutional Controls	\$ 121,000
Environmental Evaluations	\$ 318,800
Long-Term Monitoring	\$ 16,000
Offsite Monitoring	\$ 13,000
<b>CAPITAL COSTS SUBTOTAL</b>	<b>\$1,291,500</b>
Contingencies @ 30%	\$ 387,500
<b>SUBTOTAL</b>	<b>\$1,679,000</b>
Other Costs @ 20% (Includes Administrative, Service, Legal Costs)	\$ 335,800
<b>SUBTOTAL</b>	<b>\$2,014,800</b>
Design Costs @ 20%	\$ 403,000
<b>TOTAL CAPITAL COSTS</b>	<b>\$2,417,800</b>
Operation and Maintenance Costs	\$ 308,000
Present Worth Costs (Calculated for 30 years at 5% discount)	\$7,500,000

<sup>a</sup> = Additional pretreatment costs may be incurred if levels of groundwater which is discharged to TWCA's wastewater treatment plant causes an exceedance of surface water ARARs.

Estimated costs, exclusive of environmental evaluation costs, are based upon tallying costs of individual line items which were provided in the RI/FS.

## **11.0 STATUTORY DETERMINATIONS**

Under CERCLA, EPA's primary responsibility is to ensure remedial actions are undertaken which protect human health, welfare, and the environment. In addition, Section 121 of CERCLA, 42 U.S.C. §9621, establishes cleanup standards which require that the selected remedial action complies with all ARARs established under federal and state environmental law, unless such requirements are waived by EPA in accordance with established criteria. The selected remedy must also be cost-effective and must utilize permanent solutions, alternative treatment technologies, or resource recovery technologies to the maximum extent practicable. Finally, CERCLA regulations include a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous waste. The following sections discuss how the selected remedy for the TWCA Site meets these CERCLA requirements.

### **11.1 Protection of Human Health and the Environment**

The selected remedy combines a number of containment, treatment and monitoring measures which are designed to be protective of human health and the environment. The selected remedy takes into account the fact that TWCA is an active facility and that it may not be possible to completely eliminate or reduce all potential sources of contamination without substantially interfering with TWCA's ongoing processes. The goal of the selected remedy is to achieve protection of human health and the environment while giving reasonable consideration to those factors.

Groundwater contamination above ARARs or risk-based levels will be contained on Site. This measure will minimize or eliminate migration of contaminants to surface water, and to off-Site groundwater. Some past sources of groundwater contamination in the Solids Area have been removed during previous remedial actions.

Some remaining currently identified sources of groundwater contamination such as subsurface feed solution in the Feed Makeup Area, will be reduced or eliminated through a number of remedial actions. Extraction of groundwater above risk-based levels will reduce the level of contaminants in groundwater. Resource recovery of zirconium may be utilized to help reduce groundwater and subsurface soil contaminant concentrations in the Feed Makeup area. Pretreatment of extracted groundwater prior to surface water discharge will reduce the level of contaminants entering surface water. Removal of contaminated sediments from the Site will be protective of aquatic organisms by eliminating potential exposure.

Prevention of migration of contaminants, and restoration of groundwater will be accomplished via the source containment, treatment, removal and resource recovery measures described above. Slope erosion protection will prevent further contamination of Truax Creek sediments.

Due to the ongoing operation of the TWCA facility, there may be potential uncharacterized sources of groundwater contamination beneath existing buildings and structures. Scheduling environmental evaluations of these potential uncharacterized source areas for those times when TWCA makes changes in those existing buildings and structures will ensure that remediation of such sources can be integrated into the schedule of TWCA's ongoing operations and will interfere only minimally with TWCA's ongoing processes. This approach also takes into account the community's concerns about the potentially disruptive effect of the selected remedy on TWCA's ability to conduct its business.

Institutional controls and deed restrictions will further the measures described above by controlling groundwater uses.

Additional protection will be provided by the on-Site and off-Site long-term surface water and groundwater monitoring programs.

Implementation of the selected remedy will involve excavation of sediment, and may result in some potential for air emissions and additional short-term risks. Short-term risks will be minimized to the maximum extent practicable. It is expected that dust emissions from excavation activities can be controlled to acceptable levels through the use of dust suppressants. Potential migration of contaminants in sediments to surface water during the excavation of contaminated sediments will be controlled and contained via groundwater containment and surface water diversion. No adverse cross-media impacts are anticipated.

## **11.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**

The selected remedy will comply with all ARARs that have been identified. No waiver of any ARAR is being sought or invoked for any component of the selected remedy. The ARARs identified for the TWCA Site include the following:

### **Chemical-Specific ARARs**

Chemical-specific requirements are usually health- or risk-based numerical values or methodologies that establish the acceptable amount or concentration of a chemical in the ambient environment. Following are the chemical-specific requirements for the TWCA Site:

1. SDWA MCLs and non-zero MCLGs, 40 C.F.R. Part 141.

**Applicable** for off-property-drinking water supplies, if these wells are community wells that serve more than two residences. **Relevant and appropriate** for on-Site and off-Site groundwater.

2. Oregon Environmental Cleanup Law, ORS 465.315; Oregon Environmental Cleanup Rules, Standards, OAR 340-122-040.

These regulations are **applicable** for on-Site groundwater and sediments.

3. Oregon Water Quality Criteria for the Willamette Basin, OAR 340-41-445.

These regulations are **applicable** to extracted groundwater which is discharged to surface water. **Relevant and appropriate** for groundwater which discharges directly to surface water as a non-point source.

4. Oregon Ground Water Quality Statute, ORS 468B.150 to 185.

This statute is **relevant and appropriate** for remediation of groundwater at the Site.

### **Location-Specific ARARs**

Location-specific requirements are restrictions based on the concentration of hazardous substances or the conduct of activities in specific locations. These may restrict or preclude certain remedial actions or may apply only to certain portions of the Site.

1. Executive Order 11988, Statement of Procedures on Floodplain Management and Wetlands Protection, Appendix A to 40 C.F.R. Part 6.

The selected remedy is not expected to have an impact on wetlands at the Site. However, this requirement is **relevant and appropriate** to remedial actions which may affect on-Site surface water such as Truax and Murder Creeks.

2. Oregon's statewide planning goals, Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources), Goal 6 (Air, Water and Land Resources Quality), Goal 7 (Areas Subject to Natural Disaster and Hazards) and Goal 15 (Willamette River Greenway).

These regulations are **applicable** for those portions of the TWCA Site that lie within the Willamette River floodplain. The City of Millersburg is the local jurisdiction responsible for ensuring the objectives of these goals are satisfied. Remedial actions planned for these areas will need to be cleared through the City of Millersburg under its floodplain ordinance.

3. The Oregon Removal-Fill Law, ORS 196.800-196.990.

This regulation is **relevant and appropriate** for those removal and remedial actions at the TWCA Site associated with removal of Truax Fill material and sediment remediation. The Oregon Removal-Fill Law requires a permit from the Oregon Division of State Lands if 50 or more cubic yards of material is removed or filled in wetlands, streams, ponds and other areas. Although Section 121(e)(1) of CERCLA specifies that permits are not required for remedial actions conducted on site, the substantive requirements of the Oregon Removal-Fill Law will be complied with.

4. CWA, Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material, 40 C.F.R. Part 230; and Section 404(c) Procedures, 40 C.F.R. Part 231.

These regulations are **applicable** as wetlands and other water bodies located on, or in the vicinity of the TWCA Site could be affected by sediment remediation activities.

5. Fish and Wildlife Coordination Act (16 U.S.C. Part 661 et seq.) 40 C.F.R. Part 6.302 and 50 C.F.R. Part 83.

This regulation is **applicable** because surface water bodies on and adjacent to the TWCA Site could be affected by remediation activities.

### **Action-Specific ARARs**

Action-specific ARARs are technology- or activity based controls or restrictions on activities related to management of hazardous wastes. These requirements are triggered by the particular remedial activities selected to cleanup the Site.

1. TSCA PCB Disposal regulations, 40 C.F.R. § 761.60; Oregon Hazardous Waste Management Rules for PCBs, OAR 340-110.

These regulations may be **applicable** for PCB-contaminated materials that are disposed off-Site.

2. RCRA Land Disposal Treatment Standards, 40 C.F.R. Part 268, Subpart D; RCRA Transportation regulations, 40 C.F.R. Part 263.

Excavated sediment and debris will be analyzed to determine whether or not they exhibit RCRA hazardous waste characteristics. If the sediment or debris are RCRA hazardous waste then the above ARARs may be

**applicable.**

3. Oregon Hazardous Waste Management Rules, OAR 340-100; Oregon Standards Applicable to Generators of Hazardous Waste, OAR 340-102; Identification and Listing of Hazardous Wastes, OAR 340-101.

These regulations may be **applicable** for the off-Site disposal and on-Site management of hazardous wastes.

4. Oregon Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities.

This regulation is **relevant and appropriate** for groundwater pretreatment, and decontamination of waste residuals.

5. CWA NPDES Industrial and/or Stormwater Discharge Permits regulations, 40 C.F.R. 122; Ambient Water Quality Criteria, 40 C.F.R. Part 131; Oregon Regulations Pertaining to NPDES Permits, OAR 340-45

These regulations are **applicable** for groundwater pretreatment systems which will be designed to meet these requirements. Treated groundwater will be discharged in a manner which complies with the substantive requirements of the above-mentioned ARARs, or in compliance with TWCA's NPDES permit, whichever is more stringent.

6. CAA National Primary and Secondary Ambient Air Quality Standards, 40 C.F.R. Part 50; CAA National Emissions Standards for Hazardous Air Pollutants, 40 C.F.R. Part 60; CAA New Source Performance Standards, 40 C.F.R. Part 61. RCRA Air Emission Standards for Process Vents, 40 C.F.R. Part 264, Subpart AA.

The CAA regulations are **applicable** for on-Site air emissions from groundwater treatment systems and for control of dust particles emitted into the air during remediation construction activities. The RCRA regulations are **relevant and appropriate** for on-Site air emissions from groundwater treatment systems.

7. Occupational Safety and Health Act (OSHA), 29 U.S.C. 651; the implementing regulations under OSHA, 20 C.F.R. Parts 1910 and 1926. Oregon Occupational Safety and Health Code (OROSHA), OAR Chapter 860.

These regulations are **applicable** for all construction activities related to the selected remedy.

8. Amendment to NCP, Procedures for Planning and Implementing Off-Site Response Actions, 40 C.F.R. §300.440.

These rules and requirements are **applicable** to off-Site management of CERCLA hazardous substances, pollutants or contaminants resulting from this ROD.

9. RCRA, Closure and Post-Closure regulations, 40 C.F.R. Part 264, Subpart G.

These regulations are **applicable** for those on-Site areas which may be identified under RCRA authority as Regulated Units. The regulations are **relevant and appropriate** for the former on-Site sludge ponds, such as the LRSP and Schmidt Lake.

#### **Policy, Guidance and Regulations To-Be-Considered**

- Additional policies, guidance and other laws and regulations to be considered for source control and remedial actions include, but are not necessarily limited to the SDWA Secondary MCLs, 40 C.F.R. 143; the TSCA PCB Spill Cleanup Policy, 40 C.F.R. 761.120; the EPA Guidance on Selecting Remedies at Superfund sites with PCB Contamination (OSWER Directive No. 9355.4-01); RCRA Corrective Action Management Units and Temporary Units; Corrective Action Provisions, 40 C.F.R. §264.552; DEQ's Draft Examples of Concentrations Meeting Criteria for Action Levels, (Section 264.521(a)(2)(i-iv)); DEQ's Air Quality Division's Toxic Air Pollutant Program Significant Emission Rates.

The SDWA Secondary MCLs regulate the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water system. The Secondary MCLs may be considered for on-Site groundwater which may migrate off Site, or which may be discharged off Site via pretreatment and/or TWCA's existing treatment system.

The TSCA PCB Spill Cleanup Policy provides guidance on recommended cleanup levels under certain access scenarios. The Superfund PCB Guidance recommends cleanup criteria for remediation of PCB-contaminated media. The guidance also recommends cap designs which are consistent with RCRA guidance, and specifies long-term management controls for PCB-contaminated media.

DEQ's Air Quality Division's Toxic Air Pollutant Program Significant



Emission Rates are used as a rough screening tool to determine if air emissions from a facility are Toxic Air Pollutants, and if the quantity is significant to cause a potential harmful health effect. Air emissions resulting from Superfund remediation activities at the TWCA Site will be monitored to ensure that levels of air emissions are not of concern.

### **11.3 Cost Effectiveness**

EPA has determined that the combination of remedial actions identified as the selected remedy will reduce or eliminate the risks to human health and the environment in a cost-effective manner. Groundwater extraction and treatment costs at the Site will be minimized. Groundwater extraction will be mostly from existing monitoring wells. Treatment and surface water discharge of extracted groundwater will be via TWCA's existing wastewater treatment plant. Equipment and technologies to be used for source remediation activities are readily available and proven to be effective.

Costs of additional pretreatment prior to discharge to TWCA's wastewater treatment plant cannot be accurately calculated at this time, because it is unknown what volume of groundwater will need to be pretreated. Pretreatment of extracted groundwater may be required in order to meet the requirements of the CWA. Additional costs may be incurred through the implementation of cleanup actions which would be a result of the environmental evaluations of previously uninvestigated areas. Environmental evaluations, however add a vital level of protectiveness to the selected remedy.

The selected remedy recognizes that TWCA is an active facility with ongoing operations and seeks to achieve protectiveness with minimal impact on those operations. By tailoring the remedy so that removal and any necessary treatment and resource recovery are applied to some of the major source areas, and containment is used for contaminated groundwater, the selected remedy provides an appropriate level of protection for the Site and for potential off-site receptors.

### **11.4 Utilization of Permanent Solutions and Resource Recovery Technologies to the Maximum Extent Practicable**

EPA and DEQ have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the groundwater and sediment operable unit at the TWCA Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA and DEQ have determined that this selected remedy provides the best balance of trade-offs in terms of long-term effectiveness, implementability, and cost, while also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

The selected remedy recognizes that TWCA is an active facility with ongoing

operations that may impact the effectiveness and permanence of remedial actions. Scheduling environmental evaluations of previously uninvestigated areas at times when TWCA is making changes in those buildings and structures during the normal course of business will serve two purposes (1) it will increase the degree of permanence of remedial actions called for in this ROD, by ensuring that releases from these uninvestigated areas do not impede achievement of cleanup goals; and (2) it will do so with minimal impact on TWCA's ongoing operations. That approach will also help to address community concerns about TWCA's ability to continue its business operations.

Resource recovery of contaminants in groundwater and subsurface feed solution in the Feed Makeup area of the main plant would allow reuse of zirconium. Removal of contaminated sediments will permanently reduce and potentially eliminate aquatic organism exposure to contaminants.

The selected remedy employs a combination of treatment and containment of groundwater in a cost-effective manner to reduce contaminant volume, mobility, and toxicity.

#### **11.5 Preference for Treatment as a Principal Element**

Pretreatment if necessary, and treatment of groundwater via TWCA's existing wastewater treatment plant will satisfy the CERCLA preference for treatment of principal threats. The selected remedy incorporates a number of resource recovery and treatment elements which are designed to reduce or eliminate major currently identified sources of groundwater contamination at the TWCA Site.

#### **11.6 Community Acceptance**

Verbal comments received at the Proposed Plan public meeting held on September 14, 1993, in Albany, Oregon, and written comments submitted to EPA during the public comment period on the Proposed Plan, indicate that the community is concerned about the potential for the preferred alternative to interfere with TWCA's ability to maintain a viable ongoing operation. In addition, the community was concerned that TWCA not be required to actively clean up the groundwater to what many people considered to be an unrealistically stringent drinking water standard. The community's comments and suggestions, as well as EPA responses, can be found in the Responsiveness Summary section of this ROD.

EPA has determined that the selected remedy takes into consideration the concerns of the community in that remedial actions will be designed so as to have minimal impact on TWCA's ongoing operations. Environmental evaluations of previously uninvestigated areas are designed to be conducted whenever TWCA itself determines that these areas are accessible to be investigated. For example, such environmental

evaluations would occur when TWCA itself decides to raze a building or to make substantial structural changes that would in themselves be disrupting TWCA's operations in that area.

Remediation of surface and subsurface soil contamination has been deferred to a subsequent operable unit so that additional information regarding radiological contamination can be obtained and community concerns can be further addressed. Requirements for source reduction measures have been eliminated from the selected remedy as EPA anticipates that TWCA will implement these measures voluntarily. Contaminated groundwater beneath the Site will be managed so that contaminants above drinking-water standards do not migrate off-Site. However, all on-Site groundwater wells which are above drinking water standards will not require extraction and treatment to below drinking water standards because EPA expects that reduction and/or elimination of groundwater contaminant source areas, combined with natural attenuation, will enable groundwater beneath the entire Site to achieve the required cleanup levels.

## **11.7 Conclusions**

The selected remedy achieves the best balance among the nine evaluation criteria. The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable while providing the best balance among the other evaluation criteria. It achieves the best balance of tradeoffs with respect to the primary balancing criteria of long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; short term effectiveness; implementability; and cost. Additional considerations included the statutory preference for treatment as a principal element, and acceptability to the State and the potentially affected community.

TWCA has communicated to EPA both verbally and in written comments that TWCA believes EPA should select Alternative 3, proposed by TWCA, as the remedial alternative. However, EPA has determined that Alternative 3 would not effectively address the majority of the identified contaminant sources on Site. These identified sources include, but may not be limited to; the Ammonium Sulfate Storage Area, the Powder Metallurgy Building Area, the Emergency Services Building Area, the Acid Sump area, the Arc-Melting Area, and the Soil Amendment Area. In addition, groundwater contaminants would not be contained on Site, and would continue to migrate to surface water and under adjacent property. Contaminated sediments would remain on Site and would continue to pose a threat to aquatic life.

The selected remedy, Alternative 7, provides a high degree of long-term effectiveness and permanence through the requirement for extraction and pretreatment of contaminated groundwater, resource recovery of contaminated feed makeup solution, and removal of contaminated sediments. In addition, the selected remedy is the only

remedial alternative which will ensure the long-term effectiveness of remedial actions through the requirement for environmental evaluations of previously uninvestigated areas. Uninvestigated areas could potentially interfere with the ability of the remedial action to attain cleanup levels.

Alternative 7, the selected remedy, is the only remedial alternative which will address all ARARs through the requirement for pretreatment of contaminated groundwater prior to discharge to surface water. The selected remedy provides significant reduction in toxicity, mobility, and volume by reduction of volume through pretreatment of on-Site contaminants in groundwater, and through resource recovery of zirconium in the Feed Makeup area.

The selected remedy is a logical outgrowth of community concerns and is designed so as not to adversely impact TWCA's ongoing operations.

## **12.0 DOCUMENTATION OF SIGNIFICANT DIFFERENCES**

In response to public comment on the Proposed Plan, EPA re-evaluated the groundwater extraction remedial element, clarified the need for pretreatment of groundwater, provided more detail for the environmental evaluations which may be conducted at previously uninvestigated areas of the Site, and deferred remediation of surface and subsurface soil to a subsequent operable unit. In addition, in response to concerns raised by TWCA during the public comment period, EPA re-evaluated and eliminated the source reduction element of the Proposed Plan.

Some of the changes are significant changes. However, all these changes are logical outgrowths of the information available to the public in the Proposed Plan and the RI/FS reports. Additional public notice or public comment period was determined not to be necessary because, based on the information available during the public comment period and based on the comments submitted, the public could have reasonably anticipated the changes described.

The following sections discuss in more detail the changes that have been incorporated in the selected remedy.

### **12.1 Groundwater Extraction**

The Proposed Plan included extraction at 36 groundwater monitoring wells that were determined by the RI/FS to have calculated RME lifetime cancer risk values equal to or exceeding  $10^{-6}$ , and non-cancer hazard index (HI) values exceeding 1, and/or at least one average chemical concentration exceeding MCLs or non-zero MCLGs. In response to TWCA and community concerns that TWCA not be required to actively clean up the groundwater to what many people considered to be an unrealistic drinking water standard for an active operating facility, the selected remedy requires groundwater extraction only at identified hot spots and source areas of the Site that exceed the lifetime cancer risk level of  $10^{-4}$  and/or substantially exceed the noncancer HI of 1. Extraction shall occur until those hot spots and source areas achieve cleanup levels.

In order to ensure that this element of the selected remedy is protective of human health and the environment, and in order to achieve the established RAOs and cleanup levels established for groundwater at the TWCA Site, the following remedial measures have been added:

- 1) Active groundwater remediation (extraction) on the Site shall be applied to areas that have been identified as sources or hot spots. Groundwater extraction will occur until cleanup levels are achieved. Groundwater extraction is expected to occur for an estimated period of 15 years. For those on-Site areas in which groundwater contamination is above cleanup levels but active

groundwater remediation (i.e. extraction) is not required, natural attenuation may be relied upon to aid reduction of the chemical concentrations in these areas to cleanup levels.

2) If any groundwater above cleanup levels is detected in Site perimeter monitoring wells at any time, actions shall be taken to ensure that the contaminated groundwater does not migrate off-Site or into adjoining surface water bodies.

It is expected that groundwater extraction of the areas of higher risk levels will reduce sources of contamination to other areas and will expedite the timeframe required for the attainment of cleanup levels by natural attenuation. In addition, groundwater extraction will ensure that groundwater contamination which is above drinking water standards will be contained on-Site until cleanup levels are achieved.

In order to ensure that groundwater extraction is effective in removing and containing on-Site contaminants, the groundwater extraction system shall be carefully monitored until cleanup levels are achieved.

#### **12.1.1 Determination of Achievability of Cleanup Levels**

The Proposed Plan did not explain the possible contingency measures which may be implemented in order to assure achievement of groundwater cleanup goals. The determination as to whether Site-wide groundwater cleanup levels are achievable within the projected 15-year timeframe will be made by EPA, in consultation with DEQ.

The following contingency measures may be implemented in order to ensure achievement of groundwater cleanup goals:

Three years after commencing operation of the extraction system an historical and statistical analysis of Site-wide groundwater contaminant concentrations will be conducted to determine if cleanup levels are likely to decline within 15 years after start up of the extraction system. If this analysis indicates that contaminant concentrations in groundwater beneath the Site are not likely to decline to cleanup levels within 15 years after commencement of operation of the extraction system, the existing extraction system may be modified in any or all of the following ways:

- a) at individual wells where cleanup levels have been attained, pumping may be discontinued;
- b) alternating pumping may be instituted at wells to eliminate stagnation points,
- c) pulse pumping may be instituted to allow aquifer equilibration and to allow adsorbed contaminants to partition into groundwater;

d) installation of additional extraction wells may be instituted to facilitate or accelerate cleanup of the contaminant plume. The installation of additional extraction wells shall not necessarily be limited to areas with cancer risk levels exceeding  $10^{-4}$ , if performance reviews indicate pumping in lower-risk areas would assist groundwater cleanup and help achieve groundwater RAOs.

e) Additional extraction measures may be conducted in source areas or "hot spots" which are delineated as a result of environmental evaluations or as a result of any other additional sampling which is required by the selected remedy.

In addition, if it is determined on the basis of the system performance data that certain portions of the affected groundwater areas cannot be restored to cleanup levels, some or all of the following measures involving long-term management may be implemented, for an indefinite period of time, as a modification of the existing system:

a) engineering controls such as physical barriers, or long-term gradient control provided by low level pumping, as containment measures;

b) institutional controls will be maintained so as to restrict access to portions of the affected groundwater which remain above cleanup levels.

c) continued monitoring of specified wells;

d) periodic reevaluation of remedial technologies for groundwater restoration.

## **12.2 Pretreatment of Groundwater**

The Proposed Plan did not clarify the conditions under which TWCA would be required to pretreat extracted groundwater. As TWCA's existing NPDES permit was designed to address certain contaminants it is possible that implementation of this selected remedy will result in discharge of contamination which was not addressed by the NPDES permit. The selected remedy does not incorporate a mandatory requirement for pretreatment of extracted groundwater. However, in order to ensure that the discharge of extracted groundwater to TWCA's existing wastewater treatment plant will meet ARARs prior to discharge, an evaluation of the BPT which can be used to pretreat the extracted groundwater will be conducted during remedial design. Upon completion of this evaluation, EPA, in consultation with DEQ, will select the BPT which will then be implemented to pretreat contaminated groundwater prior to discharge to TWCA's wastewater treatment facility.

### **12.3 Deferral of Surface and Subsurface Soil Remediation to a Subsequent Operable Unit ROD**

The TWCA RI/FS contained several data gaps with respect to delineation of the nature and extent of soil contamination and evaluation of soil remediation options at the Site. These data gaps include:

- The RI/FS did not include a detailed evaluation of soil remediation options in the main plant portion of the Site, with the exception of the Feed Makeup Area.
- Confirmatory sampling of surface and subsurface soils in the Solids Area was not conducted as part of the RI/FS.
- Remedial options for the Soil Amendment area were not fully identified in the RI/FS.
- While a Radiological Survey was submitted as an addendum to the RI/FS, the Radiological Survey did not adequately characterize risks due to exposure to radiation in soils at the Site.

Because of the necessity to address these data gaps in the RI/FS, along with the need to evaluate Site-wide soil remediation options in accordance with the requirements of the Oregon Environmental Cleanup Rules (OAR 340-122-090) the RI/FS will be amended subsequent to this ROD. The amended RI/FS will include an evaluation of soil cleanup options.

Contingent removal and/or treatment of surface soil is an element of the remedial action alternative which was identified in the Proposed Plan. This cleanup option is not included in this ROD as part of the detailed analysis of alternatives, but will be reevaluated as part of the subsequent soils operable unit.

Upon completion of the evaluation and reevaluation of all soil cleanup options, and after a public comment period, EPA in consultation with DEQ, will document the selected soil cleanup remedy in a subsequent ROD.

### **12.4 Environmental Evaluations of Previously Uninvestigated Areas**

The Proposed Plan did not clarify the scope or purpose of the environmental evaluations which are to be conducted at previously uninvestigated areas. This element of the selected remedy recognizes that TWCA is an active operating facility. As the scope of the RI/FS was designed so as not to interfere with ongoing operations at the TWCA facility, areas beneath active ponds, buildings and structures at the facility were not sampled. Sampling such areas as part of the RI/FS would have



up paved areas, install groundwater monitoring wells in the buildings, and sample beneath active waste ponds. Because the RI/FS was designed so as not require TWCA to engage in such disruption of its business operations, it is possible that some areas of potential contamination beneath existing buildings and structures may not have been fully addressed by the sampling efforts.

Ongoing releases of contamination, if any, from portions of the Site that are currently uncharacterized could negatively impact the effectiveness of remedial actions for groundwater at the Site. In addition, those potential contaminant source areas could pose an added threat to human health and the environment. The purpose of environmental evaluations of those previously uninvestigated areas during the remedial design/remedial action stage is to ensure that any data gaps can be addressed at a later date so that the Superfund remedial actions called for by this ROD will be effective.

### **12.5 Elimination of Source Reduction**

Evaluation and implementation of source reduction techniques to minimize current and potential future releases from ongoing plant operations was an element of the Proposed Plan. This element has been eliminated from the selected remedy in response to concerns raised by TWCA during the public comment period that a requirement to impose source reduction measures could directly interfere with its ongoing processes. In determining that this element can be eliminated at this time, EPA recognizes that, because TWCA is an operating facility and hazardous waste generator, source reduction is addressed at the TWCA facility in part through other statutes such as RCRA, TSCA, and the CWA. In addition, Section 103(a) and (b) of CERCLA and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA) also impose requirements for reporting releases of hazardous substances to appropriate regulatory agencies.

EPA and DEQ also expect that TWCA will voluntarily and responsibly work to reduce or eliminate all potential sources of contamination in order to prevent further contamination and to help ensure the effectiveness of remedial actions at the Site. However, should the effectiveness of the selected remedy be adversely affected because of continuing spills and leaks of hazardous substances from the TWCA facility to the environment, EPA may require that TWCA implement source reduction measures in the future.

**APPENDIX A**  
**RESPONSIVENESS SUMMARY**

## Section 1

### Introduction

#### A. Overview:

The purpose of this responsiveness summary is to summarize and respond to public comments submitted regarding the Proposed Plan for the cleanup of the Teledyne Wah Chang Albany (TWCA) Superfund Site. The public comment period for the Proposed Plan was initially held from August 27 to September 27, 1993. At the request of TWCA, the public comment period was extended to October 27, 1993. This responsiveness summary meets the requirements of Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

In the Proposed Plan, issued August 25, 1993, the U.S. Environmental Protection Agency (EPA) described alternatives considered for the cleanup of soils, sediment, and groundwater at the TWCA Site. These cleanup alternatives were based on information collected during a Remedial Investigation and Feasibility Study (RI/FS) conducted on the Site. The purpose of an RI/FS is to conduct a thorough study of the Site and to assess possible plans to clean up the Site. The RI/FS and Proposed Plan were available at the Albany Public Library, and copies of the Proposed Plan were mailed to a list of local citizens developed as part of the Community Relations Plan.

EPA held a public meeting on September 14, 1993 at the Linn-Benton Community College in Albany to present the results of the RI/FS and to outline EPA's proposed cleanup plan. The meeting was attended by over one hundred fifty people which included representatives of TWCA. A number of questions were asked by attendees at the public meeting who expressed some opposition to the proposed cleanup plan. Questions that were asked and answered at the public meeting are recorded in the meeting transcript which is available in the Administrative Record for the Site at the Albany Public Library. Those questions are not included in this document. The majority of the commenters at the public meeting expressed concern that the Proposed Plan would present a financial hardship to TWCA which could then have a detrimental impact on the economic welfare of the community.

Eighty three comment letters were received from citizens during the public comment period. Twenty two commenters presented oral comments at the September 14, 1993 public meeting. Ten percent of the comment letters supported the Proposed Plan. The Oregon Department of Environmental Quality (ODEQ) supported the Proposed Plan. Ninety percent of the comment letters expressed some opposition to, or concern about the Proposed Plan. Many of these concerns appear

to be in response to a "white paper" opposing the cleanup plan distributed by TWCA to the Oregon business community during the public comment period.

TWCA submitted written comments opposing the Proposed Plan on October 5, 1993, and again on October 27, 1993. In addition, EPA met in person with representatives of TWCA on October 15, 1993. The minutes and comments from the October 15, 1993 meeting were transcribed and are available in the Administrative Record.

Generally, TWCA and those citizens who opposed the Proposed Plan had the following concerns which were initially defined in the TWCA "white paper":

- 1.) The Proposed Plan hinder's TWCA's ability to adapt competitively, and contains too many "blank checks" which could present a financial hardship to TWCA and the community.
- 2.) The Proposed Plan duplicates regulatory systems which are already in place at TWCA.
- 3.) The Proposed Plan appears to abandon a good faith agreement which TWCA had with EPA regarding the RI/FS. EPA and TWCA together signed an Administrative Order on Consent in 1987 which required TWCA to conduct the RI/FS. EPA appears to want to ignore the company's past track record of years of cooperation.
- 4.) The Proposed Plan creates too negative a picture of the impact of the groundwater and soil contamination problems at the Site because components of the Proposed Plan are based on the assumption that people will be drinking contaminated groundwater, and that workers would be ingesting contaminated soil at the Site.
- 5.) The Proposed Plan does not consider all of EPA's nine evaluation criteria for choosing a cleanup alternative because it does not appear to fully evaluate cost effectiveness.
- 6.) EPA did not provide TWCA due process in presenting EPA's cleanup plan for the Site because TWCA was not given the opportunity during the RI/FS to analyze the Proposed Plan as such.

Subsequent to issuance of the Proposed Plan and conclusion of the public comment period, TWCA submitted an addendum to the RI/FS which included an evaluation of radiological risk in soil at the Site. EPA has determined that this addendum to the RI/FS does not adequately characterize risks due to exposure to radiation in soils at the Site. In addition, the TWCA RI/FS contained several data gaps

with respect to the evaluation of soil cleanup options. Therefore, the selection of cleanup options for contaminated soil at the TWCA Site has been deferred to a subsequent operable unit ROD.

**B. Scope of Response to Comments:**

The primary aim of this Responsiveness Summary is to address specific comments on the Proposed Plan.

## **Section 2**

### **Community Involvement**

#### **A. Background**

The TWCA Site is located in Millersburg, Oregon, approximately one mile north of the city of Albany. The facility covers approximately 225 acres adjacent to the Willamette River.

TWCA is an active operating facility which primarily manufactures zirconium metal. The manufacturing operation consists of numerous production facilities used for the extraction and refining of zirconium and hafnium metals from zircon sands, with a small amount of tantalum, columbium, titanium and vanadium metals also being produced. The plant also has a number of waste treatment and storage facilities and several on-site ponds that were, or presently are, being used for the storage of liquid and solid wastes.

The processing of the zircon sands generates various waste materials such as sludge, waste water, residues and gases. Past practices at the TWCA facility have led to improper disposal and management of some of these waste materials. Some examples of improper disposal and management include the storage of sludges in unlined ponds, and leaks and spills of hazardous substances which are used in TWCA's manufacturing processes. Contaminants of concern at the Site include radionuclides, metals, polychlorinated biphenyls (PCBs), methyl isobutyl ketone (MIBK), and chlorinated organic solvents such as 1,1,1-trichloroethane, carbon tetrachloride, and tetrachloroethylene.

The area surrounding the Site is primarily zoned for industrial purposes. The facility is bounded on the east by Old Salem Road and Interstate 5. The land east and south of the facility is used mainly for residential and commercial purposes. The Willamette River borders the facility to the west. Portions of the TWCA facility are within the Willamette River's 100-year and 500-year flood plains. The land west of the Willamette River is used for farming. Willamette Industries' particle board plant borders the TWCA main plant to the northeast. Land to the north of the TWCA facility is used for a combination of agricultural and industrial purposes.

Albany, the urban area south of the TWCA facility, had a population of approximately 29,000 people in 1990. Millersburg had a population of about 700 people. TWCA employs approximately 1,150 people from the area.

## **B. Community Concerns**

In preparation for development of a community relations plan, EPA met with community leaders, private citizens, elected officials, local media, and TWCA representatives to hear their concerns about the Site. The Community Relations Plan was published in November 1987 and revised in October 1991. As a result of the meetings with community representatives a list of community concerns was developed prior to, and during implementation of the RI/FS. Following is a list of these concerns and a brief description of EPA responses to them:

- 1) What is the purpose and scope of the Superfund process at the TWCA facility?

The Superfund process at TWCA is divided into three phases. The first phase is the study phase to determine the nature and extent of contamination in groundwater, surface water, soil, sediment, and air from releases of hazardous substances, pollutants and contaminants into the environment due to operations and waste disposal practices at the TWCA facility. TWCA has completed this first study phase. Once the nature and extent of contamination are known, cleanup actions are proposed and decided upon. This decision phase is the phase which is being documented by the Record of Decision and this Responsiveness Summary. Once the cleanup actions are decided upon they are designed and implemented during the final cleanup phase. Cleanup actions will be implemented for contamination in groundwater, surface water, soil, or air at the TWCA Site which may pose an imminent and substantial danger to public health or welfare.

- 2) Are the Superfund actions being proposed and taken at the TWCA Site really necessary?

The TWCA facility has been in operation for over thirty five years. Past operation and waste disposal practices have resulted in leaks, spills, and improper disposal of solvents, metals and other hazardous materials throughout the facility. Soil, sediment, and groundwater at the facility are contaminated with volatile organic compounds, metals, and radionuclides. The Superfund actions are designed to clean up contamination that has resulted from past practices. The Superfund actions also recognize that TWCA is an active operating facility and elements of the selected cleanup remedy are designed to provide a measure of insurance that the cleanup actions will be effective in the long term.

- 3) What will be the impact of the cost of a Superfund cleanup on TWCA?

The estimated capital costs of implementing the Superfund cleanup remedy for groundwater and sediment at the Site (\$2.4 million) are significantly less than the costs which have been estimated for the RI/FS (\$5 million) which has already been completed. One reason for this is that existing equipment will be utilized for the cleanup. For instance; existing monitoring wells will be converted to groundwater extraction wells. Utilization of existing equipment will defray capital costs. Utilization of TWCA's existing wastewater treatment facility for treatment of extracted groundwater will also minimize both capital cost and long-term operation and maintenance costs.

- 4) Is there a potential for negative impact on the Willamette River from contamination associated with the TWCA facility?

The TWCA RI/FS concluded that contaminated groundwater from the TWCA Site either discharges to on-Site surface water bodies which flow to the Willamette River, or directly to the river. The impact on the river due to migration of contamination from the TWCA Site was not evaluated in the TWCA RI/FS. However, EPA's preferred alternative and the selected remedy include measures that are designed to ensure that contamination does not migrate off of the TWCA Site.

- 5) Are there possible health threats to workers at the TWCA plant?

The TWCA RI/FS concluded that workers on the TWCA facility may be exposed to chemicals in surface and subsurface soil through incidental ingestion or external exposure. The primary chemicals in soil that contribute to health risk are PCBs and radionuclides. The RI/FS also concluded that should workers ingest contaminated groundwater, they would be exposed to health risks from metals, chlorinated organic compounds, and other organic compounds such as methyl-isobutyl-ketone (MIBK).



### Section 3

#### Response to Comments Received From the Public at Large During the Public Comment Period

This section summarizes and responds to comments received from the general public during the public comment period on EPA's Proposed Plan. Comments and responses in this section are arranged by topic. Those which applied to more than one topic were responded to under the heading considered the most appropriate. Paraphrasing was used to incorporate related concerns expressed in more than one comment. Every attempt has been made to respond to concerns raised during the comment period.

Many of the comments received were what EPA interpreted as public reaction to a "White Paper" issued by TWCA. The "White Paper" (so designated by TWCA) was prepared and distributed by TWCA to the community but not to EPA. TWCA's White Paper took issue with the Proposed Plan and expressed TWCA's concerns that the Proposed Plan: (1) could present a financial hardship to TWCA and the community; (2) might duplicate regulatory systems which are already in place at TWCA; (3) appears to vary from the terms of a 1987 Administrative Order on Consent (AOC, termed "good faith agreement" by TWCA) between EPA and TWCA, providing for TWCA to conduct the RI/FS under EPA oversight; (4) creates too negative a picture of the groundwater and soil contamination problems at the Site; (5) does not appear to adequately consider cost effectiveness; and (6) denies TWCA due process in the selection of a cleanup remedy for the Site because TWCA could not analyze the Proposed Plan in the RI/FS. Because many of the public comments were directed to issues as they were expressed by TWCA in the White Paper rather than directed to issues as expressed in EPA's Proposed Plan, in this response to comments, EPA has included a category to incorporate issues expressed by the "White Paper."

Comments below are grouped in the following categories:

1 to 7	"White Paper"
8	Due Process
9 to 12	Risk Assessment and Risk Related Issues
13 to 16	RI/FS Issues
17 to 26	Miscellaneous

#### "White Paper"

- 1) **COMMENT:** Several commenters suggested that EPA's proposals are unreasonable and unjustified under the circumstances posed by the fact that TWCA is an operating facility. The commenters stated that based on the public

meeting at Linn-Benton Community College (LBCC), EPA had proposed a specific set of criteria that is beyond the legal requirements necessary for this site. These criteria included the proposals for source reduction measures and environmental evaluations of previously uninvestigated areas. It was also suggested that EPA did not fully evaluate the nine evaluation criteria for selecting a remedial alternative. Cost effectiveness was mentioned as an example of one of the evaluation criteria which some commenters believed were not fully analyzed by EPA.

**RESPONSE:** All the cleanup alternatives analyzed by EPA in the Proposed Plan were evaluated according to nine criteria which are required by the Superfund regulations. The evaluation according to the nine criteria is set out in the Proposed Plan and in the ROD. Among those nine criteria are three that include; (1) protectiveness of human health and the environment, (2) long-term effectiveness, and, (3) cost-effectiveness. One of the factors influencing EPA's cost-effectiveness considerations was the fact that TWCA is an active facility with several complex ongoing manufacturing processes. In consideration of TWCA's request, EPA agreed during the planning and scoping phase not to require that the Superfund RI/FS be conducted in such a way as to interfere with TWCA's ongoing operations. Potential areas of contamination under existing buildings and structures on the facility were not investigated for potential environmental damage during the RI/FS. Instead, EPA agreed to defer such investigations to a later stage in the process during the remedial design/remedial action (RD/RA) stage and agreed that such investigations could be scheduled to be integrated into the normal course of TWCA's operations such as when TWCA might schedule a building or structure to be razed.

However, cost-effectiveness must also strike an appropriate balance with long term effectiveness and protection of human health and the environment. In the RI/FS, TWCA analyzed several options for cleanup of contaminated soil and groundwater at the TWCA Site in accordance with the prior agreement (the Administrative Consent Order or "AOC") with EPA. However, TWCA's analysis did not take into account the possibility that contamination may exist in those currently uninvestigated portions of the Site beneath existing buildings and structures. The analysis did not propose a mechanism for dealing with the adverse impact on the cleanup from such potential sources of continued contamination. Thus TWCA's analysis in the RI/FS did not provide supporting data to demonstrate that the cleanup options it analyzed would be effective in the long term. Should contamination from uninvestigated sources interfere with cleanup actions, those cleanup actions may not prove to be effective. For example, contaminated soil beneath existing structures could leach contaminants into remediated areas rendering cleanup ineffectual and posing additional changes in cleanup actions and costs.

EPA's Selected Remedy is designed to allow TWCA flexibility in order to resolve questions regarding the uninvestigated areas and to minimize interference with TWCA's ongoing operations while still taking steps to contain the sources of contamination. That flexibility would allow TWCA to schedule investigations of those areas underneath buildings and structures for times when such investigations would not interfere with TWCA's ongoing operations. One example of this might be when in the course of its business operations TWCA determines for its own business purposes that a building is to be razed or that a paved surface needs to be dug up. At such time, TWCA would be able to schedule investigations of contamination beneath those buildings or paved areas with minimal interference with its business operations.

EPA's Proposed Plan and selected remedy consider the cost effectiveness by evaluating the additional protectiveness afforded by groundwater extraction and pretreatment, and environmental evaluations of previously uninvestigated areas versus the additional costs associated with these measures. Among other things, provision is made for TWCA to conserve resources and utilize existing equipment in order to minimize cleanup expenditures. Those cost-effective provisions include; (1) allowing TWCA to convert existing groundwater wells to extraction wells, (2) allowing TWCA to utilize its existing wastewater treatment facility for treatment of extracted contaminated groundwater, and (3) allowing TWCA the flexibility to schedule investigation of potentially contaminated areas beneath existing buildings and structures in such a way as to minimize impact on TWCA's ongoing business operations.

- 2) **COMMENT:** Several commenters, including the District 36 Representative to the Oregon State legislature, suggested that the Proposed Plan for cleanup might be unrealistic and ineffective. The commenters based this interpretation on the belief that the proposed remedy reflected an assumption by EPA that people would be drinking water from an on-site well which extracted its water from the contaminated groundwater rather than drinking water from the municipal water system that provides potable water to TWCA and its neighbors. One commenter also stated that it would not be possible for residences to be constructed on Site because residential construction would not be in accordance with local zoning regulations.

**RESPONSE:** The RI/FS conducted by TWCA concluded that groundwater beneath the TWCA Site is contaminated with volatile organic chemicals, PCBs, and metals which are above state standards and standards established under the federal Safe Drinking Water Act. In selecting a cleanup remedy, EPA is obligated to consider and meet federal and state standards for protection of groundwater quality. Oregon regulations require that contaminated groundwater be restored to its highest use. The groundwater in the area of the TWCA Site has been designated by the State of Oregon to be a potential

drinking water source, even if currently that water is not used for drinking. In the RI/FS, alternatives were analyzed for cleaning up the groundwater. Included was an analysis of an alternative for restoring on-Site groundwater to drinking water standards. The FS evaluation, which was conducted by TWCA, showed that cleaning up the groundwater to drinking water standards was feasible and cost-effective. Therefore, as a logical outgrowth of this analysis, the EPA Proposed Plan included a provision for restoring groundwater beneath the TWCA Site to drinking water levels.

In response to the concerns of TWCA and the community that cleanup of on-Site groundwater to drinking water standards is unrealistic and that zoning regulations preclude the installation of drinking water wells, this portion of the selected remedy differs from the Proposed Plan. Although clean up to drinking water standards still remains the goal of the groundwater clean up, the selected remedy requires that TWCA actively clean up on-Site groundwater to levels which are the minimum risk levels allowable under the Superfund regulations. Instead of actively restoring groundwater, TWCA will be required to implement measures to contain on-Site groundwater which is above the drinking water standards. Natural dilution may then be relied upon to eventually clean up the remaining contaminated on-Site groundwater to drinking water standards.

- 3) **COMMENT:** Several concerned citizens, including representatives of local businesses and a representative from the Area Chamber of Commerce, suggested that EPA changed the rules in mid-stream and abandoned its good-faith agreement with TWCA under the AOC by choosing a new, seventh cleanup alternative and instead of selecting from the range of alternatives that EPA and TWCA have formulated together for the past six years. The Chamber of Commerce representative urged EPA to take steps to restore the cooperative working arrangement with Teledyne and suggested, as the first step in accomplishing that goal, that a cleanup alternative evaluated in the TWCA RI/FS be considered. One commenter stated that EPA was ignoring the earlier \$5.4 million Superfund study conducted by CH2M Hill for TWCA, which measured contamination in soils, groundwater, and stream sediment and presented a range of cleanup alternatives that would protect human health and the environment.

**RESPONSE:** EPA and Teledyne have worked cooperatively on the RI/FS and EPA anticipates that the cooperative working relationship will continue. EPA's Proposed Plan was designed to address several issues and fill certain data gaps posed by the TWCA studies because of the site-specific circumstances of the Teledyne Wah Chang facility. TWCA evaluated cleanup alternatives which do not address the data gaps.

In negotiating the technical requirements for the RI/FS with Teledyne in 1987, EPA agreed at that time to be sensitive to minimizing the impact of the Superfund studies on Teledyne's ongoing operations. Because of those efforts to enable Teledyne to continue its business operations relatively uninterrupted, some delay has necessarily ensued in the search for some contaminant sources. That agreement was made by EPA for the purpose of making reasonable accommodation for TWCA's specific concerns regarding operation of its business. However, that agreement to attempt to minimize impact on Teledyne's ongoing operations was not a determination by EPA that potential contaminant sources would not require investigation and identification at a later date. As a result of that agreement, during the RI/FS stage, studies for contaminant sources were conducted only in areas of the TWCA facility where there were no ongoing operations. Investigation for potential contamination from areas under existing buildings and structures on the facility was deferred to a later stage when such investigations could be scheduled so as to minimize interruption to Teledyne's ongoing business operations.

TWCA analyzed several options for cleanup of contaminated soil and groundwater at the TWCA Site in accordance with the agreement. EPA has questioned the effectiveness of the cleanup options analyzed by TWCA because those options do not take into account the possibility that contamination in those currently uninvestigated portions of the Site beneath existing buildings and structures could impede the effectiveness of the remedy. These questions or data gaps have been documented by EPA several times in letters sent to TWCA prior to issuance of the Proposed Plan. In addition, the TWCA RI/FS did not fully evaluate soil cleanup options. In order to resolve questions regarding the effectiveness of the cleanup alternatives analyzed by TWCA, and in order to ensure that soil cleanup options were fully evaluated, EPA built upon TWCA's six evaluated alternatives and analyzed a seventh alternative in the Proposed Plan. That seventh alternative included components from Alternative 6 and also incorporated a provision for analyzing the currently uninvestigated areas. That seventh alternative, modified in accordance with public comment, is the selected remedy for the site. EPA has the authority to amend the evaluation of alternatives if EPA deems it necessary. TWCA is cognizant of EPA's authority in this matter. Paragraph 31.B of the AOC (the "good faith agreement"), EPA Docket No. 1086-02-19-106, to which TWCA and EPA are co-signatories, provides that EPA will make amendments to the RI/FS if EPA deems it necessary.

As stated above, EPA anticipates that a cooperative relationship will continue with TWCA. In response to comments raised by concerned citizens and by TWCA, EPA has incorporated certain provisions of the selected remedy that differ from the Proposed Plan. The groundwater extraction element of the selected remedy incorporates a number of contingencies so that groundwater

extraction may be implemented using a phased approach if warranted. The selected remedy requires TWCA to conduct an analysis of the best practicable technology (BPT) to be used to pretreat extracted contaminated groundwater in accordance with the Clean Water Act (CWA). The source reduction element of the Proposed Plan has been deferred in response to concerns raised by TWCA that a requirement to impose source reduction measures would directly interfere with its ongoing processes. EPA expects that TWCA will voluntarily implement source reduction measures. However, should the effectiveness of the selected remedy be adversely affected because of continuing spills and leaks of hazardous substances from the TWCA facility to the environment, EPA may require that TWCA implement source reduction measures in the future. In addition, source reduction measures may be required of TWCA by other federal and/or state environmental statutes, such as the Resource Conservation and Recovery Act (RCRA).

- 4) **COMMENT:** One commenter wondered whether EPA's Proposed Plan is based on proven cleanup technology that may have changed since the RI/FS and whether there might be some more recent technology that might be more cost effective in mitigating health risks and environmental damage. The commenter also wondered whether EPA has abandoned earlier agreements with TWCA (the AOC) based on the RI/FS in response to a changing political agenda.

**RESPONSE:** The Proposed Plan considered, and the ROD has selected, cleanup technologies that were evaluated in the RI/FS. EPA's Proposed Plan and EPA's Selected Remedy in the ROD are a modification, not an abandonment, of the alternatives evaluated in the TWCA RI/FS. As documented in the comments in the Administrative Record, EPA has relied on the RI/FS for the information used in its decision-making process for the Superfund cleanup of the TWCA Site.

Proven cleanup technology has not changed since TWCA submitted the RI/FS to EPA. Most cleanup technologies that were evaluated in detail in the TWCA RI/FS have been utilized in the past at many Superfund sites. These cleanup technologies include pump and treat for groundwater, excavation and removal of sediment, and flushing of subsurface contaminants. The TWCA RI/FS did conclude that flushing of subsurface contaminants in the vicinity of the Feed Makeup Area is not a proven technology. However, this technology is very uncomplicated and easily implementable. Water will be injected into the ground to leach the contaminants from the subsurface source into the groundwater. The contaminated groundwater will then be extracted and used in TWCA's existing processes for resource recovery of zirconium. However, in order to ensure that flushing of subsurface contamination will indeed be effective at TWCA, the RI/FS recommended, and the selected remedy requires, that pilot

tests be conducted prior to fully implementing this technology at TWCA. The Proposed Plan did not fully explain the simplicity of the flushing technology nor the requirement for pilot testing. The ROD clearly sets out the simplicity of this technology and the requirement for pilot testing.

- 5) **COMMENT:** Several commenters, including a representative from the City of Albany, expressed concerns regarding the impact implementation of Alternative 7 might have on TWCA's ability in business to adapt competitively. For example, commenters were concerned that TWCA's business would be hindered if EPA required TWCA to apply for permission every time the facility sought to make a change in process or equipment. The City of Albany representative further stated that EPA approvals are always cumbersome and time-consuming. The commenters believed that such a prolonged process would make it virtually impossible for TWCA to remain flexible and competitive to its foreign competitors at a time when responsiveness to marketplace changes are critical for continued success in business.

**RESPONSE:** As set forth in the Proposed Plan, throughout the ROD, and in Comment 1 of this Responsiveness Summary, EPA has always given special recognition to the particular concerns presented by the fact that TWCA is an active facility with ongoing operations. Certain data gaps in the RI/FS are a result of EPA's agreeing to an approach to investigation of contamination that permits TWCA to defer some of those investigations until it can reasonably do so with minimal interference with its ongoing operations. Because of concerns regarding the effectiveness of the cleanup remedy at an active facility, the Proposed Plan and the selected remedy in the ROD include a provision for environmental investigations of previously uninvestigated areas currently underneath existing buildings and structures at the TWCA facility. This investigation is not designed to be cumbersome, nor is it designed to interfere with TWCA's ongoing operations. Sampling and analyses of these currently uninvestigated areas will be conducted on a timeframe which is compatible with TWCA's ongoing operations. Sampling and analyses will be limited to potential contamination in the uninvestigated areas and to the effect of that contamination on the overall Superfund cleanup, so that costs of the evaluation should be minimized. Extensive EPA oversight of environmental evaluations should not be required. The Proposed Plan and selected remedy allow TWCA the flexibility to determine when it would be most practicable to investigate those previously uninvestigated areas. Environmental evaluation reports will be submitted by TWCA to EPA and DEQ once every two years.

In response to concerns raised by TWCA and the community that the Proposed Plan would interfere with ongoing operations, the source reduction element described in the Proposed Plan has been deferred pending the future evaluation

of the effectiveness of the Superfund cleanup. This element would have required TWCA to implement and evaluate source reduction techniques to minimize current and future releases of hazardous substances at the facility. Since TWCA is currently regulated under additional federal and state environmental regulations, EPA expects that TWCA will implement source reduction measures voluntarily in order to be in compliance with those regulations. However, EPA retains authority to impose source reduction requirements on TWCA in the future if it is determined that ongoing operations are adversely affecting the Superfund cleanup.

- 6) **COMMENT:** Several concerned citizens, including members of the business community in Oregon City, Halsey, Corvallis, and Albany, Oregon, expressed concerns that the Proposed Plan duplicates existing regulatory programs enforced by state and other federal agencies. Some of these commenters felt that state and federal agencies are currently monitoring every component of TWCA operations, adding another layer of unnecessary regulations that would be redundant, excessive, and irrelevant in protecting human health and the environment.

**RESPONSE:** EPA's Superfund program works closely with other federal environmental programs such as the federal Clean Water Act (CWA) and the Resource Conservation and Recovery Act (RCRA), and with the State agencies to coordinate environmental requirements and to avoid redundancy. CERCLA requires that Superfund cleanup actions comply with all existing applicable or relevant and appropriate federal and state environmental regulations (commonly referred to as ARARs). In ensuring that a Superfund cleanup action is appropriately implemented, EPA's Superfund program needs to ensure that the remedy itself does not adversely impact the environment. One method of ensuring this is to make sure that the cleanup action complies with ARARs.

For example, in the case of the TWCA site, EPA has concerns about whether groundwater treatment and discharge alternatives that were evaluated by TWCA in the RI/FS would fully comply with certain requirements of the CWA in regard to TWCA's water discharge from its facility under its CWA NPDES permit. For the Superfund action, TWCA evaluated groundwater cleanup options which would require extraction of contaminated groundwater and discharge of this contaminated groundwater to its existing wastewater treatment facility without pretreatment prior to discharge. EPA's Superfund program, in consultation with the CWA program and with the state agencies, has determined that pretreatment prior to discharge is necessary because the addition of untreated water from the Superfund cleanup to TWCA's existing wastewater treatment system could increase contaminant levels in the discharged water and cause a potential violation of the CWA. TWCA's existing NPDES permit did not envision



discharge of organic and radionuclide contaminants to surface water as a result of a Superfund cleanup action. The CWA requires that this contaminated groundwater be treated using best practicable technology (BPT) prior to discharge to surface water, rather than allowing mere dilution to be the treatment. Under TWCA's existing NPDES permit, wastewater is currently discharged first to Truax Creek where it moves into the Willamette River. In order to prevent further contamination of Truax Creek and/or the Willamette River, additional pretreatment of contaminated extracted groundwater using BPT may be required. This additional pretreatment requirement under CERCLA is not redundant. Rather, the pretreatment requirement seeks to ensure that the CWA requirements for protection of human health and the environment at the TWCA site are not undermined by discharge of contaminated water from the Superfund remedial action.

EPA and ODEQ are coordinating Superfund and RCRA activities at the TWCA facility. These activities are designed to complement each other rather than to be redundant. Superfund cleanup actions are not intended to be duplicative of RCRA actions, or any other environmental regulation.

- 7) **COMMENT:** Several commenters expressed disappointment that EPA would require TWCA to implement Alternative 7. The commenters believed that the cleanup plan described in Alternative 7 had not been considered for feasibility and consisted of too many "blank checks" (i.e. ways in which EPA could later impose additional requirements and costs on TWCA). One commenter stated that EPA's alternative may require the construction of a groundwater pretreatment facility yet EPA had not addressed the cost of building such a facility. Similarly, commenters thought that costs and feasibility had not been fully evaluated for additional sampling and analysis that might be required and that "source reduction techniques" might be required but that the Proposed Plan did not specify what those source reduction techniques would be. Commenters gave these as examples of vagueness and open-endedness in EPA's proposed Alternative 7.

**RESPONSE:** EPA's proposed Alternative 7 was based on evaluation and data provided in the RI/FS which was conducted by Teledyne under EPA oversight. EPA's proposed Alternative 7 incorporated components of the Alternative 6 in the RI/FS with additional components based on other factors such as the ability of cleanup actions to be effective at a facility with complex ongoing operations. EPA's Alternative 7 as outlined in the Proposed Plan was designed to be a comprehensive cleanup remedy for contaminated groundwater, soil, and sediment at the TWCA Site.

As part of its evaluation of cleanup alternatives in the RI/FS, TWCA itself evaluated the feasibility of discharging extracted groundwater to TWCA's existing wastewater treatment plant. However, the existing wastewater treatment plant is not designed to treat many of the contaminants which would be found in the extracted groundwater such as volatile organic compounds. Discharging contaminated groundwater directly to surface water without treating the contaminants would be in violation of the CWA. Therefore, the proposed Alternative 7 and the selected remedy in the ROD incorporates a provision which requires TWCA to analyze the BPT which can be used to pretreat the extracted groundwater prior to discharge to its wastewater treatment system. In its evaluation in the RI/FS, TWCA did not analyze the cost of such additional pretreatment. The analysis of BPT, to be conducted during the remedial design, will incorporate an evaluation of cost-effectiveness. However, EPA expects that the amount of groundwater to be pretreated will not be substantial, and the technology which will be utilized to treat the contaminants found in groundwater at the site will be readily available at reasonable cost.

In deference to concerns of the community and TWCA, EPA has deferred the requirement for implementation of source reduction as part of the selected remedy at this time. EPA expects that TWCA would voluntarily implement some source reduction techniques as part of its operating procedures. Implementation of source reduction would prevent TWCA from expending funds for potential future environmental cleanup as a result of potential future spills or leaks of hazardous substances from TWCA's ongoing manufacturing processes into the environment. EPA retains authority to impose source reduction requirements on TWCA in the future if it is determined that TWCA's ongoing operations are adversely affecting the Superfund cleanup.

## **Due Process**

8. **COMMENT:** Several commenters, including the District 37 Representative to the Oregon State Legislature, expressed disappointment that EPA had not allowed TWCA adequate time to state its case at the public meeting for comments on the Proposed Plan. Commenters thought EPA should have allowed TWCA more than five minutes to defend its own alternatives as well as to respond in detail to EPA's Proposed Plan.

**RESPONSE:** EPA policy at a public meeting to take comments on a Proposed Plan is to allow each commenter equal time to comment. The PRP (in this case, Teledyne) is allowed no more or less time than any other commenter unless excess time is left after all who wish to do so have had an opportunity to comment. The rationale for allowing a limited amount of time for each party to present oral comments at a public meeting is to give everyone an opportunity to

comment. At the beginning of the public meeting on the Proposed Plan all commenters were asked to sign up prior to beginning the portion of the meeting designated to take oral comments. Everyone, including TWCA representatives, was free to sign-up. A count was then taken of the total number of commenters, equal time was allocated accordingly, and commenters were invited to comment in order of sign-up. At the public meeting, TWCA's legal counsel signed up to comment and used more than twenty minutes (almost four times as long as any other commenter) to present oral comments at the meeting. EPA accommodated this excess use of the comment time allotted by expanding the timeframe of the public meeting by about one hour in order that no commenter who wished to make oral comment would lose the opportunity to do so.

In addition, TWCA has been given several other opportunities to state its case to EPA and for the public record. On June 30, 1993, prior to issuance of the Proposed Plan, EPA officials met with TWCA representatives, at TWCA's request, to explain EPA's rationale for the proposed Superfund cleanup. At this meeting EPA offered to allow TWCA to participate with EPA in explaining the results of its RI/FS at the public meeting on the Proposed Plan. EPA issued the Proposed Plan on August 27, 1993. One week prior to the public meeting, TWCA turned down EPA's offer giving as the reason that it disagreed with EPA's proposed Alternative 7. TWCA requested that particular time be allotted to it at the public meeting to comment on EPA's Proposed Plan. EPA explained that no particular block of time would be allocated especially for TWCA comments but that TWCA would have the same opportunity as all other commenters to make comments on the record at the public meeting. At the public meeting, as described, TWCA legal counsel used twenty minutes (more than any other commenter).

On September 24, 1993 Teledyne requested, and EPA granted, an extension of the public comment period until October 27, 1993. This extension of the public comment period was given by EPA in order to allow TWCA to submit its written comments on the Proposed Plan to EPA in a timely fashion. TWCA submitted its written comments on October 5, 1993. At TWCA's request, EPA once again met with TWCA legal and technical representatives on October 15, 1993 so that TWCA could once again present its position for the record. TWCA presented its position in great detail and this meeting was recorded for the public record. A transcript of this meeting is available in the Administrative Record. On October 27, 1993 TWCA submitted supplemental written comments on the Proposed Plan.

TWCA has been given every opportunity to comment orally and in writing on the Proposed Plan. EPA has also accommodated every request by TWCA to meet with EPA representatives to present its comments.

## **Risk Assessment and Risk Related Issues**

9. **COMMENT:** One commenter suggested that the Proposed Plan did not clarify the distinction between risk management and risk assessment. This commenter expressed the belief that uncertainties in the risk assessment had not been adequately addressed in the Proposed Plan and that EPA had failed to clearly communicate the degree of risk to the public.

**RESPONSE:** The Superfund regulations utilize a two step approach in determining the risks to the public from a Superfund site. Risk assessment, the first step, involves quantifying risks by conducting a baseline risk assessment. This risk assessment is based upon the nature and extent of contamination at the site and assesses risks to the public if no cleanup actions were conducted at the site. Risk management, the second step, involves consideration of a variety of site-specific or remedy-specific factors, such as the current and projected future usage of the site. Such factors enter into the determination as to how risks will be managed and what cleanup levels will be established for the particular site.

The Superfund regulations require that actions selected to clean up hazardous waste sites be protective of human health and the environment. To help meet this Superfund mandate, EPA has developed a standardized risk assessment process as part of its cleanup response program. The objectives of this process are to: (1) provide an analysis of baseline human health and ecological risks and help determine the need for action at sites; (2) provide a basis for determining levels of chemicals that can remain on site and still be adequately protective of public health and the environment; (3) provide a basis for comparing potential health and ecological impacts of various cleanup alternatives; and (4) provide a consistent process for evaluating and documenting public health threats at sites.

The TWCA Risk Assessment was performed following standard EPA procedures. Certain aspects of these procedures are applied uniformly to all Superfund sites in order to be able to evaluate risks consistently. The methodology used to assess risks inherently involves some uncertainty. Uncertainty can occur as a result of the initial selection of contaminants of concern used to characterize exposures and risk on the basis of the sampling data and available toxicity information. For example, if a spill or leak into the environment of a chemical that wasn't previously identified in the TWCA RI/FS would occur then risks due to this chemical would not have been evaluated. Other uncertainties are inherent when assuming that chemicals that cause cancer in animals also cause cancer in humans. Additional uncertainties, such as attempting to predict future land use, are also inherent in assessing

exposure for individual substances and for individuals. Such uncertainties are generally inherent in assessing risks at all hazardous waste sites. These uncertainties are taken into account when making determinations based on the risk assessment. The TWCA risk assessment included an assessment and presentation of uncertainties which EPA evaluated during the remedy selection process. Information and explanations on risks from the TWCA Site have been communicated many times to the public in the past via fact sheets, open houses, and public meetings.

Risk management under the Superfund regulations, requires that on-site contaminants which exceed certain risk levels be cleaned up. The regulations also describe a range of risk levels which can be managed on site. One example of how risk management is applied at the TWCA site may be seen in the remedial actions required for groundwater which are presented in the ROD. For groundwater at the TWCA Site, some areas exceed the risk levels allowable under the Superfund regulations. These areas must be cleaned up as part of the selected remedy. However, there are some areas of groundwater at the TWCA facility in which the contaminant levels exceed drinking water standards, but do not exceed the maximum allowable risk level under the Superfund regulations. These areas of contaminated groundwater will be managed or contained on site, and active cleanup of those areas should not be required.

10. **COMMENT:** Several commenters requested the specific formulas and factors that went into calculating risks. These commenters wanted to know how these factors were derived.

**RESPONSE:** This response is necessarily presented in summary form. More detailed information on the bases for risk assessment is included in the TWCA Risk Assessment Report which is Volume III of the RI/FS. The complete RI/FS including the Risk Assessment was made available for review during the public comment period. The RI/FS also forms part of the Administrative Record for the TWCA site. The Administrative Record is available for review at the Albany Public Library in Albany, Oregon, and at EPA's Region 10 Superfund Records Center in Seattle, Washington.

For contaminants at the TWCA site, the calculation of risk involved a 4-step process which included the identification of contaminants of concern, an assessment of contaminant toxicity, an exposure assessment of the population at risk, and a characterization of the magnitude of risk.

During the first step, fifty four chemicals were identified as chemicals of potential concern in soils and groundwater at the site. The chemicals of potential concern were selected based on whether; (1) the concentration of the chemical

on site exceeded naturally occurring levels, (2) whether EPA had previously studied the chemical and established a level of human toxicity, and (3) the maximum detected concentration exceeded levels known to have health effects on laboratory animals in controlled experiments.

The second step includes gathering known toxicity information for the chemicals of concern at the site. Toxicity information was provided in the RI/FS for the chemicals of concern. Cancer risks for each chemical are then calculated using toxicity factors known as slope factors (SFs), while noncancer risks rely on reference doses (RfDs).

SFs have been developed by EPA for estimating excess lifetime cancer risks associated with exposure to potential carcinogens. SFs are then multiplied by the estimated intake of a potential carcinogen to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimates of the actual cancer risk highly unlikely. SFs are derived from the results of human epidemiological studies, or chronic animal bioassay data, to which mathematical extrapolation from high to low dose, and from animal to human dose, have been applied.

RfDs have been developed by EPA to indicate the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs are estimates of lifetime daily exposure for humans, including sensitive subpopulations likely to be without risk of adverse effect. Estimated intakes of contaminants of concern from environmental media (e.g. the amount of a contaminant of concern ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied.

The third step, or exposure assessment, identified potential pathways for contaminants of concern to reach the exposed population. Exposure assumptions were based primarily on EPA regional and national guidance. The RI/FS evaluated exposure to current and future workers on the plant site, and to potential future residents in the Farm Ponds Area. The Soil Amendment Area and adjoining land to the northeast and northwest of the Farm Ponds is currently being used for agricultural purposes, therefore EPA further supplemented the evaluation in the Farm Ponds Area by evaluating an agricultural worker scenario in the Soil Amendment Area.

Human exposure to chemicals in groundwater can occur through ingestion of drinking water, by dermal contact during bathing, handwashing etc. or by inhaling chemicals volatilized from water during showering, cooking, or other

household activities. The RI/FS determined that groundwater generally flows in a westerly direction below the TWCA Site to the Willamette River. TWCA currently uses water supplied by the local municipal system. In addition, a beneficial use survey conducted during the RI/FS indicated that there are no current off-Site users of groundwater for drinking water purposes. For these reasons, the Baseline Human Health Evaluation concluded that there are no current receptors for groundwater exposures. Therefore, only exposure of contaminated groundwater to future workers on the main plant and potential future residents in the Farm Ponds Area were evaluated.

Exposure point concentrations for the TWCA site were derived in a manner consistent with the EPA guidance to evaluate Reasonable Maximum Exposures (RMEs). The RME is defined as the highest exposure that is reasonably expected to occur at a site.

In the fourth and final step, risks are calculated for carcinogen and noncarcinogen chemicals. For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated by multiplying the SF by the "chronic daily intake" developed using the exposure assumptions. These risks are probabilities generally expressed in scientific notation (e.g.  $1 \times 10^{-4}$ ). An excess lifetime cancer of  $1 \times 10^{-4}$  means that an individual has a 1 in 10,000 chance of developing cancer as a result of site-related exposure to a carcinogen under the specific exposure conditions assumed.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g. lifetime) with a reference dose derived for a similar exposure period. Hazard quotients are calculated by dividing the chronic daily intake by the specific RfD. By adding the hazard quotients for all contaminants of concern that affect the same target organ (e.g. liver), the hazard index (HI) can be generated.

The RME provides a conservative but realistic exposure in considering remedial action at a Superfund site. Based on the RME, when the excess lifetime cancer risk estimates are below  $1 \times 10^{-6}$  (1 in 1,000,000), or when the noncancer HI is less than 1, EPA generally considers the potential human health risks to be below levels of concern. Remedial action is generally warranted when excess cancer risks exceed  $1 \times 10^{-4}$ . Between  $1 \times 10^{-6}$  and  $1 \times 10^{-4}$ , cleanup may or may not be selected, depending on individual site conditions including human health and ecological concerns.

The potential human health risks at the TWCA Site were characterized by estimating risks on a sample-specific basis. This approach retains information

on the geographic distribution of risk throughout the study area. The sample specific risks were used to distinguish specific areas of the TWCA site that exceed risk-based levels.

More detailed information regarding specific numbers and factors which were used in calculating risks at the TWCA site can be found in the TWCA Risk Assessment Report which is Volume III of the RI/FS Report. This report is part of the Administrative Record, and is available at the locations mentioned in the first paragraph of this comment.

11. **COMMENT:** One commenter pointed out that only rye grass is being grown in the agricultural area north of the TWCA facility (the Soil Amendment Area). Thus, there is no direct impact of contamination in this area to human health.

**RESPONSE:** While the Soil Amendment Area is currently being used to grow rye grass, future use of this area is uncertain at this time. EPA is aware that the area is currently zoned for industrial purposes. EPA has evaluated an agricultural use scenario for this area which is less-stringent than the future residential use scenario which was evaluated in the RI/FS. Subsequent to the public meeting on the Proposed Plan, EPA determined that contamination in this area would be best addressed as part of a separate operable unit. Therefore, the selected remedy cleanup actions for the Soil Amendment Area are being deferred until EPA obtains more information regarding the nature and extent of contamination in this area. Cleanup in the Soil Amendment Area will then be addressed as part of Operable Unit Three at the TWCA Superfund Site.

12. **COMMENT:** One commenter stated that it was illogical to list fluoride and nitrate as contaminants of concern with potential adverse risk effects because fluoride is commonly added to drinking water as a beneficial substance to provide protection from tooth decay and nitrate is commonly used in fertilizer.

**RESPONSE:** Common substances, beneficial in small amounts or when used appropriately may nevertheless be harmful in larger doses or when used inappropriately. Fluoride is added to drinking water in small concentrations and is absorbed into bone to help prevent bone and teeth deterioration. However, when humans are exposed to excessive fluoride concentrations over long periods of time the excessive exposure can actually cause damage to bones and teeth. This condition is called fluorosis.

Similarly excess nitrate can be harmful. Nitrate is converted to nitrite when it enters the body. Nitrite reacts with hemoglobin in the blood to form



methemoglobin. Methemoglobin reduces the ability of the blood to transport oxygen to tissues.

## **RI/FS Issues**

13. **COMMENT:** Several commenters, including a representative from the City of Millersburg, suggested that EPA should consider the economic health of the local community when exploring alternatives to clean up the site.

**RESPONSE:** EPA has been sensitive to the concerns expressed by TWCA and by the community. The RI/FS was designed to minimize impact on TWCA's active operating facility. The FS evaluation of cleanup alternatives for the TWCA site included an evaluation of the cost and implementability of the various alternatives. EPA has modified the Proposed Plan and has selected a cleanup remedy which is largely based upon the evaluation conducted in the FS, is designed to be cost-effective, and which addresses the concerns of the community. Superfund cleanup actions at TWCA should have minimal effect on TWCA's ongoing operations. EPA understands the concerns of the community and expects to work closely with TWCA to minimize impacts of the cleanup on TWCA's ongoing operations.

14. **COMMENT:** One commenter stated that the groundwater at TWCA was extensively sampled. He also questioned why EPA should care whether or not leaks come from underneath buildings at the TWCA site since no evidence was presented that contaminated groundwater leaves the site.

**RESPONSE:** EPA is concerned about the risks to human health and the environment from exposure to contaminated groundwater that leaves the TWCA site and that flows to surface water bodies such as the Willamette River. Some of the contaminants of concern in the groundwater include volatile organic chemicals and radionuclides which can cause cancer in humans and animals. Groundwater at the TWCA site was sampled and groundwater levels were measured at over 60 wells during the RI/FS. From these samples and measurements, the RI/FS concluded that contaminated groundwater was migrating to and entering surface water on and adjacent to the site. Adjacent off-site surface water bodies include the Willamette River. In addition, the RI/FS concluded that in some areas of the site, contaminated groundwater could be exiting the site prior to moving toward surface water. Any potential future leaks or spills of hazardous substances from structures on the TWCA facility could create additional hot spots and source areas on the site which could expand the groundwater contamination and thus negatively impact both groundwater and surface water adjacent to the site.

15. **COMMENT:** Several commenters questioned why EPA is continuing to use cleanup technologies that have repeatedly proven ineffective.

**RESPONSE:** None of the technologies which were evaluated in the RI/FS and by EPA have proven to be ineffective. Commenters who believe that some of the technologies are ineffective may be basing that belief on recent data which indicates that groundwater extraction may not be effective in achieving drinking water standards. However, groundwater extraction has proven to be effective in containing contaminant plumes and in achieving significant mass removal of contaminants. The selected remedy for groundwater cleanup at the TWCA site calls for containing groundwater contamination on site, and for extraction of groundwater at those wells which have very high levels of contaminants. Once contaminants are contained on the Site, and the high levels of contamination are cleaned up, natural dilution can be relied upon to further reduce contaminants to cleanup goals such as drinking water standards.

16. **COMMENT:** One commenter questioned why there was an Alternative 7 and why was it not developed during the comprehensive study process of all viable alternatives.

**RESPONSE:** At TWCA's request so as not to interfere with TWCA's ongoing manufacturing processes, the RI/FS was designed to be conducted in areas of the facility where there were no ongoing operations. Therefore several limitations were placed on the design of the RI/FS and on the work plans submitted by TWCA to EPA prior to implementation of the RI/FS, necessarily resulting in certain data gaps. These limitations on the RI/FS allowed TWCA to exclude from investigation at that time areas underneath existing buildings and structures on the facility which were not investigated for potential environmental damage. However, TWCA did not provide in its six alternatives for the future investigation of those potential contaminant source areas. Potential negative environmental impacts of spills and leaks from ongoing operations and existing structures on the Site were not considered in the TWCA RI/FS. In addition, EPA is concerned that the discharge of extracted groundwater to TWCA's existing wastewater treatment facility as described in the RI/FS could potentially violate CWA regulations. Because of these concerns, EPA recognized that implementation of any of the six alternatives evaluated by TWCA may not prove to be effective as a comprehensive long-term remedy for the TWCA Site.

EPA evaluated a seventh alternative that would address these concerns. Alternative 7 includes components of the alternatives evaluated in the TWCA RI/FS with additional components to address the additional concerns. EPA has the authority to amend the evaluation of alternatives if EPA deems it necessary.

Based upon the limitations of the RI/FS as described above, EPA therefore found it necessary to evaluate a seventh alternative.

### **Miscellaneous**

17. **COMMENT:** One commenter requested that EPA and TWCA continue the process together and build on a positive history for the health of the community.

**RESPONSE:** EPA expects to work closely and cooperatively with TWCA to implement the selected remedy in the ROD. EPA has given TWCA ample opportunity to work together and will continue to do so in the future. As part of the Superfund process, TWCA will be given a period of time to negotiate the implementation of the selected remedy. EPA hopes that TWCA will step forward and voluntarily agree to conduct the necessary cleanup work. Such an agreement would be formalized in a legal document called a consent decree.

18. **COMMENT:** One commenter and the District 37 Representative to the Oregon State Legislature suggested that risks should be solved by Alternative 3 outlined in the RI/FS. Alternative 3 was the cleanup alternative recommended by TWCA. These commenters further stated that there should be no prolonged human exposure and no risk, and the problem would be resolved in the same timeframe if Alternative 3 were implemented.

**RESPONSE:** Alternative 3, which includes slope erosion protection along Truax Creek, and groundwater extraction at only the Feed Makeup and Farm Ponds areas of the site, would not meet the cleanup goals established in the RI/FS for the TWCA site. If Alternative 3 were implemented, contaminated groundwater would not be contained on site. Numerous identified contaminant sources on the site would not be addressed or cleaned up. Contaminated sediments would not be cleaned up. No measures would be taken which would prevent the release of additional contamination from soil to groundwater, surface water, air, and sediments therefore resulting in potential additional risks to human health and the environment.

19. **COMMENT:** Several commenters, including the Albany Chamber of Commerce and local businesses, stated that TWCA has always been responsible and has repeatedly demonstrated concerns for its employees, the community, and state and federal environmental laws.

**RESPONSE:** Comment noted.

20. **COMMENT:** One commenter stated that EPA is incorrect by implying that the facility is over 50 years old; TWCA celebrated its 35th anniversary in 1991.

**RESPONSE:** This commenter is correct. The facility has been at its' present location since 1956.

21. **COMMENT:** A representative of the City of Albany stated that to set a standard requiring TWCA to meet the federal safe drinking water requirements is beyond all reasonable expectations.

**RESPONSE:** Under CERCLA, EPA is obligated to comply with the state of Oregon regulations which require that groundwater be restored to its most beneficial use. Groundwater beneath the TWCA site has been determined by the state of Oregon to be a potential drinking water source. In order to comply with the Oregon requirements, one of the cleanup goals for the TWCA site is to reduce contaminants in groundwater to below drinking water standards. However, in response to the concerns of TWCA and the community that cleanup of on-Site groundwater to drinking water standards is unrealistic and that current deed restrictions preclude the installation of drinking water wells, the groundwater cleanup portion of the selected remedy in the ROD differs from the Proposed Plan. Although clean up to drinking water standards still remains the goal, the selected remedy requires that TWCA actively clean up on-Site groundwater to levels which are the minimum risk levels allowable under the Superfund regulations. Instead of actively restoring groundwater, TWCA will be required to implement measures to contain on-Site groundwater which is above the drinking water standards. After attaining clean up to minimum risk levels, natural dilution may then be relied upon to eventually clean up on-Site groundwater to drinking water standards.

22. **COMMENT:** One commenter expressed concern about the impact the Superfund cleanup might have on the retention, expansion, and recruitment of businesses into the area. This commenter thought that EPA's Proposed Plan sends a message that is unclear and misleading to prospective businesses that are looking to the Albany-Millersburg area and to other businesses looking possibly to locate there because of the presence of TWCA.

**RESPONSE:** EPA's Proposed Plan and Selected Remedy are specific to the TWCA facility and are not intended to adversely impact other businesses in the area. EPA believes that cleaning up the TWCA facility will improve environmental conditions in the Albany-Millersburg area and should enhance the attraction of the area to other businesses.

23. **COMMENT:** Several commenters suggested that EPA should follow the TWCA cleanup plan and start with Alternative 2 and progress to the point where TWCA comes into compliance. One commenter also stated that there is no justification for choosing Alternatives 6 and 7 until lesser alternatives have failed.

**RESPONSE:** Alternative 2, which only specifies monitoring and institutional controls, is not protective of human health and the environment. Furthermore, Alternative 2 would not meet the cleanup goals established for the TWCA site, and would not comply with existing environmental regulations. Because of site-specific conditions presented by the fact that TWCA is an active, operating facility, EPA has determined that the selected remedy is the most appropriate means of achieving the cleanup goals. The selected remedy, which is a modification of Alternative 7 based on public comment, utilizes a phased approach for groundwater clean up at the TWCA Site.

24. **COMMENT:** One commenter stated that the TWCA site should never have been considered for inclusion on the National Priorities List (NPL).

**RESPONSE:** Inclusion of a site on the NPL is an objective nationwide process. The TWCA site is on the NPL because it meets all the criteria for inclusion on the list. Based upon information collected during site inspections, EPA uses its Hazard Ranking System (HRS) to establish a score for the site. The HRS score indicates whether hazardous substances have migrated, or may migrate, through groundwater, surface water and air. Sites with high enough scores are considered for inclusion on the NPL. TWCA is one such site.

25. **COMMENT:** One commenter was concerned about potential health risks to children who play around the TWCA sludge ponds.

**RESPONSE:** Access control around the sludge ponds is an issue that is of concern to EPA. EPA's Proposed Plan included measures which will ensure that access is limited in the Farm Ponds area. While any additional remediation of the sludge ponds has been deferred until EPA obtains additional information regarding the nature and extent of existing contamination in those areas, and additional cleanup activities for the sludge ponds are not called for in this ROD, EPA will ensure that access controls, such as fencing and posting of signs, are implemented to minimize any health threat which the sludges may pose.

26. **COMMENT:** Several commenters supported EPA's Proposed Plan. One commenter was concerned that if Teledyne manages to avoid cleanup responsibilities, it would be an open invitation for other large companies to come and use Oregon as their dump site.

**RESPONSE:** Comments noted.

## **Section 4**

### **Response to Comments Received from the Potentially Responsible Party**

EPA also received comments from TWCA during the comment period (August 27, 1993 through October 27, 1993). TWCA submitted to EPA comments opposing EPA's August 25, 1993 Proposed Plan. EPA, the Oregon Department of Environmental Quality (DEQ), and TWCA met on October 15, 1993 to address any outstanding issues which resulted from TWCA's comments submitted on October 5, 1993.

TWCA submitted supplemental comments on October 27, 1993, addressing issues which arose from the meeting. Most of the supplemental comments were issues that have already been addressed in prior submitted comments to, and meetings with, EPA.

TWCA's comments are grouped in the following categories:

- |       |  |
|-------|--|
| 27-31 | TWCA Believes EPA's Proposed Plan Violates The National Contingency Plan, 40 C.F.R. Part 300 (NCP)                               |
| 32-36 | TWCA Believes EPA Has Applied Its Risk Assessment Guidance Incorrectly   |
| 37    | TWCA Believes The Community Strongly Opposes EPA's Proposed Plan   |
| 38-39 | Because TWCA Is An Active Operating Facility Subject to RCRA, TWCA Believes The Plant Should No Longer Be Regulated Under CERCLA |
| 40-41 | TWCA Believes EPA Has Failed to Articulate a Rationale for its Proposed Plan   |
| 42    | TWCA Believes The Proposed Plan Is Based on A Misapplication of Oregon's Remedial Action Regulations                             |

TWCA contended that EPA must withdraw its proposal and adopt TWCA's remedial plan (Alternative 3) based on the following comments:

**TWCA Believes EPA's Proposed Plan Violates The National Contingency Plan, 40 C.F.R. Part 300 (NCP)**

27. **COMMENT:** TWCA stated that EPA has ignored the analytical framework in the NCP by selecting a proposed plan (Alternative 7) that was not considered during the RI/FS process. Specifically, TWCA believed that the components of Alternative 7 that were not evaluated in the RI/FS include: the possibility of additional pretreatment for groundwater; potential, but undefined, requirements for soil remedial actions in the Feed Makeup Area; an evaluation of the feasibility of soil removal instead of capping selected areas around the plant site; an evaluation of source reduction techniques; and an environmental evaluation whenever TWCA changes or discontinues use of any structure at the plant.

TWCA felt that therefore, EPA's Proposed Plan (Alternative 7) was not subject to the rigorous scrutiny and evaluation required by the NCP. TWCA thought that EPA had failed to conduct the necessary evaluation of costs and effectiveness; cost information for critical components of the Proposed Plan, such as pretreatment, were unknown; and costs of construction, and long-term operation and maintenance must also be considered. TWCA objected to the fact that EPA had proposed a remedy that could be at least three and a half times more costly than TWCA's recommended Alternative 3 and that, TWCA felt, would be no more protective of human health and the environment than TWCA's proposed remedy. TWCA thought that EPA had selected an infeasible and ineffective plan that would cause TWCA and the community substantial economic harm.

**RESPONSE:** In accordance with the NCP, the Proposed Plan is designed to identify a remedial action alternative which best fits the requirements in § 300.430(f)(1) of the NCP. According to these requirements, before a remedy can be selected it must be protective of human health and the environment, and comply with all federal and state applicable or relevant and appropriate requirements (ARARs). In reviewing the TWCA RI/FS, EPA had several concerns with respect to the remedial alternatives evaluated by TWCA and their ability to comply with ARARs. Specifically, all of the groundwater extraction alternatives evaluated in the RI/FS would have discharged contaminated extracted groundwater to TWCA's existing wastewater treatment system. TWCA's existing wastewater treatment system is not designed to treat, nor is it permitted to treat, most of the contaminants which are found in the groundwater. These contaminants include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and radionuclides. For some of these contaminants (PCBs, and very high levels of VOCs) the TWCA RI/FS evaluated some form of pretreatment prior to discharge. However, the TWCA RI/FS failed to evaluate pretreatment options

for the remaining VOCs in groundwater, SVOCs, and radionuclides. Discharging contaminated groundwater to surface water without pretreatment would not be in compliance with ARARs such as Section 402 of the Clean Water Act, 33 U.S.C. 1342 which requires that effluent limitations in permitted discharges be based in part upon treatment using the best practicable control technology available (BPT). This means that TWCA is required to treat contaminated groundwater prior to discharge to surface water. Since the TWCA wastewater treatment facility does not have effluent limitations for the above-listed contaminants, and since TWCA did not propose to use BPT as pretreatment for those contaminants, the TWCA evaluated groundwater alternatives would not meet the ARARs. Therefore the pretreatment requirement was necessary for any of the groundwater proposals to meet ARARs.

The proposal for potential, but undefined, requirements for remedial actions in the Feed Makeup Area are based on the TWCA RI/FS evaluation of in-situ flushing of subsurface contamination in the Feed Makeup Area. Although flushing of subsurface contaminants is an uncomplicated technology, the TWCA RI/FS stated that pilot tests would be conducted prior to initiating the flushing technology. However, the RI/FS did not evaluate additional cleanup options in the Feed Makeup Area should the pilot test prove to be ineffective. The Proposed Plan recognizes this deficiency in the RI/FS, and proposes that additional remedial actions such as source treatment or removal be implemented in this area if the pilot tests prove to be ineffective.

Additional requirements in § 300.430(f)(1) of the NCP call for an evaluation of the long term effectiveness and permanence of the remedial alternative. The Proposed Plan recognizes that TWCA is an active facility with ongoing operations. The Proposed Plan also acknowledges that the scope of the RI/FS was designed such that sampling activities would not interfere with TWCA's ongoing operations. The Proposed Plan recognizes that in order for any remedial actions to be effective in the long term at the TWCA facility, spills or leaks of additional contamination into the environment from ongoing operations at the facility must be minimized. In addition, since some areas of the facility were not investigated during the RI/FS in order to minimize impact on ongoing operations, contamination from those uninvestigated areas could potentially have a long term impact on the selected remedy for the TWCA Site.

EPA has determined that the combination of remedial actions identified in the Proposed Plan, and as identified in the Selected Remedy in the ROD, will reduce or eliminate the risks to human health and the environment in a cost-effective manner. Costs of the Proposed Plan and the Selected Remedy will be minimized because groundwater extraction will be mostly from existing monitoring wells, treatment of groundwater contaminants will be mostly via



TWCA's existing wastewater treatment system, and pretreatment if required will be via BPT such as air stripping or carbon adsorption. Air stripping and carbon adsorption are inexpensive effective technologies.

The TWCA-preferred Alternative 3 does not meet the selection criteria for remedial alternatives as outlined in the NCP for the following reasons:

- 1) Groundwater extraction from only the Feed Makeup and Farm Ponds areas of the Site will not restore the groundwater aquifer, contain on-Site contamination, or prevent off-Site migration of contaminants. The TWCA RI/FS offers no explanation as to why only those wells in the Feed Makeup and Farm Ponds areas were selected, when a number of on-Site wells exhibit similar characteristics.
- 2) Surface water discharge of extracted groundwater without pretreatment would be in violation of ARARs for the Site.
- 3) Contaminated sediments would remain on Site, and continue to pose a threat to the environment.

For the reasons stated, EPA has determined that TWCA's preferred alternative would not be fully protective of human health and the environment and would not be able to comply with federal and state ARARs for the TWCA Site.

28. **COMMENT:** TWCA believes that because EPA evaluated a seventh alternative, not evaluated by TWCA, that EPA has dismissed, without explanation, the findings in the EPA-approved RI/FS. TWCA questions any representation by EPA that actions contained in Alternative 7 have been analyzed through consideration of various alternatives in the RI/FS.

**RESPONSE:** In reviewing the RI/FS, EPA has consistently pointed out data gaps in the RI/FS in letters and meetings with TWCA. EPA communications to TWCA pointing out these data gaps may be found in the Administrative Record as part of EPA's comments on the RI/FS. Paragraph 31.B. of the Administrative Order on Consent, EPA Docket No. 1086-02-19-106 (AOC), in which TWCA and EPA are co-signatories provides that EPA will make amendments to the RI/FS if EPA deems it necessary. EPA has in essence amended the RI/FS, by including an additional remedial action alternative (Alternative 7). The evaluation of an additional alternative (Alternative 7) is not a dismissal of the findings of the RI/FS. Alternative 7 draws on the findings of the RI/FS, incorporates components of Alternative 6 (evaluated in the RI/FS), and includes additional components to correct the data gaps.

29. **COMMENT:** TWCA stated that because the Proposed Plan was not subject to the rigorous scrutiny as required by the RI/FS process, EPA has by-passed the procedures set forth in the NCP for evaluating remedial alternatives. TWCA characterized the Proposed Plan as only performing a cursory comparative analysis of the alternatives using the nine evaluation criteria set forth in the NCP.

**RESPONSE:** As stated in Comment 27 above, EPA evaluated Alternative 7 because of concerns that the alternatives evaluated in the TWCA RI/FS would not meet the two threshold criteria of protectiveness and compliance with ARARs as is required by the NCP. Alternative 7 draws upon Alternatives 4, 5 and 6 which were evaluated in the RI/FS. Additional elements such as the requirement for environmental evaluations were added because of the concern about the effectiveness of the TWCA-evaluated alternatives. The Proposed Plan allows implementation of the TWCA-evaluated alternatives in a manner which would best meet the nine evaluation criteria, including the threshold criteria.

30. **COMMENT:** TWCA objected to EPA's refusal to allow additional time for TWCA to present its views on the Proposed Plan during the September 14, 1993 public meeting. TWCA stated that EPA did the public a disservice by not allowing TWCA and its experts to present their findings. As a result, TWCA thinks, the public was provided with incomplete explanations of the RI/FS process. In addition, TWCA contended that EPA violated due process and the NCP by not allowing TWCA and its experts an adequate opportunity to present its findings and comments concerning the Proposed Plan.

**RESPONSE:** The NCP at Section 300.430(f)(3) requires EPA to provide a reasonable opportunity for submission of oral and written comments on the Proposed Plan. On June 30, 1993, prior to issuance of the Proposed Plan, EPA officials met with TWCA representatives to explain EPA's rationale for the proposed Superfund cleanup. At this meeting EPA offered to allow TWCA the opportunity to present the results of the RI/FS at the public meeting on the Proposed Plan. EPA issued the Proposed Plan on August 27, 1993. One week prior to the public meeting, TWCA turned down EPA's offer stating that it did so because it disagreed with EPA's proposed Alternative 7. TWCA then requested one hour to oppose the Proposed Plan at the public meeting. EPA turned down this request because allowing TWCA one-hour time at the public meeting would potentially deprive other members of the public from having adequate time to comment on the Proposed Plan. EPA informed TWCA that generally because of time constraints, and depending on the number of commenters, each commenter would be limited to five minutes. TWCA would be free to use any excess time remaining after everyone had equal opportunity to provide comments. Twenty two commenters presented oral comments at the public meeting on September 14, 1993. Each commenter generally took five minutes

or less to present his/her comments. However TWCA's legal counsel used more than twenty minutes to present comments (about four times longer than any other commenter). EPA expanded the timeframe of the public meeting to accommodate TWCA's expanded comments. EPA's Response to Comment 8 of this Responsiveness Summary provides more detail on the manner in which TWCA has been given ample opportunity for comment throughout this process.

31. **COMMENT:** TWCA stated that EPA's Proposed Plan conflicts with EPA's directives and guidance documents, and with the feasibility study findings on technical practicability of remediating aquifers through groundwater extraction. TWCA also implied that EPA's assessment is simply unrealistic and contrary to most other experiences throughout the country.

**RESPONSE:** TWCA has misinterpreted the EPA guidance on technical impracticability of remediating groundwater aquifers. This guidance, which is entitled "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration" (Office of Solid Waste and Emergency Response (OSWER) Directive 9234.2-25), discourages the use of technical impracticability waivers prior to implementation of full-scale aquifer remediation systems because it is often difficult to predict the effectiveness of remedies based on limited site characterization data. Decisions regarding the technical practicability of groundwater restoration must be based on thorough characterization of the physical and chemical aspects of the site. Because of data gaps in the TWCA RI/FS due to the fact that the RI/FS does not characterize areas beneath buildings and structures, EPA cannot, at this stage, make an accurate determination on groundwater technical impracticability. Analyses of previously uninvestigated areas as called for in the Proposed Plan and the Selected Remedy must be accomplished before the TWCA Site can be considered as being thoroughly characterized. In addition, as called for in the guidance, the selected remedy in the ROD utilizes a phased approach for determining whether groundwater cleanup levels are achievable. The groundwater extraction element of the Proposed Plan and the selected remedy also conforms to state of Oregon requirements that groundwater be cleaned up to its most beneficial use.

TWCA's belief that the groundwater extraction element of the Proposed Plan is unrealistic and contrary to experience throughout the country is unfounded. Studies of groundwater extraction systems throughout the country have shown that groundwater pump and treat systems are effective for containing the contaminant plume and for reducing the mass of contamination in the aquifer. The Selected Remedy as outlined in the ROD clarifies the containment requirement of the groundwater extraction element by requiring groundwater which is above lifetime cancer risk levels of  $10^{-4}$ , and/or is significantly above the noncancer hazard index of 1, to be contained on the TWCA site. The

Selected Remedy also requires that contaminant masses at groundwater hot spots or source areas be reduced. EPA has determined that the containment and mass reduction approach to groundwater remediation at the TWCA site, which is clarified in the Selected Remedy, is realistic and is consistent with EPA policy, guidance, and with available experience.

32. **COMMENT:** TWCA commented that EPA's Proposed Plan ignores the findings in the RI/FS concerning sediment removal. TWCA also stated that despite the findings in the RI/FS, EPA has considered sediment removal technology without providing rationale for its decision.

**RESPONSE:** The TWCA RI/FS states that sediment removal could impact the existing sediment ecosystem. However, the RI/FS does not present data which confirms or supports this finding. EPA has sound basis for considering sediment removal. Sediment removal has been selected and conducted at many Superfund sites around the country, including the Commencement Bay site in Washington State, with minimal long term impact on ecosystems. Information on sediment removal drawn from experiences at this site, and other sites in the United States, is included as part of several technical sources and guidance documents found in the Administrative Record. Sediment remedial actions called for in the ROD are designed to minimize impact on the sediment ecosystem at the TWCA Site.

#### **TWCA Believes EPA Has Applied Its Risk Assessment Guidance Incorrectly**

33. **COMMENT:** TWCA commented that EPA's application of its risk evaluation guidance is erroneous and misdirected and has resulted in improper risk management decisions by EPA. TWCA implied that EPA has ignored the findings in the risk assessment. For example, the TWCA risk assessment emphasized that exposure to impacted soil and groundwater at the TWCA facility is highly unlikely. TWCA also commented that EPA has relied on unrealistic risk exposure assumptions to set harsh and unnecessary acceptable exposure levels given that the facility will continue to be used for industrial purposes.

**RESPONSE:** As stated in the Proposed Plan, throughout the ROD, and in EPA's Responses to Comments 1 and 5 of of this Responsiveness Summary, EPA recognizes that TWCA is an active facility with ongoing operations and has consistently taken those circumstances into account in making determinations. EPA has relied, for its risk management decisions, upon exposure assumptions that were developed in the TWCA RI/FS. These exposure assumptions were developed by TWCA in accordance with EPA guidelines. For example; the percent of time that workers would spend in a potentially contaminated area is

generally less than if the TWCA facility were used for residential purposes, so that for purposes of characterizing human health risks on the plant site, the TWCA RI/FS used an approach that is less conservative than if the TWCA property were used for residential purposes. This less conservative approach has been incorporated by EPA in its decision making process for the selected remedy at the TWCA site, and is further documented in the ROD.

34. **COMMENT:** TWCA commented that it believes that EPA risk assessment guidance does not require remediation when the hypothetical human health risk is below  $10^{-4}$ .

**RESPONSE:** EPA's risk assessment guidance was developed to ensure that risk assessments conducted at Superfund sites are in compliance with requirements of the NCP. Section 300.430(e)(2)(1) of the NCP states that risks are generally considered acceptable within the  $10^{-4}$  and  $10^{-6}$  range for known or suspected carcinogens. Although these levels are within the NCP range, these levels may exceed both federal and Oregon state drinking water standards. The groundwater extraction element of the Selected Remedy in the ROD has been modified from the Proposed Plan to allow for extraction of groundwater at areas of greater risk and on-Site containment of groundwater with contaminant risks between  $10^{-4}$  and  $10^{-6}$ . This modification of the Proposed Plan is reasonable because EPA expects that groundwater extraction of areas of higher risk levels will reduce sources of contamination to other groundwater areas beneath the TWCA site. Once this is accomplished, natural attenuation of contamination at the areas of lower risk may be relied upon to achieve the required cleanup levels. EPA's Responses to Comments 9 through 12 also addresses this issue in greater detail.

35. **COMMENT:** TWCA commented that it believed that institutional controls were appropriate for reducing exposure at the plant. TWCA thought that EPA had ignored the role of institutional controls in eliminating potential exposures to impacted soils and groundwater in making risk management decisions for the site.

**RESPONSE:** EPA agrees with TWCA that in some cases institutional controls are appropriate for reducing exposures. However, EPA has determined that institutional controls alone are not adequate for preventing further releases of contaminants, for preventing contaminants from migrating to groundwater, or for preventing contaminants from migrating off Site. Therefore, for institutional controls to be effective, institutional controls need to be coupled with active groundwater remediation.

36. **COMMENT:** TWCA stated that EPA's Proposed Plan would require installation of an extensive groundwater extraction system, sediment removal, and soil removal throughout the plant site. TWCA believed that the basis for those requirements are not supported by the Administrative Record.

**RESPONSE:** TWCA's RI/FS and the Administrative Record support the requirement for installation of a groundwater extraction system, and for sediment removal. The Proposed Plan recommended implementation of a modification of the TWCA evaluated groundwater extraction alternative (Alternative 6). This modification did not require installation of additional monitoring wells beyond those 36 wells already evaluated in the RI/FS. In addition, the Proposed Plan recommended removal of only 3,600 cubic yards of sediment, which is 1,500 cubic yards less than evaluated under Alternative 6 in the TWCA RI/FS.

The TWCA RI/FS contained several data gaps with respect to delineation of the nature and extent of contamination in soil and evaluation of soil remediation options at the Site. Because of the necessity to address these data gaps in the RI/FS, the RI/FS will be amended subsequent to this ROD and Responsiveness Summary. The amended RI/FS will include an evaluation of soil cleanup options, including soil removal. Upon completion of the amended RI/FS, and after a public comment period, EPA will document the selected soil cleanup remedy in a subsequent ROD for Operable Unit Three.

#### **TWCA Believes The Community Strongly Opposes EPA's Proposed Plan**

37. **COMMENT:** TWCA stated that based on the public hearing and written submissions presented to EPA, the communities of Albany and Millersburg are strongly opposed to the perceived overreaching of EPA's proposal. TWCA stated that members of these communities believed that EPA's Proposed Plan was overreaching because it was excessive in the stringency of its cleanup standards and environmentally unnecessary. TWCA also summarized other concerns of members of the community, including community leaders, elected officials, business leaders, local media experts, TWCA employees, and interested residents. These concerns as expressed by Teledyne, included the potential negative impact of the Superfund cleanup on TWCA and, in time, on the area's economy. Similarly, TWCA stated that local doctors questioned the appropriateness of the risk assumptions relied upon by EPA and stressed the relationship between employment and good health.

**RESPONSE:** EPA shares the concerns of the community in striking an appropriate balance between protectiveness of public health and the environment and cleanup standards that may be unnecessarily burdensome. EPA believes the appropriate balance has been reached in the Selected

Remedy which takes into account community concerns. The Proposed Plan is based upon site-specific conditions as described in TWCA's RI/FS. However, the selected remedy as described in the ROD, has been modified in response to public comment. The selected remedy differs from the Proposed Plan as a logical outgrowth of comments received from the community.

EPA's response to comments from the community, reflecting how community concerns were addressed, are summarized in Section 3 of this Responsiveness Summary.

**Because TWCA Is An Active Operating Facility Subject to RCRA, TWCA Believes The Plant Should No Longer Be Regulated Under CERCLA**

38. **COMMENT:** TWCA commented that it is inappropriate for EPA to use its CERCLA authority to regulate ongoing operations; rather, TWCA believed its facility would be more appropriately handled under the RCRA regulatory programs of EPA and DEQ. TWCA further expressed that, based on EPA's Proposed Plan, TWCA is potentially subject to unnecessary, duplicative, and inconsistent oversight by both the RCRA and CERCLA programs of EPA and DEQ. TWCA also contended that EPA's Proposed Plan is a method for closing the TWCA facility now. For example, EPA's proposal calls for source reduction techniques and an environmental evaluation of soils and groundwater beneath those areas when TWCA changes or discontinues use of any pond, area, building, or structure. TWCA believed that those requirements as part of the CERCLA action could impact adversely on its ongoing operations.

**RESPONSE:** The regulations under the Resource Recovery and Conservation Act, 42 U.S.C. 6901 (RCRA) authorities have historically not been extensively applied by federal or state agencies to regulate the TWCA facility. TWCA has been regulated under the CERCLA authorities because the facility has been placed on the NPL due to past releases of hazardous substances into the environment. EPA has been coordinating with DEQ RCRA and CERCLA programs to ensure that duplication of effort is minimized. EPA's Response to Comment 6 in this Responsiveness Summary also addresses this issue in greater detail.

EPA's Proposed Plan and Selected Remedy are designed so as to have minimal impact on TWCA's ongoing operations. EPA's Proposed Plan and Selected Remedy allow TWCA the flexibility for determining when environmental evaluations could be integrated into its conduct of its business operations. Source reduction techniques would not be required unless releases of contaminants into the environment from TWCA's ongoing operations impact the effectiveness of the Superfund clean up. EPA's Response to Comment 1 in this Responsiveness Summary also addresses this issue in greater detail.

39. **COMMENT:** TWCA commented that the TWCA Site should no longer be listed on the NPL, based on the EPA's deferral policy, since TWCA's actions to date have resulted in removal of environmental media of greatest concern. TWCA further stated that it does not fall within any categories justifying its listing on the NPL. First, there is no evidence of TWCA's inability or willingness to finance or perform the work. Secondly, TWCA has cooperated fully with the agencies in working through any RCRA issues, despite what TWCA considered conflicting directions from EPA and DEQ concerning the RCRA permitting requirements.

**RESPONSE:** Although EPA acknowledges that TWCA has already undertaken significant cleanup action at the Site, EPA has determined, based on the results of the TWCA RI/FS, that groundwater is contaminated beneath the Site which poses a potential threat to human health and the environment. In addition, sediment contamination on and in the vicinity of the Site may pose a threat to aquatic life. Based on these findings, EPA must require that cleanup actions be taken at the Site under CERCLA authorities. As stated in Comment 38, the requirements under RCRA have historically not been extensively applied by federal or state agencies to regulate the TWCA facility. EPA will ensure that there will be coordination between the CERCLA and RCRA programs with respect to environmental cleanup actions at the TWCA facility.

**TWCA Believes That EPA Has Failed to Articulate a Rationale for Its Proposed Plan.**

40. **COMMENT:** TWCA commented that it believed that the Proposed Plan is devoid of any rationale for EPA's selection of an entirely new alternative not considered during the preparation of the RI/FS. Furthermore, TWCA felt that many components of EPA's proposal are too vague to be understood. TWCA felt that the September 14th public meeting and the October 22nd Fact Sheet did not adequately explain why EPA felt it was necessary to consider a new alternative. TWCA believed that the distinctions and reasons for those distinctions between EPA's alternative and the alternatives considered in the RI/FS were not clearly established.

It was TWCA's perception that the Fact Sheet only set forth rationale for the requirement that TWCA perform sampling when use of any buildings and structures is discontinued. TWCA believed that the Fact Sheet did not address other aspects of EPA's Proposed Plan, such as source reduction or potential conflicts between EPA's CERCLA and RCRA authorities under the proposal.

**RESPONSE:** Rationale for developing an additional alternative is clearly presented in the Administrative Record and was presented to TWCA via numerous comment letters and conference calls regarding the RI/FS prior to



issuance of the Proposed Plan. EPA has specifically outlined data gaps and deficiencies in the TWCA RI/FS in letters from EPA to TWCA dated December 18, 1992, May 21, 1993, and July 16, 1993. Those EPA/TWCA communications are part of the Administrative Record. As specified in those previous communications, the TWCA RI/FS did not address several major areas potentially effected by releases of hazardous substances from the Site. These unaddressed areas include; (1) current potential off-Site groundwater and surface water (i.e. Willamette River) contamination as a result of releases from the Site, and, (2) on-Site operating process/waste management areas which may have previously contaminated or may be continuing to contribute to contamination of groundwater and surface water at the Site. Alternative 7 utilizes elements of alternatives evaluated by TWCA in the RI/FS while addressing concerns regarding implementation and effectiveness of the TWCA-evaluated alternatives. These concerns were presented to the public in the Proposed Plan and at the public meeting held in Albany on September 14, 1993.

As discussed further in EPA's Response to Comment 38 in this Responsiveness Summary, EPA has been coordinating with RCRA and CERCLA authorities to ensure that conflicts between the two regulatory programs do not occur with respect to the cleanup of the TWCA facility.

41. **COMMENT:** TWCA commented that it did not believe that EPA, in proposing Alternative 7, fully evaluated the remedies based on available data and the findings of the RI/FS. TWCA thought that by developing and proposing Alternative 7, EPA was acting arbitrarily and capriciously. TWCA thought that EPA gave post-hoc rationalizations and explanations and that these could not supplant the RI/FS process.

**RESPONSE:** EPA has conformed with the RI/FS process in accordance with CERCLA, the NCP, and with the AOC. EPA amended the RI/FS and developed Alternative 7 to fill the data gaps apparent regarding implementation of the alternatives evaluated in the TWCA RI/FS. In its comments to TWCA on the RI/FS, EPA has, in letters to TWCA and conference calls with TWCA representatives, consistently identified the data gaps in the RI/FS prior to issuance of the Proposed Plan. EPA's communications with TWCA on this issue may be found in EPA's comments on the RI/FS in the Administrative Record. TWCA has failed to correct those data gaps. As stated in EPA's July 16, 1993 letter to TWCA regarding the RI/FS, "to the extent that those data gaps impact the design effectiveness of proposed Superfund remedial actions for the Site, EPA believes that it is important, at this stage in the process towards Superfund remedial action, to emphasize that the data gaps must be addressed during the proposed Superfund remedial action. To adequately

protect human health and the environment, EPA commonly requires PRPs to address some data gaps during the RD/RA process."

**TWCA Believes The Proposed Plan is Based on a Misapplication of Oregon's Remedial Action Regulations.**

42. **COMMENT:** TWCA commented that Oregon law on background concentrations is not an applicable and relevant or appropriate requirement (ARAR) for the plant. TWCA contended that the Oregon State Background Standard does not satisfy the requirements for an ARAR and; therefore, should not be applied to TWCA.

**RESPONSE:** Section 300.5 of the NCP defines applicable requirements as "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable." The Oregon Environmental Cleanup Rules (OAR 340-122-010 through 340-122-360) are substantive requirements that are applied to all CERCLA hazardous waste sites in the State of Oregon. For each site the technical and economic feasibility of cleanup of environmental media to background is evaluated. If it is determined that cleanup to background is not feasible, then an evaluation is performed to determine the lowest feasible cleanup concentrations. In all cases the level of cleanup must be protective of human health and the environment. The result of this process is a cleanup level or action(s) that is applied to the site. EPA will make the determination as to whether the Oregon State Background Standard is applicable to soil cleanup actions at the TWCA Site in a subsequent soils operable unit ROD.

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 1. 0. . SITE IDENTIFICATION

SUB-HEAD: 1. 1. . Correspondence

1. 1. . - 0000001

DATE: 05/17/77 PAGES: 2

AUTHOR: William Young, Director/Keith Putnam, Administrat./Oregon Dept. of

ADDRESSEE: Vincent de Poix/Teledyne Wah Chang-Albany

DESCRIPTION: Preliminary evaluation of radiological aspects of plant operations

1. 1. . - 1025011

DATE: 05/17/77 PAGES: 2

AUTHOR: William H. Young/Oregon Dept. of Environmental Quality

ADDRESSEE: Vincent de Poix/Teledyne Wah Chang

DESCRIPTION: Results of Radiological Evaluation of Teledyne Wah Chang

1. 1. . - 1025014

DATE: 10/27/78 PAGES: 6

AUTHOR: Director/Environmental Quality Commission

ADDRESSEE: Unknown/Environmental Quality Commission

DESCRIPTION: Memo re: Agenda Item No. K, Oct. 27, 1978, EQC Meeting, Teledyne Wah Chang Albany, NPDES Permit

1. 1. . - 1025013

DATE: 03/14/80 PAGES: 5

AUTHOR: Ted Groszkiewicz/State of Oregon

ADDRESSEE: File/State of Oregon

DESCRIPTION: Interoffice memo re: Ammonia Seepage at Teledyne

1. 1. . - 0000002

DATE: 05/13/80 PAGES: 3

AUTHOR: Bob Stamnes/Ecology & Environment, Inc.

ADDRESSEE: File/Unknown

DESCRIPTION: Notes/Discussion with Ted Groszkiewicz from DEQ regarding disposal pits, lagoons and ponds

1. 1. . - 0000003

DATE: 06/30/81 PAGES: 11

AUTHOR: Karen Weliky, Mitchell Lyle, Jack Dymond, Bill Rug/Oregon State

ADDRESSEE: David Stewart-Smith/George Toombs/OSHD

DESCRIPTION: Sampling of Willamette River and Conser Slough with attached maps and notes

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

1. 1. . - 00000004  
DATE: 11/23/81 PAGES: 9  
AUTHOR: Hussein Aldis/Ecology & Environment, Inc.  
ADDRESSEE: Bill Schmidt/Ecology & Environment, Inc.  
DESCRIPTION: Status report of TWCA as controlled vs. uncontrolled hazardous waste site
1. 1. . - 00000005  
DATE: 12/02/81 PAGES: 2  
AUTHOR: Carolyn Wilson/Ecology & Environment, Inc.  
ADDRESSEE: J. E. Osborn/Ecology & Environment, Inc.  
DESCRIPTION: Review of status report on TWCA as controlled vs. uncontrolled hazardous waste site
1. 1. . - 00000006  
DATE: 12/07/81 PAGES: 1  
AUTHOR: Hussein Aldis/Ecology & Environment, Inc.  
ADDRESSEE: Bill Schmidt/Ecology & Environment, Inc.  
DESCRIPTION: Possible EPA Involvement
1. 1. . - 1025012  
DATE: 09/13/82 PAGES: 3  
AUTHOR: Kris W. Barrett/Mitre Corporation  
ADDRESSEE: Jackie Betz/Ecology and Environment, Inc.  
DESCRIPTION: Cover letter and attached EPA hazard ranking system scoring method for the toxicity/persistence of radioactive substances found at uncontrolled hazardous waste sites
1. 1. . - 00000007  
DATE: 09/19/82 PAGES: 3  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Background memorandum
1. 1. . - 00000008  
DATE: 09/27/82 PAGES: 3  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Notes/Sampling at sludge ponds
1. 1. . - 00000009  
DATE: 09/28/82 PAGES: 2  
AUTHOR: T. E. Nelson/TWCA  
ADDRESSEE: Robert Poss/EPA  
DESCRIPTION: Memo regarding samples taken at Lower River Sludge Pond on 4/29/79 with attached sample map

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

1. 1. . - 0000010  
DATE: 11/18/82 PAGES: 1  
AUTHOR: Mark Hooper/EPA  
ADDRESSEE: Robert Poss/EPA  
DESCRIPTION: Memo regarding identification of waste streams from TWCA
1. 1. . - 0000011  
DATE: 02/11/83 PAGES: 1  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Memo regarding building constructed over old TWCA landfill
1. 1. . - 0000012  
DATE: 07/12/83 PAGES: 8  
AUTHOR: Stan Sturges/Water Quality Division, State of Oregon  
ADDRESSEE: JEB, DSL and Files/Water Quality Division, State of Oregon  
DESCRIPTION: Memo regarding review of current monitoring program for groundwater protection at Farm Pond site with attached diagrams and sampling data
1. 1. . - 0000013  
DATE: 09/06/83 PAGES: 6  
AUTHOR: Thomas Johnson/Weston Sper  
ADDRESSEE: James Willman/EPA  
DESCRIPTION: Transmittal letter and attached Technical Assistance Team (TAT) review regarding TWCA as National Priority List (NPL) site
1. 1. . - 0000014  
DATE: 09/19/83 PAGES: 7  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Notes, background information and current actions
- SUB-HEAD: 1. 1. 2.
1. 1. 2. - 1025058  
DATE: / / PAGES: 42  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Statement of Work for the Remedial Design and Remedial Action for the Sitcum Waterway Problem Area and Other Areas of the Commencement Bay Nearshore/Tideflats Superfund Site, Pierce County, Washington
- SUB-HEAD: 1. 2. . Historical Summary

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

1. 2. . - 0000001

DATE: / / PAGES: 18

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Report-Historical summary of Oregon laws applicable to TWCA & legal actions taken against TWCA, letter from EPA to TWCA, and 3 letters to EPA regarding "Prelim. Engin. Report on Permanent Lime Solids Containment for TWCA", Order on Consent

1. 2. . - 0011896

DATE: 01/01/79 PAGES: 48

AUTHOR: Hal Darst/Pacific Northwest Research Center

ADDRESSEE: /

DESCRIPTION: Zirconium Hazards and Nuclear Profits : A Report on Teledyne Wah Chang Albany

SUB-HEAD: 1. 3. . Site Investigation Report

1. 3. . - 0000001

DATE: 08/15/79 PAGES: 3

AUTHOR: Neil Thompson, Al Goodman-EPA; Ted Groszkiewicz-DE/Q; Tom Nelson,

ADDRESSEE: Unknown/EPA

DESCRIPTION: Investigation Report-Abandoned waste site program

SUB-HEAD: 1. 4. . Site Inspection Reports

1. 4. . - 0000001

DATE: 07/15/80 PAGES: 14

AUTHOR: Hussein Aldis/Ecology & Environment, Inc.

ADDRESSEE: Unknown/EPA

DESCRIPTION: Potential hazardous waste site report

1. 4. . - 0000002

DATE: 07/16/80 PAGES: 23

AUTHOR: Hussein Aldis/Ecology & Environment, Inc.

ADDRESSEE: Bob Stammes/Ecology & Environment, Inc.

DESCRIPTION: Memos-Magnesium chloride wastes and site inspection report with attached maps, memo regarding ammonia seepage, and potential hazardous waste site inspection report

1. 4. . - 0000003

DATE: 08/30/82 PAGES: 11

AUTHOR: Hussein Aldis/Ecology & Environment, Inc.

ADDRESSEE: Unknown/EPA

DESCRIPTION: Potential hazardous waste site report

SUB-HEAD: 1. 5. . Sampling Data

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

1. 5. . - 0000001  
DATE: 04/26/79 PAGES: 1  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Sampling sites for radiation monitoring at plant

1. 5. . - 0000002  
DATE: 07/28/82 PAGES: 22  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Groundwater and sludge sampling data with attached maps, memoranda, and zirconium manufacturing sequence fact sheet

1. 5. . - 0000003  
DATE: 10/11/82 PAGES: 1  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Heavy Metals sampling data

1. 5. . - 0000005  
DATE: 02/22/83 PAGES: 7  
AUTHOR: Hussein Aldis/Ecology & Environment, Inc.  
ADDRESSEE: John Osborn/Ecology & Environment, Inc.  
DESCRIPTION: Memo-Waste discharge and sludge pond sampling data with attached maps

1. 5. . - 0000006  
DATE: 01/30/86 PAGES: 59  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Memo-Analytical results for heavy metals in groundwater samples and attached sampling data

SUB-HEAD: 1. 6. . Preliminary Assessment Reports

1. 6. . - 0000007  
DATE: / / PAGES: 4  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Potential hazardous waste site identification and Preliminary Assessment

1. 6. . - 0000001  
DATE: 08/01/79 PAGES: 1  
AUTHOR: J. W. Fey/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Potential hazardous waste site log

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

1. 6. . - 0000002  
DATE: 02/25/80 PAGES: 1  
AUTHOR: R. Fullner/Ecology & Environment, Inc.  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Evaluation of Section 311 cleanup requirements

1. 6. . - 0000003  
DATE: 02/29/80 PAGES: 2  
AUTHOR: Robert Stamnes/Ecology & Environment, Inc.  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Potential hazardous waste site tentative disposition/Pyrophoric materials

1. 6. . - 0000004  
DATE: 05/30/80 PAGES: 2  
AUTHOR: Robert Stamnes/Ecology & Environment, Inc.  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Potential hazardous waste site tentative disposition/Dike integrity

1. 6. . - 0000005  
DATE: 09/02/86 PAGES: 2  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Potential hazardous waste site identification with attached letter from Corps of Engineers regarding hazardous waste disposal sites on their property

1. 6. . - 0000006  
DATE: 05/07/87 PAGES: 7  
AUTHOR: Tom Robertson/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Potential hazardous waste site identification with attached memo regarding pond accessible to public, maps and photographs



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 2. 0. . ENVIRONMENTAL PROGRAMS - BACKGROUND

SUB-HEAD: 2. 1. 1. Correspondence

2. 1. 1. - 0000010

DATE: / / PAGES: 3

AUTHOR: Dennis Stefani/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Notes, changes in permit by Environmental Quality Commission

2. 1. 1. - 1025010

DATE: 03/30/78 PAGES: 7

AUTHOR: Donald P. Dubois/EPA

ADDRESSEE: William H. Young/Oregon Dept. of Environmental Quality

DESCRIPTION: Notice of Violation to Teledyne Wah Chang pursuant to Section 309 of Clean Water Act

2. 1. 1. - 0000001

DATE: 10/26/78 PAGES: 1

AUTHOR: Donald Dubois, Regional Administrator/EPA

ADDRESSEE: William Young, Director/Oregon Dept. of Environmental Quality (DEQ)

DESCRIPTION: Letter-EPA approval of proposed permit

2. 1. 1. - 0000002

DATE: 10/27/78 PAGES: 6

AUTHOR: Director/Environmental Quality Commission

ADDRESSEE: Unknown/Environmental Quality Commission

DESCRIPTION: Memo-Draft renewal permit

2. 1. 1. - 0000003

DATE: 11/01/78 PAGES: 1

AUTHOR: Alan Goodman/EPA

ADDRESSEE: Harold Geren/EPA

DESCRIPTION: Transmittal memo-Final Permit

2. 1. 1. - 0000004

DATE: 11/16/78 PAGES: 1

AUTHOR: V. P. De Poix/Teledyne Wah Chang-Albany

ADDRESSEE: William Young/DEQ

DESCRIPTION: Request for hearing to contest certain conditions and limitations imposed by the Environmental Quality Commission on the NPDES permit

2. 1. 1. - 0000005

DATE: 11/22/78 PAGES: 7

AUTHOR: Lloyd Reed/EPA

ADDRESSEE: Gil Zemansky/Friends of the Earth

DESCRIPTION: Letter regarding processing and issuance of permit with attached letters from Friends of the Earth and DEQ

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 1. - 00000006  
DATE: 04/10/79 PAGES: 11  
AUTHOR: Charles Ashbaker/DEQ  
ADDRESSEE: John Vlastelicia/Oregon Ops Office-EPA  
DESCRIPTION: Preparation for hearing requested by TWCA regarding permit limits with attached letter from TWCA attorneys regarding their position on permit limits and sampling data

2. 1. 1. - 00000007  
DATE: 05/24/79 PAGES: 3  
AUTHOR: John Vlastelicia/Oregon Ops Office-EPA  
ADDRESSEE: Charles Ashbaker/DEQ  
DESCRIPTION: EPA review of TWCA position on permit limits with attached memo with comments from industrial waste consultant E.J. Struzeski

2. 1. 1. - 00000008  
DATE: 03/20/87 PAGES: 1  
AUTHOR: Richard Parkin/EPA  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: NPDES monitoring reports

2. 1. 1. - 00000009  
DATE: 01/07/88 PAGES: 2  
AUTHOR: Richard Parkin/EPA  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Transmittal letter (supply of 1988 monitoring reports)

SUB-HEAD: 2. 1. 2. Sampling Data

2. 1. 2. - 00000012  
DATE: / / PAGES: 15  
AUTHOR: EGD Sample Control Center/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Metals traffic reports for EPA samples

2. 1. 2. - 00000001  
DATE: 09/27/79 PAGES: 29  
AUTHOR: Edmund Struzeski/National Enforcement Investigations Center  
ADDRESSEE: Al Goodman/Oregon Ops Office-EPA  
DESCRIPTION: Analytical results for effluent sampling with attached sampling data

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 2. - 0000002  
DATE: 01/02/80 PAGES: 3  
AUTHOR: Unknown/TWCA  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Bioassay results on effluent

2. 1. 2. - 0000003  
DATE: 02/07/80 PAGES: 2  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Ted Groszkiewicz/DEQ  
DESCRIPTION: Memo-sludge dewatering lagoons monitoring with attached sampling data

2. 1. 2. - 0000006  
DATE: 03/30/82 PAGES: 4  
AUTHOR: Joseph Cummins/EPA  
ADDRESSEE: Gerald Bell/DEQ  
DESCRIPTION: Results of acute toxicity test conducted on process wastewater with attached sampling data

2. 1. 2. - 0000004  
DATE: 10/06/82 PAGES: 12  
AUTHOR: Gerald Bell/DEQ  
ADDRESSEE: See Document/Unknown  
DESCRIPTION: Results of toxicity bioassay and mixing zone survey to evaluate effluent upon receiving stream

2. 1. 2. - 0000005  
DATE: 12/28/82 PAGES: 4  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Additional split sample of treated effluent analysis with attached sampling data

2. 1. 2. - 0000007  
DATE: 06/03/85 PAGES: 16  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Jeanne Holmes/Radian Corporation  
DESCRIPTION: Sampling request for nonferrous metals with attached sampling data

2. 1. 2. - 0000008  
DATE: 06/21/85 PAGES: 19  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Kristyn Malina/Radian Analytical Services  
DESCRIPTION: EPA sampling reports for samples 88158-88169

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 2. - 0000009  
DATE: 09/16/85 PAGES: 32  
AUTHOR: Janet Goodwin/EPA  
ADDRESSEE: Chuck Knoll/TWCA  
DESCRIPTION: Analysis of wastewater samples collected by TWCA per EPA 3/19/85 request with attached sampling data

2. 1. 2. - 0000010  
DATE: 09/24/85 PAGES: 22  
AUTHOR: John Vidumsky/Radian Corporation  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Analysis of EPA samples 88158-88169

2. 1. 2. - 0000011  
DATE: 01/29/88 PAGES: 14  
AUTHOR: Joseph Cummins/EPA  
ADDRESSEE: Daniel Tangarone/EPA  
DESCRIPTION: Data report regarding results of effluent toxicity evaluation

SUB-HEAD: 2. 1. 3. Nonferrous Metals Industry Study and Final Trip Report

2. 1. 3. - 0000001  
DATE: 07/20/79 PAGES: 4  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Roger Jungclaus/Sverdrup Parcel and Associates, Inc.  
DESCRIPTION: Ammonia recovery plant data

2. 1. 3. - 0000002  
DATE: 06/19/80 PAGES: 13  
AUTHOR: Roger Jungclaus/Sverdrup Parcel and Associates, Inc.  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: EPA Final trip report with attached sampling data

2. 1. 3. - 0000003  
DATE: 08/20/80 PAGES: 3  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Roger Jungclaus/Sverdrup Parcel and Associates, Inc.  
DESCRIPTION: Review of Final trip report and sampling analytical results

SUB-HEAD: 2. 1. 4. Industrial Wastewater Sources of Total Organic Carbon

2. 1. 4. - 0000001  
DATE: 02/10/81 PAGES: 20  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Ted Groszkiewicz/DEQ  
DESCRIPTION: Study to evaluate unidentified total organic carbon sources with attached sampling data

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 2. 1. 5. Permits

2. 1. 5. - 0000001  
DATE: 03/26/75 PAGES: 6  
AUTHOR: Kessler Cannon and Verner Adkison/DEQ  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Waste discharge permit

2. 1. 5. - 0000002  
DATE: 01/13/77 PAGES: 2  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Figures-High resolution spectrum in the nitrogen 1s energy region

2. 1. 5. - 0000003  
DATE: 03/11/77 PAGES: 3  
AUTHOR: William Young/DEQ  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Addendum to waste permit 2012-J

2. 1. 5. - 0000004  
DATE: 04/03/78 PAGES: 1  
AUTHOR: William Young/DEQ  
ADDRESSEE: V. P. de Poix/TWCA  
DESCRIPTION: Addendum to waste permit 2012-J

2. 1. 5. - 0000010  
DATE: 07/14/78 PAGES: 5  
AUTHOR: Unknown/DEQ  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Public Notice and Fact Sheet with Notice of Public Hearing

2. 1. 5. - 0000005  
DATE: 10/24/78 PAGES: 12  
AUTHOR: Al Goodman/EPA  
ADDRESSEE: Chuck Findley/EPA  
DESCRIPTION: Memo regarding approval of attached proposed waste permit

2. 1. 5. - 0000006  
DATE: 10/31/78 PAGES: 8  
AUTHOR: William Young/DEQ  
ADDRESSEE: V. P. de Poix/TWCA  
DESCRIPTION: Review and approval by DEQ and EPA of waste permit with attached permit

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 5. - 0000007

DATE: 01/30/81 PAGES: 23

AUTHOR: Thomas Nelson/TWCA

ADDRESSEE: Charles Ashbaker/DEQ

DESCRIPTION: Completed EPA application forms 1 and 2c for new consolidated permit and for renewal of waste discharge permit 2849-J

2. 1. 5. - 0000008

DATE: 04/09/81 PAGES: 24

AUTHOR: Charles Knoll/TWCA

ADDRESSEE: Larry Patterson/DEQ

DESCRIPTION: Additional information to be included with consolidated permit application form 2c

2. 1. 5. - 0000009

DATE: 05/29/81 PAGES: 14

AUTHOR: William Young/DEQ

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Acknowledgement of consolidated application forms 1 and 2c and promulgation of effluent guidelines with attached waste discharge permit 2849-J

SUB-HEAD: 2. 1. 6. Violations/Penalty Assessments

2. 1. 6. - 0000001

DATE: 07/01/77 PAGES: 8

AUTHOR: William Young/DEQ

ADDRESSEE: V. P. de Poix/TWCA

DESCRIPTION: Stipulation and Final Order, Civil Penalties and compliance with effluent limitations

2. 1. 6. - 0000002

DATE: 12/27/79 PAGES: 5

AUTHOR: William Young/DEQ

ADDRESSEE: V. P. de Poix/TWCA

DESCRIPTION: Review of discharge monitoring reports and notation of violations with attached Notice of Assessment of Civil Penalty No. WQ-WVR-79-118

2. 1. 6. - 0000003

DATE: 06/23/80 PAGES: 6

AUTHOR: William Young/DEQ

ADDRESSEE: V. P. de Poix/TWCA

DESCRIPTION: Review of discharge monitoring reports for 3/80 and notation of violations with attached Notice of Assessment of Civil Penalty No. WQ-WVR-80-96

SUB-HEAD: 2. 1. 7. Compliance Inspection Reports

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 7. - 00000002  
DATE: 05/21/78 PAGES: 4  
AUTHOR: Unknown/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Compliance Inspection Report

2. 1. 7. - 00000001  
DATE: 06/07/78 PAGES: 8  
AUTHOR: Alan Goodman/EPA  
ADDRESSEE: Harold Geren/EPA  
DESCRIPTION: Audit of DEQ compliance monitoring inspection with attached compliance inspection report

2. 1. 7. - 00000003  
DATE: 09/15/81 PAGES: 5  
AUTHOR: Ted Groszkiewicz/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Compliance Inspection Report with attached letter from DEQ to TWCA

2. 1. 7. - 00000004  
DATE: 06/14/82 PAGES: 3  
AUTHOR: Bill Sobolewski/EPA  
ADDRESSEE: John Underwood/EPA  
DESCRIPTION: Audit of state compliance inspection with attached compliance inspection report

2. 1. 7. - 00000005  
DATE: 08/13/82 PAGES: 6  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Compliance inspection report

2. 1. 7. - 00000006  
DATE: 06/08/83 PAGES: 10  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Compliance inspection report

2. 1. 7. - 00000007  
DATE: 02/22/84 PAGES: 6  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Compliance inspection report

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 7. - 0000008  
DATE: 05/21/86 PAGES: 19  
AUTHOR: F. A. Skirvin/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Compliance inspection report

2. 1. 7. - 0000009  
DATE: 05/05/87 PAGES: 8  
AUTHOR: David St. Louis/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Compliance inspection report

2. 1. 7. - 0000010  
DATE: 07/29/87 PAGES: 1  
AUTHOR: Daniel Tangarone/EPA  
ADDRESSEE: Rick Parkin/EPA  
DESCRIPTION: Audits of compliance inspections

SUB-HEAD: 2. 1. 8. Best Available Treatment/Best Convention Technology

2. 1. 8. - 0000001  
DATE: 01/04/79 PAGES: 2  
AUTHOR: William Young/DEQ  
ADDRESSEE: Donald Dubois/EPA  
DESCRIPTION: BAT/BCT applicable to effluent limitations with attached EPA memo regarding BAT/BCT development

2. 1. 8. - 0000002  
DATE: 03/02/79 PAGES: 2  
AUTHOR: Edmund Struzeski/NEIC/EPA  
ADDRESSEE: Enforcement Director/EPA  
DESCRIPTION: BAT/BCT guidelines development for nonferrous metals industry

2. 1. 8. - 0000003  
DATE: 03/16/79 PAGES: 2  
AUTHOR: Robert Schaffer/EPA  
ADDRESSEE: Lloyd Reed/EPA  
DESCRIPTION: Request for BAT guidelines on zirconium-hafnium

2. 1. 8. - 0000004  
DATE: 04/26/79 PAGES: 1  
AUTHOR: Lloyd Reed/EPA  
ADDRESSEE: William Young/DEQ  
DESCRIPTION: Contract for development of effluent guidelines



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 8. - 00000005  
DATE: 05/14/79 PAGES: 1  
AUTHOR: J. Struzeski/NEIC/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Record of communication - Phone call from Roger Jungclaus, Sverdrup and Parcel, regarding sampling at TWCA

2. 1. 8. - 00000006  
DATE: 06/20/79 PAGES: 2  
AUTHOR: Alan Goodman/EPA  
ADDRESSEE: Pat Williams/EPA  
DESCRIPTION: Comments on Sverdrup and Parcel's proposed wastewater sampling plan

2. 1. 8. - 00000007  
DATE: 06/26/81 PAGES: 2  
AUTHOR: Harold Geren/EPA  
ADDRESSEE: Pat Williams/EPA  
DESCRIPTION: BAT effluent limitation guidelines for zirconium with attached letter from DEQ to EPA regarding Phase I and II BAT guidelines

SUB-HEAD: 2. 1. 9. Discharge Monitoring Reports

2. 1. 9. - 00000001  
DATE: 02/14/80 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Ken Ashbaker/DEQ  
DESCRIPTION: Discharge monitoring report for 1/80

2. 1. 9. - 00000002  
DATE: 03/14/80 PAGES: 7  
AUTHOR: C. R. Knoll/TWCA  
ADDRESSEE: C. Kent Ashbaker/DEQ  
DESCRIPTION: Discharge monitoring report for 2/80

2. 1. 9. - 00000003  
DATE: 05/15/80 PAGES: 8  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: C. Kent Ashbaker/DEQ  
DESCRIPTION: Discharge monitoring report for 4/80

2. 1. 9. - 00000004  
DATE: 04/15/85 PAGES: 2  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: David St. Louis/DEQ  
DESCRIPTION: Discharge monitoring report for 3/85

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 9. - 00000005  
DATE: 05/15/85 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: David St. Louis/DEQ  
DESCRIPTION: Discharge monitoring report for 4/85

2. 1. 9. - 00000006  
DATE: 06/14/85 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: David St. Louis/DEQ  
DESCRIPTION: Discharge monitoring report for 6/85

2. 1. 9. - 00000007  
DATE: 09/13/85 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Fritz Skirvin/DEQ  
DESCRIPTION: Discharge monitoring report for 8/85

2. 1. 9. - 00000008  
DATE: 10/11/85 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Fritz Skirvin/DEQ  
DESCRIPTION: Discharge monitoring report for 9/85

2. 1. 9. - 00000009  
DATE: 03/12/86 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Fritz Skirvin/DEQ  
DESCRIPTION: Discharge monitoring report for 2/86

2. 1. 9. - 00000010  
DATE: 07/10/86 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Fritz Skirvin/DEQ  
DESCRIPTION: Discharge monitoring report for 6/86

2. 1. 9. - 00000011  
DATE: 09/15/86 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Fritz Skirvin/DEQ  
DESCRIPTION: Discharge monitoring report for 8/86

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1. 9. - 0000012  
DATE: 11/17/86 PAGES: 2  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: F. A. Skirvin/DEQ  
DESCRIPTION: Letter re: error in 10/86 report in hydrogen cyanide values recorded for 9/86 with attached sampling data

2. 1. 9. - 0000013  
DATE: 01/01/88 PAGES: 11  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: Unknown/DEQ  
DESCRIPTION: Discharge monitoring report for 1/88

2. 1. 9. - 0000014  
DATE: 02/22/88 PAGES: 2  
AUTHOR: Kay Marcum/TWCA  
ADDRESSEE: F. A. Skirvin/DEQ  
DESCRIPTION: Letter re: error in 9/87 report in hydrogen cyanide values with attached sampling data

2. 1. 9. - 0000016  
DATE: 03/01/88 PAGES: 13  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: Unknown/DEQ  
DESCRIPTION: Discharge monitoring report for 3/88

2. 1. 9. - 0000015  
DATE: 03/14/88 PAGES: 12  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: F. A. Skirvin/DEQ  
DESCRIPTION: Discharge monitoring report for 2/88

2. 1. 9. - 0000017  
DATE: 04/01/88 PAGES: 10  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: Unknown/DEQ  
DESCRIPTION: Discharge monitoring report for 4/88

SUB-HEAD: 2. 1.10. Alternate Test Procedure for Cyanide

2. 1.10. - 0000001  
DATE: 11/19/86 PAGES: 141  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: Fred Hansen/DEQ  
DESCRIPTION: Application requesting approval of alternate test procedure for determination of total cyanide in wastewaters

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 1.10. - 0000002

DATE: 03/26/87 PAGES: 1

AUTHOR: Robert Courson/EPA

ADDRESSEE: Fred Hansen/DEQ

DESCRIPTION: Review of application for approval of alternate test procedure

SUB-HEAD: 2. 2. 1. Correspondence

2. 2. 1. - 0000001

DATE: 12/04/81 PAGES: 2

AUTHOR: Linda Dawson/EPA

ADDRESSEE: Charles Knoll/TWCA

DESCRIPTION: Review and revision of hazardous waste permit application

2. 2. 1. - 0000002

DATE: 01/15/82 PAGES: 2

AUTHOR: Charles Knoll/TWCA

ADDRESSEE: Linda Dawson/TWCA

DESCRIPTION: Amended waste permit application

2. 2. 1. - 0000003

DATE: 03/16/82 PAGES: 3

AUTHOR: Kenneth Feigner/EPA

ADDRESSEE: Thomas Nelson/TWCA

DESCRIPTION: Completion of processing information submitted in Part A permit application

2. 2. 1. - 0000004

DATE: 04/05/82 PAGES: 32

AUTHOR: Charles Knoll/TWCA

ADDRESSEE: Richard Reiter/DEQ

DESCRIPTION: Byproducts and waste residues which are ignitable hazardous materials with attached report entitled "Description of Ignitable Hazardous Wastes and Waste Management Procedures at Teledyne Wah Chang Albany."

2. 2. 1. - 0000005

DATE: 05/01/82 PAGES: 2

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Compliance inspection and Part A permit application with attached letter from DEQ to TWCA regarding hazardous waste inspection

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 1. - 0000006  
DATE: 07/29/83 PAGES: 2  
AUTHOR: Al Goodman/EPA  
ADDRESSEE: EPA Files/Unknown  
DESCRIPTION: Telephone use report re: conversation with Stan Sturges on DEQ on groundwater monitoring at sludge ponds and a fire on magnesium chloride pile

2. 2. 1. - 0000007  
DATE: 08/02/83 PAGES: 2  
AUTHOR: Alexandra B. Smith/EPA  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Formal request for Part B application

2. 2. 1. - 0000008  
DATE: 10/12/83 PAGES: 1  
AUTHOR: George Hofer/EPA  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Current hazardous waste management practices that do not meet permit standards

2. 2. 1. - 0000009  
DATE: 10/21/83 PAGES: 1  
AUTHOR: Paul Day/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Phone call record of call with Mike Flynn re: barium limits for soil in waste pile closure

2. 2. 1. - 0000010  
DATE: 10/21/83 PAGES: 1  
AUTHOR: Paul Day/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Phone call record w/Burnell Vincent re: significant contamination in groundwater monitoring wells

2. 2. 1. - 0000011  
DATE: 10/21/83 PAGES: 1  
AUTHOR: Paul Day/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Phone call record w/Al Geswein re: waste pile on old non-regulated sludge pond and floodplain standard

2. 2. 1. - 0000012  
DATE: 01/30/84 PAGES: 2  
AUTHOR: Paul Day/EPA  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Review of draft Part B application

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 1. - 0000013  
DATE: 02/29/84 PAGES: 2  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Submittal of Part B application to DEQ

2. 2. 1. - 0000014  
DATE: 03/26/84 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Paul Day/EPA  
DESCRIPTION: EPA visit and review of report regarding the treatment of industrial process wastewater discharges

2. 2. 1. - 0000015  
DATE: 06/08/84 PAGES: 2  
AUTHOR: Charles Findley/EPA  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Review of TWCA response to a Notice of Deficiency and Warning letter dated 4/6/84

2. 2. 1. - 0000016  
DATE: 06/25/84 PAGES: 2  
AUTHOR: William Hartford/DEQ  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Review and request for resubmittal of Part A application with corrections

2. 2. 1. - 0000017  
DATE: 07/17/84 PAGES: 4  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: George Hofer/EPA  
DESCRIPTION: Formal request to consider certain operations exempt from current EPA hazardous waste regulations

2. 2. 1. - 0000018  
DATE: 07/26/84 PAGES: 1  
AUTHOR: Charles Findley/EPA  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Acknowledgement of receipt of request to consider certain operations exempt

2. 2. 1. - 0000019  
DATE: 08/08/84 PAGES: 11  
AUTHOR: Richard Reiter/DEQ  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Request for exemption for thermal treatment smokehouse facility, water reaction vessels, and magnesium chloride pile from hazardous waste regulations with attached letter from TWCA to DEQ regarding request and Part A application

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 1. - 0000020  
DATE: 08/27/84 PAGES: 1  
AUTHOR: John Skinner/EPA  
ADDRESSEE: Charles Findley/EPA  
DESCRIPTION: Memo-Initiation of comprehensive and legal review of RCRA applicability to certain TWCA operations

2. 2. 1. - 0000021  
DATE: 01/17/85 PAGES: 4  
AUTHOR: Charles Findley/EPA  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Notification of 1984 amendments to RCRA

2. 2. 1. - 0000022  
DATE: 01/31/85 PAGES: 1  
AUTHOR: Paul Day/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Record of phone call from Chuck Knoll regarding mining exclusion

2. 2. 1. - 0000023  
DATE: 02/04/85 PAGES: 3  
AUTHOR: John Skinner/EPA  
ADDRESSEE: Charles Findley/EPA  
DESCRIPTION: Applicability of Subtitle C to TWCA

2. 2. 1. - 0000024  
DATE: 02/15/85 PAGES: 2  
AUTHOR: Charles Findley/EPA  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: EPA headquarters findings on RCRA applicability to TWCA

2. 2. 1. - 0000025  
DATE: 02/27/85 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Charles Findley/EPA  
DESCRIPTION: Ignitability of solid material

2. 2. 1. - 0000026  
DATE: 06/21/85 PAGES: 3  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: TWCA management plan

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 1. - 0000027  
DATE: 08/21/85 PAGES: 4  
AUTHOR: Charles Findley/EPA  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Results of ignitability testing of solid material samples from TWCA with attached letter from Research Triangle Institute to EPA regarding samples

2. 2. 1. - 0000028  
DATE: 09/12/85 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Charles Findley/EPA  
DESCRIPTION: Results of ignitability testing of solid material samples

2. 2. 1. - 0000029  
DATE: 11/08/85 PAGES: 1  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Dexter Hinckley/EPA  
DESCRIPTION: Review of proposed rule on mining waste exclusion

2. 2. 1. - 0000030  
DATE: 11/26/85 PAGES: 3  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Unknown/Washington DC  
DESCRIPTION: Comments on proposed mining waste exclusion rule

2. 2. 1. - 0000031  
DATE: 02/23/87 PAGES: 1  
AUTHOR: C. Parker/DEQ  
ADDRESSEE: Hazardous Waste Division/DEQ  
DESCRIPTION: Report of acid spill at TWCA

2. 2. 1. - 0000032  
DATE: 05/17/91 PAGES: 2  
AUTHOR: Charles E. Findley/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Results of technical evaluation performed by EPA to determine whether waste from the F006 electroplating operation was a component of sludges

2. 2. 1. - 0010010  
DATE: 08/15/91 PAGES: 136  
AUTHOR: Catherine Massimino/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Summary of review performed to determine whether sludges in Schmidt Lake and Lower River Solids Pond include the listed EPA hazardous waste No. F006



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 1. - 0011895  
DATE: 11/19/93 PAGES: 2  
AUTHOR: Ali Nikukar/Oregon Dept. of Environmental Quality  
ADDRESSEE: Charles R. Knoll/Teledyne Wah Chang  
DESCRIPTION: Letter discussing site visit conducted concerning RCRA Part B Permit Application

SUB-HEAD: 2. 2. 2. Permit Applications/Notifications of Hazardous Waste

2. 2. 2. - 0000001  
DATE: 11/18/80 PAGES: 8  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Notification of hazardous waste activity with attached letter, Charles Knoll to EPA, regarding modification of Notice of Hazardous Waste Activity

2. 2. 2. - 0000002  
DATE: 02/18/82 PAGES: 1  
AUTHOR: Linda Dawson/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Record of phone call from Charles Knoll regarding revision of Part A Application

2. 2. 2. - 0000003  
DATE: 03/05/82 PAGES: 1  
AUTHOR: Linda Dawson/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Record of phone call from Charles Knoll regarding incinerators listed in Part A application

2. 2. 2. - 0000004  
DATE: 03/09/82 PAGES: 1  
AUTHOR: Charles Knoll/Thomas Nelson/TWCA  
ADDRESSEE: Linda Dawson/EPA  
DESCRIPTION: Revisions in waste permit application

2. 2. 2. - 0000005  
DATE: 03/16/82 PAGES: 1  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Conditions of Operation During Interim Status (form)

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 2. - 0000006

DATE: 05/23/83 PAGES: 13

AUTHOR: Charles R. Knoll/TWCA

ADDRESSEE: Betty Weise/EPA

DESCRIPTION: RE: Notification of hazardous waste activity

2. 2. 2. - 0000007

DATE: 05/23/83 PAGES: 19

AUTHOR: Charles R. Knoll/TWCA

ADDRESSEE: Linda Dawson/EPA

DESCRIPTION: RE: Hazardous waste permit application

SUB-HEAD: 2. 2. 3. Compliance Inspection Reports

2. 2. 3. - 0000001

DATE: 10/01/81 PAGES: 22

AUTHOR: Donald A. Donaldson/TWCA?

ADDRESSEE: Glenn K. Rodenhurst/TWCA?

DESCRIPTION: RE: TWCA RCRA Compliance Inspection

2. 2. 3. - 0000002

DATE: 10/12/83 PAGES: 6

AUTHOR: George C. Hofer/EPA

ADDRESSEE: Thomas E. Nelson/TWCA

DESCRIPTION: RE: inspection conducted by Paul Day, TWCA, on Sept. 13, 1983

2. 2. 3. - 0000003

DATE: 02/19/86 PAGES: 28

AUTHOR: Laura Hamilton/Unknown

ADDRESSEE: Paul Day/EPA

DESCRIPTION: Inspection report of visit on 9/24-9/27/85 by DEQ

SUB-HEAD: 2. 2. 4. Treatment of Industrial Process Wastewater Discharges

2. 2. 4. - 0000001

DATE: 02/15/84 PAGES: 107

AUTHOR: Charles R. Knoll/TWCA

ADDRESSEE: Paul Day/EPA

DESCRIPTION: Treatment of Industrial Process Wastewater Discharges at Teledyne Wah Chang Albany

SUB-HEAD: 2. 2. 5. Violations/Penalty Assessments

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 5. - 0000001  
DATE: 08/25/83 PAGES: 8  
AUTHOR: Al/EPA  
ADDRESSEE: John Barich, Paul W./EPA  
DESCRIPTION: News article re: TWCA fined for industrial fire, letter from DEQ to  
TWCA re: the incident and Notice of Assessment of Civil Penalty

2. 2. 5. - 0000002  
DATE: 10/20/83 PAGES: 24  
AUTHOR: C. W. Rice/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Violation assessment with attached field trip report and facility  
inspection form

2. 2. 5. - 0011894  
DATE: 08/27/93 PAGES: 45  
AUTHOR: Stephanie Hallock/Oregon Dept. of Environmental Quality  
ADDRESSEE: Charles R. Knoll/Teledyne Wah Chang  
DESCRIPTION: Letter re: Second Partial Notice of Deficiency and Warning Letter  
for the Smokehouse Incinerator Unit Part B Application Dated  
December 1991 ORD 050 955 848

SUB-HEAD: 2. 2. 6. Sampling Data

2. 2. 6. - 0000001  
DATE: 08/15/79 PAGES: 2  
AUTHOR: Ted Groszkiewicz/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Possible sources of hazardous waste inventory

2. 2. 6. - 0000002  
DATE: 05/23/84 PAGES: 8  
AUTHOR: Stan Sturges/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Field sample data sheet with attached sampling analysis data

2. 2. 6. - 0000003  
DATE: 07/20/84 PAGES: 8  
AUTHOR: Unknown/Region 10 Lab-EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Laboratory analysis report for sludge, solid waste, and effluent  
samples

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 6. - 00000004

DATE: 07/20/84 PAGES: 7

AUTHOR: Unknown/Region 10 Lab-EPA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Laboratory analysis report for sludge, solid waste, and effluent samples

2. 2. 6. - 00000005

DATE: 07/24/84 PAGES: 25

AUTHOR: Unknown/Region 10 Lab-EPA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Laboratory analysis report for sludge, solid waste, and effluent samples

SUB-HEAD: 2. 2. 7. Quality Assurance/Quality Control (QA/QC) - Sampling

2. 2. 7. - 00000002

DATE: / / PAGES: 42

AUTHOR: L.C. Michael, R.L. Perritt and E.D. Pellizzari/Research Triangle

ADDRESSEE: Unknown/EPA

DESCRIPTION: Report "Laboratory Evaluation of Test Procedures for Use in the RCRA Hazardous Waste Ignitability Characteristic"

2. 2. 7. - 00000001

DATE: 06/05/84 PAGES: 8

AUTHOR: Stan Sturges/DEQ

ADDRESSEE: File/DEQ

DESCRIPTION: Memo-Description of sample methods used to collect samples identified on DEQ request for analysis with attached request for analysis and diagrams

SUB-HEAD: 2. 2. 8. Review of Waste Exclusion Petition

2. 2. 8. - 00000001

DATE: 10/26/84 PAGES: 41

AUTHOR: Stuart Haus/Mitre

ADDRESSEE: Angela Wilkes/EPA

DESCRIPTION: Review of waste exclusion petition with Attachment 1 regarding zirconium, hafnium, and titanium production. Attach. 2 re: wastes treated in smokehouse. Attach. 3 re: wastes treated in crucible burn pots. Attach. 4: ignitability of metal

SUB-HEAD: 2. 2. 9. Requests for Information and Responses

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2. 9. - 0000001  
DATE: 11/20/85 PAGES: 3  
AUTHOR: Charles Findley/EPA  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Request for information pursuant to Section 3007 of RCRA regarding hazardous waste land disposal units that had interim status before 11/8/85, and/or stored hazardous waste after 11/19/80.

2. 2. 9. - 0000002  
DATE: 12/13/85 PAGES: 6  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Kenneth Feigner/EPA  
DESCRIPTION: Response to request for information dated 11/20/85 with attached letter dated 11/20/85 from EPA to TWCA, and letter dated 7/26/85 from Research Triangle Institute to EPA

SUB-HEAD: 2. 2.10. Magnesium Chloride Treatment Process

2. 2.10. - 0000003  
DATE: 10/03/83 PAGES: 23  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: John Borden/Oregon Department of Environmental Quality  
DESCRIPTION: Transmittal letter-Information package on process for recovery of recyclable materials from the magnesium resource recovery pile (Document located in confidential portion of record at EPA Region 10, Seattle, WA)

2. 2.10. - 0000004  
DATE: 10/19/83 PAGES: 3  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Review and conditional approval of information package on process for recovery of recyclable materials from the magnesium resource recovery pile (Document located in confidential portion of record at EPA Region 10, Seattle, WA)

2. 2.10. - 0000005  
DATE: 10/26/83 PAGES: 5  
AUTHOR: Thomas Nelson/TWCA  
ADDRESSEE: John Borden/DEQ  
DESCRIPTION: Response to review and conditional approval of information package on process for recovery of recyclable materials (Document located in confidential portion of record at EPA Region 10, Seattle, WA)

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2.10. - 00000006  
DATE: 11/03/83 PAGES: 1  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Modification to information package on process for recovery of recyclable materials (Document located in confidential portion of record at EPA Region 10, Seattle, WA)
2. 2.10. - 00000007  
DATE: 01/05/84 PAGES: 56  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Stanley Sturges/DEQ  
DESCRIPTION: Transmittal letter-Information and engineering specifications on the installation and operation of 1st phase, process to recover recyclable materials (Document located in confidential portion of record at EPA Region 10, Seattle, WA)
2. 2.10. - 00000008  
DATE: 02/07/84 PAGES: 3  
AUTHOR: David St. Louis/DEQ  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Notice of intent to Construct and Request for Construction Approval (Document located in confidential portion of record at EPA Region 10, Seattle, WA)
2. 2.10. - 00000009  
DATE: 05/22/84 PAGES: 3  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Paul Day/EPA  
DESCRIPTION: Transmittal letter/Photographs taken on 3/20/84 in the smokehouse thermal treatment facility (Document located in confidential portion of record at EPA Region 10, Seattle, WA)
2. 2.10. - 00000010  
DATE: 07/09/84 PAGES: 1  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Charles Knoll/TWCA  
DESCRIPTION: Final process procedure details and associated trial data for recovery process for recyclable materials from the magnesium resource recovery pile (Document located in confidential portion of record at EPA Region 10, Seattle, WA)
2. 2.10. - 00000011  
DATE: 07/27/84 PAGES: 7  
AUTHOR: John Bohmker/TWCA  
ADDRESSEE: Stanley Sturges/DEQ  
DESCRIPTION: Transmittal ltr/Information and specifications on installation and operation of the process for recyclable materials from the magnesium resource recovery pile (Document located in confidential portion of record at EPA Region 10, Seattle, WA)

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2.10. - 0000012  
DATE: 10/24/84 PAGES: 3  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Chuck Knoll/TWCA  
DESCRIPTION: Notice of Intent to Construct and Request for Construction Approval  
(Document located in confidential portion of record at EPA Region  
10, Seattle, WA)

2. 2.10. - 0000013  
DATE: 01/17/85 PAGES: 11  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Stanley Sturges/DEQ  
DESCRIPTION: Monthly reports on process for 10/84 and 11/84 (Document located  
in confidential portion of record at EPA Region 10, Seattle, WA)

2. 2.10. - 0000014  
DATE: 04/04/85 PAGES: 16  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: David St. Louis/DEQ  
DESCRIPTION: Transmittal letter/Monthly reports on process for 12/84, 1/85 and  
2/85 (Document located in confidential portion of record at EPA  
Region 10, Seattle, WA)

2. 2.10. - 0000015  
DATE: 06/25/85 PAGES: 11  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: David St. Louis/DEQ  
DESCRIPTION: Transmittal letter/Monthly reports on process for 3/85, 4/85  
(Document located in confidential portion of record at EPA Region  
10, Seattle, WA)

2. 2.10. - 0000001  
DATE: 08/23/85 PAGES: 5  
AUTHOR: Laura Hamilton/DEQ  
ADDRESSEE: Paul Day/EPA  
DESCRIPTION: Letter re: rocks recovered from magnesium pile and treated with  
sodium sulfate with attached letter from DEQ to TWCA dated 8/21/85,  
letter from TWCA to DEQ dated 8/2/85, and sampling data

2. 2.10. - 0000002  
DATE: 09/18/85 PAGES: 4  
AUTHOR: Laura Hamilton/DEQ  
ADDRESSEE: Chuck Knoll/TWCA  
DESCRIPTION: Transmittal letter-Inspection report of rock treatment process and  
conclusion of regulatory status of rocks

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 2.10. - 0000016

DATE: 11/13/85 PAGES: 16

AUTHOR: Charles Knoll/TWCA

ADDRESSEE: F. A. Skirvin/DEQ

DESCRIPTION: Transmittal letter/Monthly reports on process for 5/85, 6/85, 7/85  
(Document located in confidential portion of record at EPA Region  
10, Seattle, WA)

2. 2.10. - 0000017

DATE: 01/01/86 PAGES: 19

AUTHOR: Unknown/TWCA

ADDRESSEE: Unknown/DEQ

DESCRIPTION: Transmittal letter/Monthly report on process for 1/86 (Document  
located in confidential portion of record at EPA Region 10,  
Seattle, WA)

2. 2.10. - 0000018

DATE: 02/01/86 PAGES: 27

AUTHOR: Unknown/CH2M Hill

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Report entitled "Field Trial for Land Application of Magnesium  
Resource Recovery Process Residue" (Document located in  
confidential portion of record at EPA Region 10, Seattle, WA)

2. 2.10. - 0000019

DATE: 01/30/87 PAGES: 49

AUTHOR: Charles Knoll/TWCA

ADDRESSEE: F. A. Skirvin/DEQ

DESCRIPTION: Monthly reports for process for 3-8/86 (Document located in  
confidential portion of record at EPA Region 10, Seattle, WA)

SUB-HEAD: 2. 2.11. RCRA/CERCLA Relationship

2. 2.11. - 1025007

DATE: 04/06/93 PAGES: 22

AUTHOR: Unknown/U. S. Court of Appeals for the Tenth Circuit

ADDRESSEE: Unknown/Unknown

DESCRIPTION: 15th Opinion of Level 2 printed in FULL format from LEXIS U.S.A.  
v. State of Colorado, et al...at issue is whether a state  
authorized by EPA to carry out state's haz. waste program ...is  
precluded from doing so at ...facility...on NPL

SUB-HEAD: 2. 3. 1. Correspondence



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 3. 1. - 0000001  
DATE: 01/14/76 PAGES: 1  
AUTHOR: Mark Hooper/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Notes, Study of possible fugitive pollutants that may contribute to ambient pollutant levels that exceed regulations

2. 3. 1. - 0000002  
DATE: 04/06/76 PAGES: 1  
AUTHOR: Larry Sims/EPA  
ADDRESSEE: Mark Hooper/EPA  
DESCRIPTION: Inspection of TWCA facilities from various locations outside the plant fence

2. 3. 1. - 0000003  
DATE: 08/14/85 PAGES: 5  
AUTHOR: Dave/DEQ  
ADDRESSEE: Fritz/DEQ  
DESCRIPTION: Memo-"Mercaptan like" odor with attached pollution complaints

2. 3. 1. - 0000007  
DATE: 03/01/87 PAGES: 1  
AUTHOR: Thomas Hall/Unknown  
ADDRESSEE: Lloyd Kostow/DEQ  
DESCRIPTION: Letter/New permit for air pollutant emissions

2. 3. 1. - 0000004  
DATE: 03/12/87 PAGES: 1  
AUTHOR: Ole Anderson/Unknown  
ADDRESSEE: Unknown/DEQ  
DESCRIPTION: Letter re: air pollutant emissions

2. 3. 1. - 0000005  
DATE: 03/20/87 PAGES: 1  
AUTHOR: Jean Hale/Unknown  
ADDRESSEE: Unknown/DEQ  
DESCRIPTION: Postcard: Request for correct chemical name for an organic solvent

2. 3. 1. - 0000006  
DATE: 03/23/87 PAGES: 2  
AUTHOR: Bryan Ford/Unknown  
ADDRESSEE: Unknown/DEQ  
DESCRIPTION: Letter re: new permit for air pollutant emissions

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 3. 1. - 0000008  
DATE: 04/27/87 PAGES: 2  
AUTHOR: Lloyd Kostow/DEQ  
ADDRESSEE: Bryan Ford/Unknown  
DESCRIPTION: Letter/Response to comments on new permit for air pollutant emissions

SUB-HEAD: 2. 3. 2. Order Confirming Compliance Agreement

2. 3. 2. - 0000001  
DATE: 02/25/72 PAGES: 5  
AUTHOR: Harry Carson/Mid-Willamette Valley Air Pollution Authority  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Order confirming compliance agreement

SUB-HEAD: 2. 3. 3. Compliance Inspection Reports

2. 3. 3. - 0000001  
DATE: 09/23/75 PAGES: 3  
AUTHOR: Norm Edmisten/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Compliance inspection conducted on 9/23/75

2. 3. 3. - 0000002  
DATE: 01/06/77 PAGES: 11  
AUTHOR: Unknown/DEQ  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Review of compliance status of TWCA

2. 3. 3. - 0000003  
DATE: 07/03/79 PAGES: 1  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Notes, Compliance Inspection

2. 3. 3. - 0000004  
DATE: 06/10/81 PAGES: 1  
AUTHOR: Berger/Jim Herlihy/DEQ/EPA-Oregon Ops Office  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Air pollution source inspection CDS update report

2. 3. 3. - 0000005  
DATE: 09/15/82 PAGES: 4  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Notes/TWCA plant processes

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 3. 3. - 0000006

DATE: 02/16/83 PAGES: 1

AUTHOR: Jim Herlihy/Stan Sturges/EPA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Air pollution source inspection CDS update report

2. 3. 3. - 0000007

DATE: 06/25/84 PAGES: 6

AUTHOR: Stanley Sturges/DEQ

ADDRESSEE: Ed Riggs/TWCA

DESCRIPTION: Letter RE: compliance with air contaminant discharge permit with attached Source Inspection Form and DEQ interoffice memo regarding air quality inspection

2. 3. 3. - 0000008

DATE: 06/26/84 PAGES: 7

AUTHOR: Paul Boys/EPA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Compliance Inspection Report with attached handwritten notes and diagrams

2. 3. 3. - 0000009

DATE: 06/27/84 PAGES: 1

AUTHOR: Paul Boys/EPA

ADDRESSEE: Mike Johnston/EPA

DESCRIPTION: Memo re: compliance inspection

SUB-HEAD: 2. 3. 4. Air Quality Compliance Study

2. 3. 4. - 0000001

DATE: 07/30/76 PAGES: 3

AUTHOR: Technology Division/GCA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Proposed Scope of Work

2. 3. 4. - 0000002

DATE: 11/03/76 PAGES: 6

AUTHOR: Norm Edmisten/EPA

ADDRESSEE: Mark Hooper/EPA

DESCRIPTION: Scope of Work for air quality study and control strategy development

2. 3. 4. - 0000003

DATE: 12/23/76 PAGES: 6

AUTHOR: Norm Edmisten/EPA

ADDRESSEE: George Hofer, Clark Gaulding, Mark Hooper/EPA

DESCRIPTION: Proposed Scope of Work for aerometric study

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 3. 4. - 0000004  
DATE: 12/29/76 PAGES: 7  
AUTHOR: Myra Cypser/EPA  
ADDRESSEE: Norm Edmisten/EPA  
DESCRIPTION: Revised contract for air quality study

2. 3. 4. - 0000005  
DATE: 01/02/77 PAGES: 2  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Air quality compliance study

2. 3. 4. - 0000006  
DATE: 01/19/77 PAGES: 4  
AUTHOR: William Young/DEQ  
ADDRESSEE: Donald Dubois/EPA  
DESCRIPTION: Acceptance of attached Scope of Work

2. 3. 4. - 0000007  
DATE: 09/30/77 PAGES: 77  
AUTHOR: David Gunter, David Lynn, Arthur Werner/GCA  
ADDRESSEE: Unknown/EPA/Washington DC  
DESCRIPTION: Report-"Millersburg Industrial Complex Air Quality and Compliance Study, Task 1, Data Analysis and Survey Design"

SUB-HEAD: 2. 3. 5. Citizens for a Clean Environment Data Submittal

2. 3. 5. - 0000001  
DATE: 04/01/77 PAGES: 43  
AUTHOR: Mark Hooper/EPA  
ADDRESSEE: George Hofer/EPA  
DESCRIPTION: Memo and information from Citizens for a Clean Environment regarding sulfur dioxide, sulfur trioxide, hydrochloric acid emissions

2. 3. 5. - 0000002  
DATE: 04/04/77 PAGES: 3  
AUTHOR: Mark Hooper/EPA  
ADDRESSEE: George Hofer/EPA  
DESCRIPTION: Memo and article "Predicting Dew Points of Flue Grass" used by Citizens for a Clean Environment

SUB-HEAD: 2. 3. 6. Air Contaminant Discharge Permit

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 3. 6. - 0000001

DATE: 07/03/78 PAGES: 4

AUTHOR: F. A. Skirvin/DEQ

ADDRESSEE: Donald Dubois/EPA

DESCRIPTION: Transmittal letter/Air Contaminant Discharge Permit 22-0547

SUB-HEAD: 2. 3. 7. Fugitive Emission Assessment Control Strategy

2. 3. 7. - 0000001

DATE: 03/31/79 PAGES: 65

AUTHOR: Peter Spawn/GCA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Report - "Millersburg: Fugitive Emission Assessment and Control Strategy Development"

SUB-HEAD: 2. 4. 1. Notice of Noncompliance

2. 4. 1. - 0000001

DATE: 10/30/80 PAGES: 12

AUTHOR: Marshall Parrott/DEQ

ADDRESSEE: R. T. VanSanten/TWCA

DESCRIPTION: Letter/Failure of uranium extraction process in removal of uranium from waste effluent, attached radioactive materials license, maps, sampling data, notes re: chlorinator residue pile, DEQ memo re: insufficiency of monitoring at site

SUB-HEAD: 2. 4. 2. Historical Data and Reports

2. 4. 2. - 1025005

DATE: 07/01/77 PAGES: 28

AUTHOR: Unknown/Oregon State Health Division

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Preliminary Report : Radiological Aspects of Wah Chang Operations

2. 4. 2. - 1025006

DATE: 08/01/77 PAGES: 4

AUTHOR: Unknown/Oregon State Health Division

ADDRESSEE: Unknown/Unknown

DESCRIPTION: "Oregon Health" newsletter entitled "Wah-Ching Wah Chang"

SUB-HEAD: 2. 5. 1. Status Reports On Compliance with PCB Regulations

2. 5. 1. - 0000002

DATE: 01/01/81 PAGES: 5

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Equipment in building 23 and 75 containing PCB

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 5. 1. - 0000001  
DATE: 01/13/81 PAGES: 4  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Equipment containing PCB

2. 5. 1. - 0000003  
DATE: 01/01/82 PAGES: 5  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Equipment in building 23 and 75 containing PCB

2. 5. 1. - 0000004  
DATE: 12/16/82 PAGES: 4  
AUTHOR: Charles Knoll/TWCA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Corrective action to bring TWCA into compliance with PCB regulations, attached letter dated 6/29/83 from EPA to TWCA re: PCB reports for 1982

SUB-HEAD: 2. 5. 2. PCB Inspection Reports

2. 5. 2. - 0000001  
DATE: 08/27/82 PAGES: 7  
AUTHOR: Unknown/TWCA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: PCB Transformer maintenance reports for 1/82-8/82

2. 5. 2. - 0000002  
DATE: 08/31/82 PAGES: 6  
AUTHOR: Alan Goodman/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: PCB inspection narrative

2. 5. 2. - 0000003  
DATE: 08/31/82 PAGES: 1  
AUTHOR: Alan Goodman/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Investigation summary

SUB-HEAD: 2. 5. 3. Violation Assessments

2. 5. 3. - 0000001  
DATE: 08/31/82 PAGES: 1  
AUTHOR: Alan Goodman/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Violation assessment

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 2. 5. 4. Notice Letters and Responses

2. 5. 4. - 0000001  
DATE: 08/31/82 PAGES: 1  
AUTHOR: Alan Goodman/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Notice of inspection

2. 5. 4. - 0000002  
DATE: 11/18/82 PAGES: 3  
AUTHOR: Alexandra B. Smith/EPA  
ADDRESSEE: V. P. de Poix/TWCA  
DESCRIPTION: Noncompliance with PCB regulations

2. 5. 4. - 0000003  
DATE: 12/17/82 PAGES: 1  
AUTHOR: Donald Donaldson/EPA  
ADDRESSEE: Thomas Nelson/TWCA  
DESCRIPTION: Response letter/Notice of Noncompliance dated 11/18/82

SUB-HEAD: 2. 6. 1. Correspondence

2. 6. 1. - 0000001  
DATE: 08/31/82 PAGES: 3  
AUTHOR: Chris Wheeler/Water Resources Dept./Oregon State  
ADDRESSEE: Frank Ostrander/Dan Godard/Dept of Justice/Dept of Energy  
DESCRIPTION: Letter re: closure of lower solids pond site

2. 6. 1. - 0000002  
DATE: 09/29/82 PAGES: 3  
AUTHOR: Hussein Aldis/Ecology & Environment, Inc.  
ADDRESSEE: Bob Poss/EPA  
DESCRIPTION: Memo-Application to Oregon Energy Facility Siting Council (EFSC)  
for onsite disposal of low-level radioactive materials

2. 6. 1. - 0000003  
DATE: 09/29/82 PAGES: 8  
AUTHOR: Al Goodman/EPA  
ADDRESSEE: Bob Poss/EPA  
DESCRIPTION: Memo-Applicability of RCRA to low-level radioactive materials with  
attached handwritten notes and sampling data

SUB-HEAD: 2. 6. 2. Application Hearing

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 6. 2. - 0000007  
DATE: / / PAGES: 0  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Site Certification Application (Document located at Oregon Department of Energy Facility Siting Council)

2. 6. 2. - 0000001  
DATE: 08/27/82 PAGES: 13  
AUTHOR: David Stewart-Smith/Oregon Dept of Human Resources  
ADDRESSEE: Frank Ostrander/Donald Godard/Dept of Justice/Dept of Energy  
DESCRIPTION: Transmittal letter-Answers to questions posed by hearing officers at 8/16/82 hearing

2. 6. 2. - 0000002  
DATE: 08/31/82 PAGES: 6  
AUTHOR: David Stewart-Smith/Oregon Dept of Human Resources  
ADDRESSEE: Frank Ostrander/Donald Godard/Dept of Justice/Dept of Energy  
DESCRIPTION: Transmittal letter-Completion of answers to questions posed by hearing officers at 8/16/82 hearing

2. 6. 2. - 0000003  
DATE: 09/01/82 PAGES: 9  
AUTHOR: Stanley Sturges/DEQ  
ADDRESSEE: Frank Ostrander/Donald Godard/Dept of Justice/Dept of Energy  
DESCRIPTION: Transmittal letter- Answers to questions posed by hearing officers at 8/16/82 hearing

2. 6. 2. - 0000004  
DATE: 09/29/82 PAGES: 2  
AUTHOR: M. H. Hooper/EPA  
ADDRESSEE: R. A. Poss/EPA  
DESCRIPTION: Preparation for 10/82 hearing regarding waste sludge

2. 6. 2. - 0000005  
DATE: 09/30/82 PAGES: 3  
AUTHOR: Edward Cowan/Unknown  
ADDRESSEE: Bob Poss/EPA  
DESCRIPTION: Radiological aspects of site certification

2. 6. 2. - 0000006  
DATE: 10/19/82 PAGES: 2  
AUTHOR: John Spencer/EPA  
ADDRESSEE: Frank Ostrander/Donald Godard/DOJ/DOE  
DESCRIPTION: Compatability of CERCLA and RCRA with proposed onsite disposal of low-level radioactive materials



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 2. 6. 3. Groundwater Management Study

2. 6. 3. - 0000001

DATE: 07/09/82 PAGES: 20

AUTHOR: Unknown/CH2M Hill

ADDRESSEE: Charles Knoll/TWCA

DESCRIPTION: Technical review of TWCA groundwater management program

SUB-HEAD: 2. 6. 4. Radon Studies (Battelle)

2. 6. 4. - 0000001

DATE: 06/09/82 PAGES: 32

AUTHOR: H.D. Freeman/J.N. Hartley/Battelle

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Study-"Radon Exhalation From Old-Lime Solid Waste"

2. 6. 4. - 0000002

DATE: 08/01/85 PAGES: 4

AUTHOR: J.N. Hartley/H.D. Freeman/G.W. Gee/Battelle

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Study-"Analysis of Radon Release from TWCA Old-Lime Solid Waste and Oar Air Pathway Exemption"

2. 6. 4. - 0000003

DATE: 12/01/85 PAGES: 4

AUTHOR: J.N. Hartley/H.D. Freeman/G.W. Gee/M.R. Toland/Battelle

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Supplement 1 to study cited as document 2.6.4-0002

2. 6. 4. - 0000004

DATE: 01/01/86 PAGES: 106

AUTHOR: J. N. Hartley/Battelle

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Analysis of Radon Release from TWCA Old-Lime Solid Waste and OAR Air Pathway Exemption-Supplement 2

SUB-HEAD: 2. 6. 5. Final Order/Site Certificate

2. 6. 5. - 0000001

DATE: 12/15/82 PAGES: 73

AUTHOR: Allen Nistad/EFSC

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Final Order and Site Certificate with attached Appendices and Certificate of Service

SUB-HEAD: 2. 7. 1. Toxic Substance Reduction Plan

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

2. 7. 1. - 1004001

DATE: 03/15/93 PAGES: 28

AUTHOR: Noel L. Vaughn/Teledyne Wah Chang

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Cover letter and enclosed copy of TWCA's Toxic Substances Reduction Plan

2. 7. 1. - 0011893

DATE: 12/14/93 PAGES: 49

AUTHOR: Charles R. Knoll/TWC

ADDRESSEE: /

DESCRIPTION: Hazardous Waste Minimization Plan Teledyne Wah Chang Albany  
Revision Date 12/14/93

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 3. 0. . REMEDIAL INVESTIGATION - ENTIRE SITE

SUB-HEAD: 3. 1. . Correspondence

3. 1. . - 0000009

DATE: 06/12/87 PAGES: 2

AUTHOR: Neil Thompson/EPA

ADDRESSEE: Tom Nelson/TWCA

DESCRIPTION: Comments on "Preliminary Engineering Report on Permanent Lime Solids Containment for Teledyne Wah Chang Albany"

3. 1. . - 0000001

DATE: 07/20/87 PAGES: 5

AUTHOR: Kenneth Bird/TWCA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Review of Remedial Action Master Plan (RAMP)

3. 1. . - 0000002

DATE: 07/20/87 PAGES: 1

AUTHOR: Kenneth Bird/TWCA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Request for copies of two reports referenced in RAMP

3. 1. . - 0000003

DATE: 07/30/87 PAGES: 1

AUTHOR: Kenneth Bird/TWCA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Transmittal of work plan for remedial investigation/feasibility study (RI/FS) and acceleration of portion of RI/FS relating to Schmidt Lake and Lower River Solids Pond

3. 1. . - 1025004

DATE: 09/16/87 PAGES: 2

AUTHOR: Jerry Leitch/EPA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Memo re: RI/FS review

3. 1. . - 0000004

DATE: 10/29/87 PAGES: 1

AUTHOR: Kenneth Bird/TWCA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Utilization of TWCA analytical facilities during RI/FS

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 1. . - 0000005  
DATE: 12/01/87 PAGES: 1  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Ken Bird/TWCA  
DESCRIPTION: Proposed schedule for submittal of revised work plan

3. 1. . - 0000006  
DATE: 03/02/88 PAGES: 2  
AUTHOR: Kenneth Bird/TWCA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Installation of treatment system to reduce fluoride discharges per established effluent limitation guidelines with attached map

3. 1. . - 0000007  
DATE: 04/14/88 PAGES: 1  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Barry Towns/EPA  
DESCRIPTION: Request for quality assurance/quality control (QA/QC) audit of TWCA facility

3. 1. . - 1025002  
DATE: 08/01/88 PAGES: 2  
AUTHOR: Kenneth W. Bird/Teledyne Wah Chang  
ADDRESSEE: Neil E. Thompson/EPA  
DESCRIPTION: Letter re: Order on Consent

3. 1. . - 0000008  
DATE: 08/09/88 PAGES: 4  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: File/EPA  
DESCRIPTION: Approval process for work plan

3. 1. . - 1025003  
DATE: 10/21/88 PAGES: 1  
AUTHOR: Charles R. Knoll/Teledyne Wah Chang  
ADDRESSEE: F. A. Skirvin/Oregon Dept. of Environmental Quality  
DESCRIPTION: Letter notifying of intentions to eliminate a source seepage originating from solids settling and storage pond No. 1

3. 1. . - 1025034  
DATE: 01/09/89 PAGES: 2  
AUTHOR: Chip Humphrey/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Cover letter and attached specific comments on the RI/FS Workplan

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 1. . - 1025033  
DATE: 01/27/89 PAGES: 2  
AUTHOR: Neil E. Thompson/EPA  
ADDRESSEE: Ken Bird/Teledyne Wah Chang Albany  
DESCRIPTION: Letter approving TWCA RI/FS Workplan with some conditions or changes
3. 1. . - 0000010  
DATE: 06/19/90 PAGES: 2  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Commitment to submission of various reports and request that EPA amend Consent Order to reflect any changes
3. 1. . - 0000011  
DATE: 06/28/90 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Notification of EPA's objection to May 1990 Progress Report (SEE 3.5-0008)
3. 1. . - 0000012  
DATE: 06/29/90 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Notification that TWCA's intent to drill on 7/2/90 may be in violation of the Order on Consent (SEE 3.4.6.-0002)
3. 1. . - 0000013  
DATE: 08/02/90 PAGES: 1  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Formal notification of the start of Phase 2 drilling and monitoring well installation
3. 1. . - 1025001  
DATE: 02/15/91 PAGES: 2  
AUTHOR: Charles R. Knoll/Teledyne Wah Chang  
ADDRESSEE: Ted Hopkins/Oregon Dept. of Environmental Quality  
DESCRIPTION: Letter re: Action to Prevent the Potential Release of Corrosive Liquid in the Feed Makeup Process Area
3. 1. . - 0010011  
DATE: 07/15/91 PAGES: 3  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Responses to EPA Comments (dated 5/24/91) re: Phase 2 Work Plan, Soil Sampling Sections

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 1. . - 0010012  
DATE: 08/08/91 PAGES: 2  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter proposing revisions to Surface Water and Sediment Sampling and Analysis Plan
3. 1. . - 0010013  
DATE: 09/24/91 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comment and conditional approval letter on the "Sampling and Analysis Plan, Soil Gas Survey, Addendum 8 to the RI/FS Sampling and Analysis Plan, Teledyne Wah Chang Albany, Revision 1"
3. 1. . - 0010014  
DATE: 09/25/91 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comment and conditional approval letter for "Sampling and Analysis Plan, PCB Source Characterization, Addendum 9 to the RI/FS Sampling and Analysis Plan, Teledyne Wah Chang Albany"
3. 1. . - 0010015  
DATE: 09/30/91 PAGES: 2  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Response to the EPA's Comments on the "Sampling and Analysis Plan, PCB Source Characterization, Addendum 9 to the RI/FS Sampling Plan"
3. 1. . - 0010016  
DATE: 10/04/91 PAGES: 3  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comments to the "Sampling and Analysis Plan, Surface and Subsurface Soils Investigation, Addendum 10 to the RI/FS Sampling and Analysis Plan"
3. 1. . - 0010017  
DATE: 11/12/91 PAGES: 1  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Preliminary Findings of Phase 2 Soil Investigation

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 1. . - 0010018  
DATE: 11/15/91 PAGES: 1  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Air Permeability Testing in Support of the TWCA FS
3. 1. . - 0010019  
DATE: 11/22/91 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter re: Air Permeability Testing in Support of Feasibility Study
3. 1. . - 0010020  
DATE: 11/26/91 PAGES: 2  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter transmitting and commenting on the "Interim Toxicity Assessment"
3. 1. . - 0010021  
DATE: 01/22/92 PAGES: 2  
AUTHOR: John Kane/Science Applications International Corp. (SAIC)  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Synopsis of SAIC/TSC's soil gas split sampling and oversight activities at the Teledyne Wah Chang site during the week of 9/16/91
3. 1. . - 0010022  
DATE: 02/27/92 PAGES: 3  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter re: Lower River Solids Pond and Schmidt Lake, and requesting that TWC submit a detailed Work Plan to EPA and DEQ within 30 days of receipt of letter
3. 1. . - 0010023  
DATE: 03/10/92 PAGES: 1  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter transmitting Addendum 15 to the "RI/FS Sampling Plan, Geophysical Survey in Solids Area"
3. 1. . - 0010024  
DATE: 03/18/92 PAGES: 2  
AUTHOR: David Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Response to Comments - PCB Source Delineation, Round Two

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3. 1. . - 0010025  
DATE: 03/25/92 PAGES: 2  
AUTHOR: David Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter clarifying the status of characterization of soils and groundwater in the area of Schmidt Lake and Lower River Solids Pond
3. 1. . - 0010026  
DATE: 04/06/92 PAGES: 2  
AUTHOR: David Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Responses to Comments - Sampling and Analysis Plan for Geophysical Survey in Solids Area at Teledyne Wah Chang Albany
3. 1. . - 0010027  
DATE: 04/14/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Response to request for EPA's approval of the SAPs for Lower River Solids Pond and Schmidt Lake
3. 1. . - 0010028  
DATE: 05/05/92 PAGES: 6  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comments on the "Final Draft, Risk Assessment Interim Deliverable, Exposure Assessment", includes comments on preliminary remediation goals for the site
3. 1. . - 0010029  
DATE: 05/21/92 PAGES: 5  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Response to EPA/DEQ Comments on Exposure Assessment
3. 1. . - 0010030  
DATE: 06/03/92 PAGES: 8  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter providing information on Phase II RI oversight sampling activities
3. 1. . - 0010031  
DATE: 06/05/92 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter stating that Draft RI/FS is due to EPA on 9/25/92



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3. 1. . - 0010032  
DATE: 06/15/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter re: Sample Specific Risk Assessment
3. 1. . - 0010033  
DATE: 06/23/92 PAGES: 1  
AUTHOR: David Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter re: PCB Source Investigation and Removal, response to request for notification of TWC's plans to locate and removal the source of oil
3. 1. . - 0010034  
DATE: 06/25/92 PAGES: 3  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter re: concerns and comments which must be addressed before the PCB Source Investigation Plan can be implemented
3. 1. . - 0010035  
DATE: 06/30/92 PAGES: 1  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter re: Scope of the Teledyne Wah Chang Feasibility Study
3. 1. . - 0010036  
DATE: 08/14/92 PAGES: 1  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter requesting extension of due date for the RI/FS Report from 9/25 to 10/16/92
3. 1. . - 1004002  
DATE: 03/26/93 PAGES: 1  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter for Revised Draft Final Remedial Investigation/Feasibility Study Report
3. 1. . - 0011889  
DATE: 06/01/93 PAGES: 1  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter confirming that TWC will begin external radiation monitoring in accordance with the Sampling and Analysis Plan

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3. 1. . - 0011888  
DATE: 06/23/93 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Catherine Krueger/EPA  
DESCRIPTION: Memorandum re: Teledyne Wah Chang Attempts by EPA at Resolving Data Gaps and Deficiencies in RI/FS
3. 1. . - 0011892  
DATE: 07/26/93 PAGES: 15  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter re: July 15, 1992 Response to EPA Comments on the Biota Investigation Report Your July 16, 1993 Clarification Letter/Ecological Assessment Comments
3. 1. . - 0011890  
DATE: 09/01/93 PAGES: 1  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter requesting complete cost breakdown for each remedial action cost element contained within the Alternative 7 Estimated Costs, requesting Risk Assessment information, data, and calculations used in the formulation of Alternative 7
3. 1. . - 0011887  
DATE: 09/07/93 PAGES: 6  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Response to Vaughn's 9/1/93 letter, addressing request for time at public meeting and cost breakdown of the Proposed Alternative
3. 1. . - 0011891  
DATE: 10/25/93 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter re: timeliness of Radiological Survey
3. 1. . - 0011886  
DATE: 10/29/93 PAGES: 2  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter re: Status of Radiological Survey at TWC

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 1. . - 0011883

DATE: 11/24/93 PAGES: 2

AUTHOR: Noel L. Vaughn/Teledyne Wah Chang

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Letter re: OSWER Directive No. 9234.2-25 "Guidance for Evaluating Technical Impracticability of Groundwater Restoration"

3. 1. . - 1025032

DATE: 11/29/93 PAGES: 2

AUTHOR: Roger Ovink/CH2M Hill

ADDRESSEE: Noel Vaughn/Teledyne Wah Chang Albany

DESCRIPTION: Memo addressing statements/assumptions made in the letter to Howard Orlean from NOAA (10/27/93) concerning use of lakes and creeks by anadromous salmonids

3. 1. . - 0011885

DATE: 12/01/93 PAGES: 2

AUTHOR: Noel L. Vaughn/Teledyne Wah Chang

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Letter re: Additional TWCA comments - OSWER Directive No. 9234.2-25 "Guidance for Evaluating Technical Impracticality of Groundwater Restoration"

3. 1. . - 0011884

DATE: 12/03/93 PAGES: 3

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang

DESCRIPTION: Letter re: Response to TWCA Comments re: OSWER Directive No. 9234.2-25

SUB-HEAD: 3. 2. . Background Reports

3. 2. . - 0000004

DATE: / / PAGES: 205

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Report-Characterization of the content of the lower river solids storage pond and the upper river solids storage pond

3. 2. . - 0000012

DATE: / / PAGES: 203

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Characterization of the content of the lower river solids storage pond and the upper river solids storage pond

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 2. . - 0000001  
DATE: 03/01/81 PAGES: 128  
AUTHOR: Science Applications Inc. and/H. Esmaili & Associates Inc.  
ADDRESSEE: Unknown/Oregon Dept. of Human Resources  
DESCRIPTION: Report - "Public Health Hazards Associated with the Storage of Certain Types of Low Level Radioactive Waste Materials in Oregon"
3. 2. . - 0000006  
DATE: 04/27/82 PAGES: 55  
AUTHOR: Unknown/Dames & Moore  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Additional Geotechnical Investigation and Consultation Stability and Capping of Lower Solids Storage Pond
3. 2. . - 0000002  
DATE: 03/09/83 PAGES: 36  
AUTHOR: Unknown/TWCA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Report - "Review of EPA and General Report Data on Teledyne Wah Chang Albany Zirconium Production Process and Its Waste Streams"
3. 2. . - 0000007  
DATE: 03/09/83 PAGES: 36  
AUTHOR: Unknown/TDD R10-8301-04 (Ecology & Environment Inc.?)  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Review of EPA and General Report Data on TWCA Zirconium Production Process and Its Waste Streams
3. 2. . - 0000003  
DATE: 06/01/85 PAGES: 58  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/Oregon Dept of Environmental Quality (DEQ)  
DESCRIPTION: Scope of work and sampling & analysis plans and data for the nonferrous metals forming wastewater collection and transfer system
3. 2. . - 0000008  
DATE: 01/23/86 PAGES: 58  
AUTHOR: Charles R. Knoll/TWCA  
ADDRESSEE: F. A. Skirvin/DEQ  
DESCRIPTION: Proposal by CH2M Hill for additional corrective action measures for indirect chemical releases from the nonferrous metals forming wastewater transfer sump

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 2. . - 0000009  
DATE: 03/31/87 PAGES: 101  
AUTHOR: Jeffery H. Randall/CH2M Hill  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Groundwater Quality Study, Nonferrous Metals Forming Wastewater Transfer Sump, TWCA

3. 2. . - 0000005  
DATE: 05/01/87 PAGES: 51  
AUTHOR: Unknown/Hazard Management Specialists  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Report-Preliminary Engineering report on permanent lime solids containment for Teledyne Wah Chang Albany

3. 2. . - 0000010  
DATE: 05/01/87 PAGES: 51  
AUTHOR: Unknown/Hazard Management Specialists  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Preliminary Engineering Report on Permanent Solids Containment for TWCA

3. 2. . - 0000011  
DATE: 07/01/87 PAGES: 21  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Monitoring well RDD installation and testing report, TWCA farm site, Albany, Oregon

3. 2. . - 0000014  
DATE: 02/27/90 PAGES: 10  
AUTHOR: Roger Ovink/CH2M Hill  
ADDRESSEE: Chuck Knoll/TWCA  
DESCRIPTION: TWCA Discharge Effects on the Beneficial Uses of Truax Creek and Conser Slough, Linn County, Oregon

3. 2. . - 0000013  
DATE: 03/16/90 PAGES: 19  
AUTHOR: Bruce A. Woods/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: On-site Evaluation Report of TWCA

SUB-HEAD: 3. 3. . Remedial Action Master Plan (RAMP)

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 3. . - 0000001

DATE: 03/31/83 PAGES: 1

AUTHOR: Thomas Nelson/TWCA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Submittal of information requested on well monitoring and request for copy of RAMP

3. 3. . - 0000002

DATE: 07/01/83 PAGES: 174

AUTHOR: Unknown/NUS Corporation

ADDRESSEE: Unknown/EPA

DESCRIPTION: Draft RAMP

SUB-HEAD: 3. 4. 1. Work Plan Outline (EPA)

3. 4. 1. - 0000001

DATE: 12/03/86 PAGES: 75

AUTHOR: Unknown/Woodward-Clyde Consultants

ADDRESSEE: Unknown/EPA

DESCRIPTION: Final work plan outline

SUB-HEAD: 3. 4. 2. Draft Planning Documents

3. 4. 2. - 0000001

DATE: 08/01/87 PAGES: 502

AUTHOR: Unknown/CH2M Hill

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Draft planning documents

3. 4. 2. - 0000002

DATE: 04/01/90 PAGES: 32

AUTHOR: Unknown/CH2M Hill

ADDRESSEE: Unknown/TWCA

DESCRIPTION: Sampling and analysis plan, April 1990, Sampling event for groundwater, surface water and sediment, Phase 1 RI (Addendum to 3.4.2-0001)

SUB-HEAD: 3. 4. 3. Comments on Draft Planning Documents

3. 4. 3. - 0000001

DATE: 08/17/87 PAGES: 4

AUTHOR: Anita Wong Lovely/Tetra Tech Inc.

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Comments on work plan and sampling plan

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 4. 3. - 0000002  
DATE: 08/25/87 PAGES: 2  
AUTHOR: Ron Blair/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Comments on health and safety plan

3. 4. 3. - 0000003  
DATE: 09/03/87 PAGES: 1  
AUTHOR: Jon Schweiss/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Comments on work plan

3. 4. 3. - 0000004  
DATE: 09/10/87 PAGES: 1  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Kenneth Bird/TWCA  
DESCRIPTION: Review of work plan

3. 4. 3. - 0000005  
DATE: 09/16/87 PAGES: 2  
AUTHOR: Dana Davoli/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Review of planning documents

3. 4. 3. - 0000006  
DATE: 09/16/87 PAGES: 2  
AUTHOR: Jerry Leitch/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Review of planning documents

3. 4. 3. - 0000007  
DATE: 09/16/87 PAGES: 1  
AUTHOR: Kenneth Bird/TWCA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Review of EPA and DEQ comments on planning documents

3. 4. 3. - 0000008  
DATE: 09/16/87 PAGES: 25  
AUTHOR: Anita Wong Lovely/Tetra Tech Inc.  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Comments on planning documents

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 4. 3. - 0000009  
DATE: 09/21/87 PAGES: 3  
AUTHOR: Glenn Bruck/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Review of planning documents

3. 4. 3. - 0000010  
DATE: 10/05/87 PAGES: 3  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Kenneth Bird/TWCA  
DESCRIPTION: Letter re: lack of use of EPA guidance in development of planning documents

3. 4. 3. - 0000011  
DATE: 10/09/87 PAGES: 6  
AUTHOR: Roy Jones and Raleigh Farlow/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Comments on planning documents

3. 4. 3. - 0000012  
DATE: 10/19/87 PAGES: 17  
AUTHOR: Tom Miller/DEQ  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Compilation of comments from DEQ, Oregon Health Division Depart. of Water Resources, US Dept of Energy and US Department of Justice

3. 4. 3. - 0000013  
DATE: 10/27/87 PAGES: 36  
AUTHOR: Anita Wong Lovely/Tetra Tech Inc.  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Integrated Tetra Tech Inc. and EPA comments on planning documents

3. 4. 3. - 0000014  
DATE: 10/30/87 PAGES: 2  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Ken Bird/TWCA  
DESCRIPTION: Transmittal letter-compilation of comments received by EPA and DEQ project managers

3. 4. 3. - 0000015  
DATE: 11/15/87 PAGES: 1  
AUTHOR: Kenneth Bird/TWCA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Receipt of comments received by EPA and DEQ project managers and revisions of draft work plan



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 4. 3. - 0000016  
DATE: 12/01/87 PAGES: 1  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Ken Bird/TWCA  
DESCRIPTION: Proposed submittal of the revised work plan

SUB-HEAD: 3. 4. 4. Revised Draft Planning Documents

3. 4. 4. - 0000001  
DATE: 01/01/88 PAGES: 584  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Revised planning documents

3. 4. 4. - 0000002  
DATE: 10/01/88 PAGES: 701  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Revised planning documents

3. 4. 4. - 0000003  
DATE: 01/25/91 PAGES: 95  
AUTHOR: Davi Richards/CH2M Hill  
ADDRESSEE: Holders of the TWCA RI/FS Planning Documents/Unknown  
DESCRIPTION: Revisions to the planning documents

3. 4. 4. - 0010037  
DATE: 06/13/91 PAGES: 15  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Teledyne Wah Chang/Unknown  
DESCRIPTION: Addendum 1 to the Quality Assurance Project Plan for a Remedial Investigation/Feasibility Study

3. 4. 4. - 0010038  
DATE: 09/16/91 PAGES: 11  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Teledyne Wah Chang/Unknown  
DESCRIPTION: Addendum 2 to the Quality Assurance Project Plan for a Remedial Investigation/Feasibility Study

3. 4. 4. - 0010039  
DATE: 01/31/92 PAGES: 5  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Teledyne Wah Chang/Unknown  
DESCRIPTION: Addendum 3 to the Quality Assurance Project Plan for a Remedial Investigation/Feasibility Study

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

SUB-HEAD: 3. 4. 5.            Comments on Revised Draft Planning Documents

3. 4. 5.    - 00000001

DATE: 03/15/88    PAGES:    30

AUTHOR: Anita Wong Lovely/Tetra Tech Inc.

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Comments on revised planning documents

3. 4. 5.    - 00000002

DATE: 03/24/88    PAGES:    7

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Review of revised planning documents with attached sampling data and map

3. 4. 5.    - 00000003

DATE: 04/14/88    PAGES:    69

AUTHOR: Anita Wong Lovely/Tetra Tech Inc.

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Integrated review comments on revised planning documents

SUB-HEAD: 3. 4. 6.            Final Documents

3. 4. 6.    - 00000001

DATE: 04/01/90    PAGES:    47

AUTHOR: Unknown/SAIC

ADDRESSEE: Unknown/EPA

DESCRIPTION: Final Quality Assurance Project Plan for April-May 1990 Oversight of the Remedial Investigation at TWCA, Oregon

3. 4. 6.    - 00000002

DATE: 06/29/90    PAGES:    4

AUTHOR: David R. Lee/TWCA

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Sampling and Analysis Plan for Low Ph Soil and Groundwater Around Well PW-28A TWCA

3. 4. 6.    - 00000003

DATE: 02/28/91    PAGES:    28

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Sampling and Analysis Plan, Spring 1991, Round 3 Sampling Event for Groundwater Addendum 4 to the RI/FS

SUB-HEAD: 3. 5.            Sampling and Analysis Data/Progress Reports

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0000001  
DATE: 03/08/90 PAGES: 135  
AUTHOR: Donna Morgans/CH2M Hill  
ADDRESSEE: David Lee/TWCA  
DESCRIPTION: Data validation for Sept. 1989 groundwater, surface water and sediment samples (Data packages available at EPA Region 10, Seattle, WA)
3. 5. . - 0000002  
DATE: 03/08/90 PAGES: 91  
AUTHOR: Donna Morgans/CH2M Hill  
ADDRESSEE: David Lee/TWCA  
DESCRIPTION: Attachment 1, Key to Table Notations (attachment to 3.5-0001)
3. 5. . - 0000006  
DATE: 03/31/90 PAGES: 14  
AUTHOR: Barry V. Pepich/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Report of Data Validation for TWC (Data available at EPA Region 10, Seattle, WA)
3. 5. . - 0000003  
DATE: 05/07/90 PAGES: 24  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for April 1990, inc. sampling activities in April 1990 and groundwater elevations summary, June 1989-April 1990
3. 5. . - 0000004  
DATE: 05/17/90 PAGES: 9  
AUTHOR: Linda Kemp/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Data Review of Teledyne Wah Chang Soil Samples for PCBs (Data packages located at EPA Region 10, Seattle, WA)
3. 5. . - 0000005  
DATE: 05/29/90 PAGES: 66  
AUTHOR: John R. Kane/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Phase I Round I Radio Chemistry Sampling Data for Teledyne Wah Chang, Albany, Oregon
3. 5. . - 0000007  
DATE: 06/02/90 PAGES: 13  
AUTHOR: Linda Kempe/EPA  
ADDRESSEE: Robert Rieck/EPA  
DESCRIPTION: Case narrative of TWCA Water Samples for BNA/Pest/PCBs

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0000008  
DATE: 06/08/90 PAGES: 28  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for May 1990, Inc. sampling activities summary for Phase I, Round 2 and groundwater elevations summary, June 1989-May 1990

3. 5. . - 0000009  
DATE: 06/14/90 PAGES: 15  
AUTHOR: Kari Alexander/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: QA Memo for Teledyne Wah Chang, VOA

3. 5. . - 0000010  
DATE: 07/09/90 PAGES: 23  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for June 1990, inc. groundwater elevation summary, June 1989-June 1990

3. 5. . - 0000011  
DATE: 08/02/90 PAGES: 27  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for July 1990, inc. groundwater elevation summary, June 1989-July 1990

3. 5. . - 0000012  
DATE: 09/07/90 PAGES: 29  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for August 1990, inc. groundwater elevation summary, June 1989-August 1990

3. 5. . - 0000013  
DATE: 10/09/90 PAGES: 30  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for September 1990, inc. groundwater elevation summary, June 1989-September 1990

3. 5. . - 0000014  
DATE: 11/09/90 PAGES: 7  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for October 1990, inc. groundwater elevation summary, October 1990

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0000016  
DATE: 01/07/91 PAGES: 8  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for December 1990, inc. groundwater elevation summary

3. 5. . - 0000017  
DATE: 02/06/91 PAGES: 8  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for January 1991, inc. groundwater elevation summary

3. 5. . - 0000018  
DATE: 03/04/91 PAGES: 25  
AUTHOR: Bill Mason/CH2M Hill  
ADDRESSEE: Dave Lee/TWCA  
DESCRIPTION: Technical Memo/Phase 2 Monitoring Well Installation

3. 5. . - 0000019  
DATE: 03/08/91 PAGES: 8  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for Feb. 1991, inc. groundwater elevation summary

3. 5. . - 0000020  
DATE: 04/09/91 PAGES: 5  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for March 1991, inc. groundwater elevation summary

3. 5. . - 0000021  
DATE: 05/09/91 PAGES: 8  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for April 1991, inc. groundwater elevation summary

3. 5. . - 0000022  
DATE: 06/04/91 PAGES: 8  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for May 1991, inc. technical memorandum on Round 3 groundwater sampling event

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0010040  
DATE: 07/09/91 PAGES: 4  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: June 1991 Progress Report

3. 5. . - 0010041  
DATE: 08/08/91 PAGES: 6  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: July 1991 Progress Report

3. 5. . - 0010042  
DATE: 09/09/91 PAGES: 5  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: August 1991 Progress Report

3. 5. . - 0010043  
DATE: 10/09/91 PAGES: 4  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: September 1991 Progress Report

3. 5. . - 0010044  
DATE: 11/01/91 PAGES: 25  
AUTHOR: Bill Mason, Kira Richardson/CH2M Hill  
ADDRESSEE: File/Unknown  
DESCRIPTION: Summary of Soil Gas Survey conducted by Tracer Research during September

3. 5. . - 0010046  
DATE: 11/06/91 PAGES: 57  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: October 1991 Progress Report

3. 5. . - 0010047  
DATE: 12/04/91 PAGES: 43  
AUTHOR: Donna Morgans/CH2M Hill  
ADDRESSEE: David Lee/Teledyne Wah Chang  
DESCRIPTION: Data Validation for V2 Pond Soil Samples Collected During Phase II

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0010048  
DATE: 12/04/91 PAGES: 117  
AUTHOR: Donna Morgans/CH2M Hill  
ADDRESSEE: David Lee/Teledyne Wah Chang  
DESCRIPTION: Data Validation for April 1991 Groundwater and Soil Samples  
Collected for Phase 2
3. 5. . - 0010049  
DATE: 12/04/91 PAGES: 31  
AUTHOR: Donna Morgans/CH2M Hill  
ADDRESSEE: David Lee/Teledyne Wah Chang  
DESCRIPTION: Data Validation for Backhoe Pit Soil Samples Collected During Phase  
2
3. 5. . - 0000015  
DATE: 12/07/91 PAGES: 10  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Progress report for November 1990, inc. groundwater elevation  
summary, November 1990
3. 5. . - 0010050  
DATE: 12/09/91 PAGES: 16  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: November 1991 Progress Report
3. 5. . - 0010051  
DATE: 12/11/91 PAGES: 6  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Addition to November 1991 Progress Report
3. 5. . - 0010052  
DATE: 01/10/92 PAGES: 6  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: December 1991 Progress Report
3. 5. . - 0010053  
DATE: 02/07/92 PAGES: 11  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: January 1992 Progress Report

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0010054  
DATE: 03/09/92 PAGES: 13  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: February 1992 Progress Report

3. 5. . - 0010055  
DATE: 04/07/92 PAGES: 6  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: March 1992 Progress Report

3. 5. . - 0010056  
DATE: 05/08/92 PAGES: 9  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: April 1992 Progress Report

3. 5. . - 0010057  
DATE: 05/12/92 PAGES: 240  
AUTHOR: Page Birmingham, Donna Morgans/CH2M Hill  
ADDRESSEE: David Lee/Teledyne Wah Chang  
DESCRIPTION: Data Validation for Surface Water, Soil, and Sediment Samples  
Collected During Phase 2, and Groundwater Samples Collected During  
Round 4, RI/FS

3. 5. . - 0010058  
DATE: 05/26/92 PAGES: 34  
AUTHOR: Ann Stark/CH2M Hill  
ADDRESSEE: David Lee/Teledyne Wah Chang  
DESCRIPTION: PCB Source Delineation

3. 5. . - 0010059  
DATE: 06/09/92 PAGES: 9  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: May 1992 Progress Report

3. 5. . - 0010060  
DATE: 07/07/92 PAGES: 6  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: June 1992 Progress Report



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0010061  
DATE: 08/10/92 PAGES: 13  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: July 1992 Progress Report

3. 5. . - 0010062  
DATE: 09/09/92 PAGES: 10  
AUTHOR: Page Birmingham/CH2M Hill  
ADDRESSEE: Dave Lee/Teledyne Wah Chang  
DESCRIPTION: Review of Quality Assurance/Quality Control (QA/QC) Data for  
Surface Water and Soil Sample Analyses from Lower River Solids Pond  
and Schmidt Lake at TWCA

3. 5. . - 0010063  
DATE: 09/10/92 PAGES: 10  
AUTHOR: Page Birmingham/CH2M Hill  
ADDRESSEE: Dave Lee/Teledyne Wah Chang  
DESCRIPTION: Review of Quality Assurance/Quality Control (QA/QC) Data for  
Groundwater and Soil Samples from the Chlorinator Residue Pile at  
TWCA

3. 5. . - 0010064  
DATE: 09/10/92 PAGES: 3  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: August 1992 Progress Report

3. 5. . - 0010065  
DATE: 10/08/92 PAGES: 2  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: September 1992 Progress Report

3. 5. . - 0010066  
DATE: 12/08/92 PAGES: 2  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: November 1992 Progress Report

3. 5. . - 1004008  
DATE: 01/15/93 PAGES: 4  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached progress report for December 1992

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 1004007  
DATE: 02/09/93 PAGES: 4  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached progress report for January 1993

3. 5. . - 1004006  
DATE: 03/11/93 PAGES: 5  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached progress report for February 1993

3. 5. . - 1004005  
DATE: 04/08/93 PAGES: 10  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached progress report for March 1993

3. 5. . - 1004004  
DATE: 05/10/93 PAGES: 10  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached progress report for April 1993

3. 5. . - 1004003  
DATE: 06/14/93 PAGES: 3  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached progress report for May 1993

3. 5. . - 0011860  
DATE: 07/08/93 PAGES: 21  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: June progress report and cover letter

3. 5. . - 0011867  
DATE: 08/12/93 PAGES: 9  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: July progress report and cover letter

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. . - 0011866  
DATE: 09/10/93 PAGES: 13  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: August progress report and cover letter

3. 5. . - 0011864  
DATE: 10/07/93 PAGES: 4  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: September progress report and cover letter

3. 5. . - 0011868  
DATE: 11/10/93 PAGES: 4  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: October progress report and cover letter

3. 5. . - 0011865  
DATE: 12/09/93 PAGES: 3  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: November progress report and cover letter

SUB-HEAD: 3. 5. 1. Split Sample Data Validation Reports

3. 5. 1. - 1004009  
DATE: 07/26/91 PAGES: 47  
AUTHOR: EPA Region 10 Laboratory/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sample/Project Analysis Results Teledyne Wah Chang

3. 5. 1. - 0010067  
DATE: 12/02/91 PAGES: 11  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, SAS No: 6285J-01, Radium, Uranium and Thorium Radionuclide Analysis

3. 5. 1. - 0010068  
DATE: 12/02/91 PAGES: 9  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, SAS No: 6642J, Phosphate Analysis and Percent Moisture Determination

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. 1. - 0010069  
DATE: 12/04/91 PAGES: 10  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, SAS No: 6642J-02, Total Organic Carbon Analysis

3. 5. 1. - 0010070  
DATE: 12/04/91 PAGES: 7  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, SAS No: 6697J-02 Total Organic Carbon Analysis

3. 5. 1. - 0010071  
DATE: 12/09/91 PAGES: 53  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation Reports and Performance of Participating SAS Eligible Laboratories SAS #' 6823J and 6697J, Metals Analysis

3. 5. 1. - 0010072  
DATE: 12/16/91 PAGES: 6  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation Report for Teledyne Wah Chang, SAS #6823J-02, Oil and Grease Analysis

3. 5. 1. - 0010073  
DATE: 12/30/91 PAGES: 9  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, SAS No. 6697J-03, Fluoride Analysis, EAS Labs, Watertown, CT

3. 5. 1. - 0001074  
DATE: 12/31/91 PAGES: 80  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, Case No. 17225, SDG #JJ306, Semi-Volatile Analysis

3. 5. 1. - 0010075  
DATE: 12/31/91 PAGES: 35  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, Case #17225, SDG #JJ306, Pesticide PCB Analysis

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. 1. - 0010076  
DATE: 01/02/92 PAGES: 14  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation Report and Performance of Participating SAS  
Eligible Laboratories. SAS #6823J, Metals Analysis

3. 5. 1. - 0010077  
DATE: 01/02/92 PAGES: 24  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, SAS No. 6823J-03, Amonia,  
Phosphate and ph Analysis in Soils

3. 5. 1. - 0010078  
DATE: 01/02/92 PAGES: 39  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, Case #17351, SDG #JJ524,  
Organic Analysis

3. 5. 1. - 0010079  
DATE: 01/09/92 PAGES: 9  
AUTHOR: Donald Matheny/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation for Teledyne Wah Chang, SAS No: 6823J-04, Samples  
01 thru 16, Total Organic Carbon Analysis

3. 5. 1. - 0010080  
DATE: 02/27/92 PAGES: 19  
AUTHOR: Heip L. Mai/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation Reports - Teledyne Wah Chang RI/FS Oversight  
Support

3. 5. 1. - 0010081  
DATE: 03/02/92 PAGES: 5  
AUTHOR: Hiep L. Mai/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation of Metals and Zirconium for Phase II Round 4  
Sampling Event - Teledyne Wah Chang RI/FS Oversight Supports

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. 1. - 0010082  
DATE: 03/09/92 PAGES: 23  
AUTHOR: Claudia Spita/SAIC  
ADDRESSEE: Heip L. Mai/SAIC  
DESCRIPTION: Data Validation Report of Metals and Zirconium for Phase II Round 4 Sampling Event

3. 5. 1. - 0010083  
DATE: 03/09/92 PAGES: 12  
AUTHOR: Claudia Spita/SAIC  
ADDRESSEE: Hiep L. Mai/SAIC  
DESCRIPTION: Data Validation Report of Metals and Zirconium for Phase II Round 4 Sampling Event

3. 5. 1. - 0010084  
DATE: 03/30/92 PAGES: 35  
AUTHOR: Hiep L. Mai/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Data Validation Reports for SDG #'s 6766j-0101, 6766J-01-06, 6766J-01-32, 6823J-0101, and 6697J-04-01

SUB-HEAD: 3. 5. 2. Schmidt Lake Evacuation Project

3. 5. 2. - 0010085  
DATE: 08/01/92 PAGES: 19  
AUTHOR: Northwest Geophysical Associates, Inc./Unknown  
ADDRESSEE: CH2M Hill, Inc./Unknown  
DESCRIPTION: Geophysical Search for Buried Materials, Schmidt Lake and LRSP (includes maps)

3. 5. 2. - 0010086  
DATE: 08/25/92 PAGES: 6  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Schmidt Lake Evacuation Progress Report

3. 5. 2. - 0010087  
DATE: 08/26/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter requesting more detailed information on the Evacuation project

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. 2. - 0010088  
DATE: 09/14/92 PAGES: 14  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter providing additional requested information
3. 5. 2. - 0010089  
DATE: 11/25/92 PAGES: 19  
AUTHOR: Noel Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Disposal of Contaminated Soil from the Schmidt Lake Excavation Project, our Telecon of November 24, 1992
3. 5. 2. - 0010090  
DATE: 12/02/92 PAGES: 32  
AUTHOR: Noel Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Characterization and Disposal of Wastes - Schmidt Lake Excavation Project
3. 5. 2. - 0010091  
DATE: 12/04/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter noting that based on information provided, Teledyne may begin transport of waste to the off-site disposal facility
3. 5. 2. - 1004010  
DATE: 01/19/93 PAGES: 3  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and enclosed final tabulation and cumulative graph of SLEP materials that were packaged and transported for disposal
3. 5. 2. - 0011861  
DATE: 07/15/93 PAGES: 1  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter re: Notification of Resuming Excavation Activities Schmidt Lake Excavation Project
3. 5. 2. - 0011869  
DATE: 09/09/93 PAGES: 2  
AUTHOR: Thor Cutler/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Memorandum re: On-site Tank Removal, 9/8/93

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 5. 2. - 0011870  
DATE: 10/05/93 PAGES: 2  
AUTHOR: Bruce Long/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Fax cover letter and attached map

3. 5. 2. - 0011872  
DATE: 12/03/93 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter written to inform TWC that previous removal actions taken by TWCA during Schmidt Lake Excavation Project do not comply with EPA requirements

3. 5. 2. - 0011871  
DATE: 12/06/93 PAGES: 4  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Catherine Krueger/EPA  
DESCRIPTION: Letter written to confirm telephone conversation regarding current shipments of excavation materials from Schmidt Lake Excavation Project

SUB-HEAD: 3. 6. 1. Addendum

3. 6. 1. - 0000001  
DATE: 07/01/90 PAGES: 23  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Draft RI/FS Work Plan TWCA, Addendum 1, Phase 2, RI Monitoring Well Installation Work Plan

3. 6. 1. - 0000002  
DATE: 02/22/91 PAGES: 10  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Addendum No. 3 Sampling and Analysis Plan, V-2 Pond Closure Confirmation Sampling

3. 6. 1. - 0010108  
DATE: 03/06/91 PAGES: 5  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan, Geophysical Survey in Solids Area, Addendum 15 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 1. - 0010095  
DATE: 06/01/91 PAGES: 6  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan July 1991 Sampling Event for Aquatic Biota Characterization and Tissue Collection, Addendum 5 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany
3. 6. 1. - 0010096  
DATE: 07/01/91 PAGES: 24  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan Surface Water and Sediment Toxicity Testing, Addendum 6 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany
3. 6. 1. - 0010097  
DATE: 07/30/91 PAGES: 36  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan Fall 1991 (Round 4) Sampling Event for Groundwater, Addendum 7 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany
3. 6. 1. - 0010099  
DATE: 08/01/91 PAGES: 22  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan PCB Source Characterization, Addendum 9 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany
3. 6. 1. - 0010098  
DATE: 09/03/91 PAGES: 24  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Revision 1, Sampling and Analysis Plan Soil Gas Survey, Addendum 8 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany
3. 6. 1. - 0010100  
DATE: 09/18/91 PAGES: 45  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan Surface and Subsurface Soils Investigation, Addendum 10 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 1. - 0010092  
DATE: 11/01/91 PAGES: 33  
AUTHOR: Teledyne Wah Chang/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Work Plan For An Interim Remedial Measure at Well PW-28A

3. 6. 1. - 0010101  
DATE: 11/01/91 PAGES: 17  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan Groundwater Monitoring Plan for the Lower River Solid Pond and Schmidt Lake, Addendum 11 to the RI/FS Sampling and Analysis Plan, Teledyne Wah Chang, Albany

3. 6. 1. - 0010102  
DATE: 11/27/91 PAGES: 17  
AUTHOR: Unknown/CH2M Hill, Inc.  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan LRSP and SL Soil Sampling, Addendum 12 to the RI/FS Sampling and Analysis Plan, Teledyne Wah Chang Albany

3. 6. 1. - 0010103  
DATE: 11/27/91 PAGES: 4  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Attachment 1 to Sampling and Analysis Plan, LRSP and SL Soil Sampling, Addendum 12 to the RI/FS Sampling and Analysis Plan dated November 27, 1991

3. 6. 1. - 0010104  
DATE: 11/27/91 PAGES: 13  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan, Subsurface Soil - PCB Source Delineation, Addendum 13 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany

3. 6. 1. - 0010106  
DATE: 11/27/91 PAGES: 13  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan, Subsurface Soil - PCB Source Delineation, Addendum 14 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang, Albany

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 1. - 0010107  
DATE: 11/27/91 PAGES: 1  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Figure 2 Solids Area Sampling Locations Former Chlorinator Residue  
File [From SAP, Addendum 14]
3. 6. 1. - 0010093  
DATE: 12/01/91 PAGES: 381  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Teledyne Wah Chang/Unknown  
DESCRIPTION: Phase 2 Work Plan for the RI/FS, Addendums to the Phase 2 Work  
Plan, SAP, and QAPP
3. 6. 1. - 0010094  
DATE: 12/01/91 PAGES: 94  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Teledyne Wah Chang/Unknown  
DESCRIPTION: Phase 2 Work Plan for the RI/FS, Addendum 2 to the RI/FS Work Plan
3. 6. 1. - 0010105  
DATE: 02/21/92 PAGES: 8  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Addendum 1 to Sampling Plan, Subsurface Soil - PCB Source  
Delineation, Addendum 13 to RI/FS SAP
3. 6. 1. - 0010109  
DATE: 05/29/92 PAGES: 6  
AUTHOR: Jay Celorie, Dave Livesay/CH2M Hill  
ADDRESSEE: Dave Lee/Teledyne Wah Chang  
DESCRIPTION: PCB Source Investigation Plan [Addendum]
3. 6. 1. - 0010110  
DATE: 09/29/92 PAGES: 8  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/Teledyne Wah Chang  
DESCRIPTION: Addendum 13 to the Sampling and Analysis Plan PCB Source  
Investigation Work Plan
3. 6. 1. - 1004012  
DATE: 04/19/93 PAGES: 2  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter for revised Draft Sampling and Analysis Plan, Addendum  
17 to the RI/FS SAP, stating that this draft replaces draft SAP  
dated 2/8/93

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 1. - 1004013  
DATE: 04/19/93 PAGES: 28  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Sampling and Analysis Plan Radiological Survey, Addendum 17 to the RI/FS Sampling and Analysis Plan Teledyne Wah Chang Albany

3. 6. 1. - 1004011  
DATE: 05/26/93 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter stating that EPA approves "Sampling and Analysis Plan, Radiological Survey, Addendum 17 to the RI/FS Sampling and Analysis Plan", but TWC will need to adequately address concerns during remedial design and remedial action

SUB-HEAD: 3. 6. 2. Comments on Addendum

3. 6. 2. - 0000001  
DATE: 08/14/90 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Review and comments on "Draft RI/FS Work Plan, TWCA, Addendum 1, Phase 2 RI, Monitoring Well Work Plan"

3. 6. 2. - 0000002  
DATE: 02/07/91 PAGES: 11  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Comments on document entitled "Phase 2 Work Plan, RI/FS, Addendum 2 to the RI/FS Work Plan, Draft, December 1990"

3. 6. 2. - 0000003  
DATE: 02/26/91 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Approval of groundwater investigation section for Draft December 1990, Phase 2 Work Plan, contingent upon listed agreed-upon tasks

3. 6. 2. - 0000004  
DATE: 03/06/91 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Approval of Addendum #3, Sampling and Analysis Plan, V-2 Pond Closure, Confirmation Sampling, providing listed recommendations are implemented

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 2. - 0000005  
DATE: 03/13/91 PAGES: 33  
AUTHOR: Unknown/TWCA  
ADDRESSEE: Unknown/EPA, Oregon DEQ  
DESCRIPTION: TWCA Responses and Final Resolutions to EPA and DEQ Comments on Phase 2 Work Plan

3. 6. 2. - 0000006  
DATE: 03/15/91 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Approval of Amendment to Addendum 3, Sampling and Analysis Plan, V-2 Pond Closure, Confirmation Sampling

3. 6. 2. - 0000007  
DATE: 03/25/91 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Approval of "Sampling and Analysis Plan, Spring 1991, Round 3 Sampling Event for Groundwater, Addendum 4", provided the listed comments are adequately addressed

3. 6. 2. - 0000008  
DATE: 03/29/91 PAGES: 2  
AUTHOR: David R. Lee/TWCA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Response to comments on "Sampling and Analysis Plan, Spring 1991 Round 3 Sampling Event for Groundwater, Addendum 4"

3. 6. 2. - 0000009  
DATE: 04/04/91 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Notice that 3/29/91 letter addresses all EPA comments, therefore SAP is approved

3. 6. 2. - 0000010  
DATE: 05/24/91 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Comments on "Draft Soil Sampling Sections, Phase 2 Work Plan"

3. 6. 2. - 0010111  
DATE: 07/02/91 PAGES: 2  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Response to EPA comments on Well PW-28A Interim Remedial Measure Statement of Work

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 2. - 0010161  
DATE: 07/19/91 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter stating that TWC has adequately responded to EPA comments and the Statement of Work is now approved; request to submit a workplan for the Interim Remedial Measure as soon as possible
3. 6. 2. - 0010112  
DATE: 08/27/91 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Cover letter for "Draft Work Plan for Interim Remedial Measure", requesting meeting with EPA in early September
3. 6. 2. - 0010113  
DATE: 09/23/91 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comments on Well PA-28A Interim Remedial Measure Work Plan
3. 6. 2. - 0010114  
DATE: 10/14/91 PAGES: 3  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments on Addendum 10, SAP, Surface and Subsurface Soils
3. 6. 2. - 0010115  
DATE: 10/18/91 PAGES: 1  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter clarifying and documenting the surface soil sampling approach currently implemented at TWC
3. 6. 2. - 0010116  
DATE: 10/21/91 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter approving Addendum 10, SAP, Surface and Subsurface Soils
3. 6. 2. - 0010117  
DATE: 11/14/91 PAGES: 4  
AUTHOR: David R. Lee/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter addressing EPA's comments on "Work Plan for Interim Remedial Measure, Well PW-28A"

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 2. - 0010118  
DATE: 11/22/91 PAGES: 2  
AUTHOR: Dave Livesay/CH2M Hill  
ADDRESSEE: Dave Lee/TWC  
DESCRIPTION: Pore Volume Calculation for PW-28A IRM

3. 6. 2. - 0010119  
DATE: 01/28/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comments on Addendum 14, SAP, Subsurface Soil, Former Chlorinator Residue Pile

3. 6. 2. - 0010120  
DATE: 03/05/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comments on Addendum 1 to the SAP, Subsurface Soil - PCB Source Delineation

3. 6. 2. - 0010121  
DATE: 03/06/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter approving Addendum 14, SAP based on clarifications made by TWC

3. 6. 2. - 0010122  
DATE: 03/09/92 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter clarifying EPA's request that TWC submit a detailed Work Plan for the Lower River Solids Pond and Schmidt Lake within 30 days of receipt of 2/27/92 letter

3. 6. 2. - 0010123  
DATE: 03/24/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comments on the "SAP, Geophysical Survey in Solids Area, Addendum 15 to the RI/FS SAP"

3. 6. 2. - 0010124  
DATE: 10/22/92 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter stating that Teledyne has addressed EPA's comments on "Addendum 16 to the SAP, PCB Source Investigation at B91-5"

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 6. 2. - 1004016

DATE: 05/14/93 PAGES: 20

AUTHOR: Roseanne M. Lorenzana/EPA

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: TWCA Sampling and Analysis Plan Radiological Survey

3. 6. 2. - 1004014

DATE: 06/01/93 PAGES: 1

AUTHOR: Noel L. Vaughn/Teledyne Wah Chang

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Letter confirming telephone conversation 5/28/93, stating that TWC will begin external radiation monitoring in accordance with their Sampling and Analysis Plan

SUB-HEAD: 3. 6. 3. Interim Remedial Measure

3. 6. 3. - 0000001

DATE: 05/14/91 PAGES: 2

AUTHOR: Howard Orlean/EPA

ADDRESSEE: David R. Lee/TWCA

DESCRIPTION: Comments on "Draft Statement of Work, Interim Remedial Measure"

SUB-HEAD: 3. 7. Oversight Documents

3. 7. - 0000001

DATE: 12/01/90 PAGES: 72

AUTHOR: Unknown/SAIC

ADDRESSEE: Unknown/EPA

DESCRIPTION: Draft Report-Oversight of Phase I, Round 1 and 2, Field Sampling

3. 7. - 0010151

DATE: 01/22/92 PAGES: 2

AUTHOR: John Kane/SAIC

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Field Report from SAIC/TSC's Subsurface Soil Split Sampling and Oversight Activities at Teledyne Wah Chang Albany, Oregon in October, 1991

3. 7. - 1004018

DATE: 12/01/92 PAGES: 78

AUTHOR: Science Applications International Corporation/Unknown

ADDRESSEE: EPA/Unknown

DESCRIPTION: Data Validation Technical Memorandum Report for the Teledyne Wah Chang Albany, Oregon Superfund Site



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 7. . - 1004028  
DATE: 12/01/92 PAGES: 68  
AUTHOR: Science Applications International Corp./Unknown  
ADDRESSEE: EPA/Unknown  
DESCRIPTION: Data Validation Technical Memorandum Report for the Teledyne Wah  
Chang Albany, Oregon Superfund Site

3. 7. . - 0011875  
DATE: 05/03/93 PAGES: 9  
AUTHOR: Hiep L. Mai/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter providing information regarding natural attenuation trends  
allegedly occurring at TWC

3. 7. . - 1004017  
DATE: 06/17/93 PAGES: 4  
AUTHOR: Hiep L. Mai/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter summarizing SAIC/TSC oversight activities at the Teledyne  
Wah Chang Albany Superfund site during the period of June 9 and  
June 10, 1993 re: contractor sampling procedures and compliance to  
approved Sampling and Analysis Plan

3. 7. . - 0011873  
DATE: 06/28/93 PAGES: 3  
AUTHOR: Hiep L. Mai/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter elaborating on the elevated gamma readings observed during  
June 9th and 10th oversight at the Old Chemical Unloading Area in  
the Fabrication Area of TWC

3. 7. . - 0011874  
DATE: 07/20/93 PAGES: 5  
AUTHOR: Hiep L. Mai/SAIC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached requested data for hotspot delineation

SUB-HEAD: 3. 8. . Other Technical Reports

3. 8. . - 0010126  
DATE: 11/01/91 PAGES: 25  
AUTHOR: Bill Mason, Kira Richardson/CH2M Hill  
ADDRESSEE: File/Unknown  
DESCRIPTION: Summary of Soil Gas Survey conducted by Tracer Research

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 8. . - 0010125  
DATE: 04/02/92 PAGES: 41  
AUTHOR: CH2M Hill, Inc./Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Performance Evaluation Report : Well PW-28A Groundwater Extraction and Treatment, Teledyne Wah Chang, Albany, OR October 1991 - January 1992

3. 8. . - 1004019  
DATE: 04/09/93 PAGES: 6  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached final report summarizing procedures, observations, and conclusions regarding 11/92 attempt to excavate and locate suspected point source of PCB oil

SUB-HEAD: 3. 9. . RI/FS Reports and Comments

3. 9. . - 0010128  
DATE: 01/02/92 PAGES: 2  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Comments on Interim Toxicity Assessment

3. 9. . - 0010127  
DATE: 12/18/92 PAGES: 42  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel Vaughn/Teledyne Wah Chang  
DESCRIPTION: Review of Remedial Investigation/Feasibility Study

3. 9. . - 1021611  
DATE: 02/19/93 PAGES: 4  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter summarizing results of 2/9/93 conference call and subsequent conversations between EPA, TWCA, CH2M Hill, and DEQ

3. 9. . - 1004063  
DATE: 05/21/93 PAGES: 11  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang Albany  
DESCRIPTION: Letter regarding EPA's review of the 3/93 revised RI/FS Draft

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 9. . - 1004062

DATE: 06/24/93 PAGES: 31

AUTHOR: J. H. Denham/Teledyne Wah Chang Albany

ADDRESSEE: Catherine Krueger/EPA

DESCRIPTION: Letter responding to Howard Orlean's 5/21/93 letter documenting alleged deficiencies in the revised RI/FS

3. 9. . - 1004061

DATE: 07/16/93 PAGES: 28

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang Albany

DESCRIPTION: Letter and attachments re: Clarification of Revised RI/FS Comments

SUB-HEAD: 3. 9. 1. Vol. 1

3. 9. 1. - 1004020

DATE: 01/29/93 PAGES: 2

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang

DESCRIPTION: Letter stating that language proposed on 1/27/93 letter is not acceptable to EPA (copy of 1/27/93 letter attached)

3. 9. 1. - 0010163

DATE: 03/01/93 PAGES: 206

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: RI/FS Report Volume 1 - Executive Summary for the RI Report, Risk Assessment, and FS Report : Revised Draft (This document is Final)

SUB-HEAD: 3. 9. 2. Vol. 2

3. 9. 2. - 0010164

DATE: 03/01/93 PAGES: 570

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: RI/FS Report Volume 2 - RI Report for Phase 1 and Phase 2 of the Remedial Investigation : Revised Draft (This document is Final)

SUB-HEAD: 3. 9. 3. Vol. 3

3. 9. 3. - 0010165

DATE: 03/01/93 PAGES: 435

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: RI/FS Report Volume 3 - Risk Assessment - Baseline Risk Assessment for Human Health : Revised Draft (This document is Final)

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 9. 3. - 1004021

DATE: 04/23/93 PAGES: 20

AUTHOR: Roseanne M. Lorenzana/EPA

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Review of the Revised Draft RI/FS baseline risk assessment -  
Teledyne Wah Chang Albany and Submittal of EPA-calculated risk maps  
and Agricultural Worker Exposure Scenario

SUB-HEAD: 3. 9. 3. 1 Exposure/Toxicity Assessment

3. 9. 3. 1 - 0010136

DATE: / / PAGES: 75

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Teledyne Wah Chang/Unknown

DESCRIPTION: Final Risk Assessment Interim Deliverable Exposure Assessment

3. 9. 3. 1 - 0010129

DATE: 11/27/91 PAGES: 18

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Interim Toxicity Assessment for the Teledyne Wah Chang Albany RI/FS

3. 9. 3. 1 - 0010130

DATE: 02/12/92 PAGES: 4

AUTHOR: Roseanne M. Lorenzana/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Recommendations - Interim Exposure Assessment, and Risk-Based  
Preliminary Remediation Goals

3. 9. 3. 1 - 0010131

DATE: 04/23/92 PAGES: 2

AUTHOR: Roseanne Lorenzana/EPA

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Preliminary Remediation Goals for Teledyne Wah Chang Albany -  
Comments

3. 9. 3. 1 - 0010132

DATE: 04/24/92 PAGES: 6

AUTHOR: Dennis Shelton/CH2M Hill

ADDRESSEE: Howard Orlean, Roseanne Lorenzana/EPA

DESCRIPTION: Risk Characterization Approach for the Teledyne Wah Chang RI/FS

3. 9. 3. 1 - 0010135

DATE: 05/26/92 PAGES: 3

AUTHOR: Howard Orlean/EPA

ADDRESSEE: David R. Lee/Teledyne Wah Chang

DESCRIPTION: Comments on Exposure Assessment/Risk Assessment and RI/FS Schedule

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3. 9. 3. 1 - 0010133

DATE: 06/15/92 PAGES: 13

AUTHOR: Howard Orlean/EPA

ADDRESSEE: David R. Lee/Teledyne Wah Chang

DESCRIPTION: Comments on "Biota Investigation, RI/FS, Teledyne Wah Chang Albany, Albany, OR"

3. 9. 3. 1 - 0010134

DATE: 06/15/92 PAGES: 2

AUTHOR: Howard Orlean/EPA

ADDRESSEE: David R. Lee/Teledyne Wah Chang

DESCRIPTION: Letter re: Sample-Specific Risk Assessment

SUB-HEAD: 3. 9. 3. 2 Radiation Risk

3. 9. 3. 2 - 0010137

DATE: 09/04/92 PAGES: 69

AUTHOR: Dennis Shelton/CH2M Hill

ADDRESSEE: Howard Orlean, Roseanne Lorenzana/EPA

DESCRIPTION: Radiation Dosimetry Measurements

3. 9. 3. 2 - 0011858

DATE: 12/01/93 PAGES: 114

AUTHOR: Unknown/CH2M Hill

ADDRESSEE: Unknown/

DESCRIPTION: Remedial Investigation/Feasibility Study - Addendum 1 - Radiological Survey DRAFT

SUB-HEAD: 3. 9. 4. Vol. 4

3. 9. 4. - 0010166

DATE: 03/01/93 PAGES: 435

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: RI/FS Report Volume 4 - FS Report - Remedial Action Objectives and Alternatives : Revised Draft (This document is Final)

SUB-HEAD: 3. 9. 5. Vol. 5

3. 9. 5. - 0010167

DATE: 03/01/93 PAGES: 634

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: RI/FS Report Volume 5 - Analytical Data - Summary Data for Phase 1 and Phase 2 of the Remedial Investigation : Revised Draft (This document is Final)

SUB-HEAD: 3. 9. 6. Vol. 6

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

3. 9. 6. - 0010168

DATE: 03/01/93 PAGES: 789

AUTHOR: CH2M Hill, Inc./Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: RI/FS Report Volume 6 - Appendixes : Revised Draft (This document is Final)

3. 9. 6. - 1025020

DATE: 05/13/94 PAGES: 8

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Site File/Administrative Record/EPA

DESCRIPTION: Memo re: Documentation of Estimated Costs for Evaluated Remedial Alternatives at Teledyne Wah Chang Albany

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 4. 0. . RI/FS = SOILS OPERABLE UNIT III

SUB-HEAD: 4. 1. . Correspondence

4. 1. . - 1025025  
DATE: 12/16/93 PAGES: 2  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter for Addendum 1 to the RI/FS Report - Radiological Survey Results

4. 1. . - 1025030  
DATE: 01/04/94 PAGES: 3  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter summarizing telephone discussion of 12/14/93 regarding clarification of 12/3/93 letter and new off-site regulation for disposal of wastes

4. 1. . - 1025029  
DATE: 01/19/94 PAGES: 1  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Confirmation of Telecon of 1/18/94 concerning former sand unloading subarea- sand removal technique evaluation work

4. 1. . - 1025027  
DATE: 02/03/94 PAGES: 11  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: EPA comments on Addendum 1 to the RI/FS Report - Radiological Survey

4. 1. . - 1025056  
DATE: 02/25/94 PAGES: 2  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter confirming 2/23/94 telephone conversation with Kevin Rochlin regarding Radiological Survey Report

4. 1. . - 1025057  
DATE: 04/14/94 PAGES: 2  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Kevin Rochlin/EPA  
DESCRIPTION: Letter re: request for approval of off-site disposal facility, confirming telcon of April 11, 1994

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

4. 1. . - 1025026  
DATE: 04/19/94 PAGES: 2  
AUTHOR: Kevin Rochlin/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter providing update on events surrounding the required revisions to the 1993 draft Radiological Survey
4. 1. . - 1025028  
DATE: 04/20/94 PAGES: 3  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter in response to two issues raised by Teledyne Wah Chang in regard to the disposal of two types of wastes
4. 1. . - 1025031  
DATE: 05/02/94 PAGES: 2  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter regarding EPA Region 10 letter dated 4/20/94 - "Teledyne Wah Chang Superfund Site/TWCA's Request for Approval for Disposal of CERCLA Wastes"
4. 1. . - 1025024  
DATE: 05/03/94 PAGES: 20  
AUTHOR: Noel L. Vaughn/Teledyne Wah Chang  
ADDRESSEE: Kevin Rochlin/EPA  
DESCRIPTION: Cover letter and enclosed paper describing action criteria for soils with radionuclide constituents
4. 1. . - 1025023  
DATE: 05/11/94 PAGES: 6  
AUTHOR: Kevin Rochlin/EPA  
ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang Albany  
DESCRIPTION: Comments on Draft Radiological Survey



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 5. 0. . REMEDIAL INVESTIGATION - OPERABLE UNIT

SUB-HEAD: 5. 1. . Correspondence

5. 1. . - 1025019

DATE: 06/12/87 PAGES: 2

AUTHOR: Neil E. Thompson/EPA

ADDRESSEE: Tom Nelson/Teledyne Wah Chang

DESCRIPTION: EPA comments on "Preliminary Engineering Report on Permanent Lime Solids Containment for Teledyne Wah Chang Albany"

5. 1. . - 0000001

DATE: 04/27/88 PAGES: 2

AUTHOR: Fred Hansen/Oregon Dept of Environmental Quality

ADDRESSEE: James Denham/TWCA

DESCRIPTION: RE: Moving of lime solids material prior to EPA approval of disposal method

5. 1. . - 0000002

DATE: 07/26/88 PAGES: 10

AUTHOR: Neil Thompson/EPA

ADDRESSEE: Kenneth Bird/TWCA

DESCRIPTION: EPA approval of Chapter 4 of planning documents for RI/FS

5. 1. . - 0000003

DATE: 08/11/88 PAGES: 2

AUTHOR: Neil Thompson/EPA

ADDRESSEE: File/EPA

DESCRIPTION: Monthly activity report re: status of progress

5. 1. . - 0000004

DATE: 06/02/89 PAGES: 1

AUTHOR: Kenneth W. Bird/TWCA

ADDRESSEE: Christine Gebbie/Oregon State Health Division

DESCRIPTION: Letter announcing TWCA's presentation of the RI/FS draft on 6/9/89

5. 1. . - 0000005

DATE: 10/12/89 PAGES: 2

AUTHOR: Kenneth W. Bird/TWCA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: TWCA comments on the Supplemental Human Health Risk Assessment for Op Unit 1

SUB-HEAD: 5. 2. . Work Plan, Quality Assurance Proj. Plan, & Sampling &

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

5. 2. . - 0000001  
DATE: 06/17/88 PAGES: 56  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: QAPP for RI/FS

5. 2. . - 0000002  
DATE: 07/20/88 PAGES: 52  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Revised draft work plan for operable unit

5. 2. . - 0000003  
DATE: 07/20/88 PAGES: 32  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Draft SAP for operable unit

5. 2. . - 0000004  
DATE: 07/26/88 PAGES: 9  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Kenneth Bird/TWCA  
DESCRIPTION: Conditional approval of work plan

SUB-HEAD: 5. 3. . Remedial Investigation/Feasibility Study (RI/FS) Report

5. 3. . - 0000001  
DATE: 06/01/89 PAGES: 166  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: RI/FS Report, Vol. I of III

5. 3. . - 0000002  
DATE: 06/01/89 PAGES: 247  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: RI/FS Report, Vol.II of III

5. 3. . - 0000003  
DATE: 06/01/89 PAGES: 259  
AUTHOR: Unknown/CH2M Hill  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: RI/FS Report, Vol.III of III

SUB-HEAD: 5. 3. 1. Supplemental Human Health Risk Assessment

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

5. 3. 1. - 0000001  
DATE: 09/01/89 PAGES: 19  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Teledyne Wah Chang Albany Operable Unit Number One, Supplemental Human Health Risk Assessment

SUB-HEAD: 5. 4. . Comments and Evaluations

5. 4. . - 0000001  
DATE: 07/01/89 PAGES: 6  
AUTHOR: Unknown/Tetra Tech Inc./Jacobs Engineering Group  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Comments on TWCA's operable unit RI/FS

5. 4. . - 0000002  
DATE: 07/13/89 PAGES: 12  
AUTHOR: Unknown/Tetra Tech Inc./Jacobs Engineering Group  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Comments on TWCA's operable unit RI/FS Endangerment Assessment

5. 4. . - 0000003  
DATE: 07/17/89 PAGES: 2  
AUTHOR: Glenn Bruck/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Comments on draft operable unit RI/FS (lime solids)

5. 4. . - 0000004  
DATE: 07/26/89 PAGES: 2  
AUTHOR: Chip Humphrey/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Comments on TWCA's Op Unit RI/FS study draft

5. 4. . - 0000005  
DATE: 07/31/89 PAGES: 6  
AUTHOR: William H. Dana/Oregon DEQ  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Comments on TWCA's Op Unit RI/FS

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 8. 0. . RECORDS OF DECISION

SUB-HEAD: 8. 1. . Record of Decision - Sludge Ponds

8. 1. . - 0000001

DATE: 12/01/89 PAGES: 118

AUTHOR: Unknown/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Record of Decision, Decision Summary, and Responsiveness Summary  
for Interim Response Action

SUB-HEAD: 8. 2. . Record of Decision - Groundwater and Sediment

8. 2. . - 1021644

DATE: 06/10/94 PAGES: 348

AUTHOR: Chuck Clarke/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Record of Decision, Declaration, Decision Summary, and  
Responsiveness Summary for Final Remedial Action of Groundwater and  
Sediments Operable Unit Teledyne Wah Chang Albany Superfund Site  
Millersburg, Albany June 10, 1994

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HEADING: 9. 0. . STATE COORDINATION

SUB-HEAD: 9. 1. . Correspondence

9. 1. . - 1025017

DATE: 06/30/81 PAGES: 11

AUTHOR: Karen Weliky/Oregon State University

ADDRESSEE: David Stewart-Smith/Oregon State Health Division

DESCRIPTION: Letter including results of preliminary examination of Truax Creek area

9. 1. . - 1025018

DATE: 07/12/83 PAGES: 8

AUTHOR: Stan Sturges/State of Oregon

ADDRESSEE: JEB/State of Oregon

DESCRIPTION: Interoffice Memo re: Farm Pond Monitoring review

9. 1. . - 0000012

DATE: 09/01/83 PAGES: 1

AUTHOR: Lloyd Marbet/Forelaws on Board

ADDRESSEE: Victor Atiyeh/State of Oregon

DESCRIPTION: Adequacy of Oregon waste disposal laws and request for formation of citizens committee

9. 1. . - 0000013

DATE: 09/01/83 PAGES: 1

AUTHOR: Governor Victor Atiyeh/State of Oregon

ADDRESSEE: Lloyd Marbet/Forelaws on Board

DESCRIPTION: Response to request for citizens committee

9. 1. . - 0000001

DATE: 08/11/84 PAGES: 1

AUTHOR: Al Goodman/Oregon Ops Office/EPA

ADDRESSEE: Rich Reiter/Oregon DEQ

DESCRIPTION: Draft Remedial Action Master Plan (RAMP)

9. 1. . - 0000002

DATE: 08/15/84 PAGES: 3

AUTHOR: Kathryn Davidson/EPA

ADDRESSEE: Dolores Streeter/Intergovernmental Relations Division

DESCRIPTION: Notification of proposed Superfund project at TWCA

9. 1. . - 0000003

DATE: 09/07/84 PAGES: 1

AUTHOR: W. Parks/Division of State Lands

ADDRESSEE: Unknown/Intergovernmental Relations Division

DESCRIPTION: Oregon project notification and review system form/EPA proposed study

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9. 1. . - 0000004  
DATE: 09/11/84 PAGES: 1  
AUTHOR: Dolores Streeter/Intergovernmental Relations Div.  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Oregon project notification and review system form/EPA proposed study

9. 1. . - 0000005  
DATE: 05/18/87 PAGES: 1  
AUTHOR: Kristine Gebbie/Oregon Dept of Human Resources  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Sludge ponds relocation proposal

9. 1. . - 0000006  
DATE: 06/16/87 PAGES: 2  
AUTHOR: Ray Paris/DHR  
ADDRESSEE: Tom Nelson/TWCA  
DESCRIPTION: Response to request to move lime solids (For response to letter, see document 9.1-0021)

9. 1. . - 0000021  
DATE: 06/22/87 PAGES: 1  
AUTHOR: Thomas E. Nelson/TWCA  
ADDRESSEE: Ray D. Paris/Radiation Control Section, Health Division  
DESCRIPTION: Responding to letter of June 16, 1987 in which you requested additional information about the TWCA Preliminary Engineering Report on Permanent Lime Solids Containment

9. 1. . - 0000007  
DATE: 07/13/87 PAGES: 2  
AUTHOR: Ray Paris/DHR  
ADDRESSEE: Tom Nelson/TWCA  
DESCRIPTION: Inclusion of project to relocate lime solids in the EPA RI/FS

9. 1. . - 0000008  
DATE: 10/19/87 PAGES: 17  
AUTHOR: Tom Miller/DEQ  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Compilation of comments by DEQ, Oregon Health Div, Oregon Dept of Water Resources, Oregon Dept of Energy, Oregon Dept of Justice on draft RI/FS planning documents

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

9. 1. . - 0000009  
DATE: 10/30/87 PAGES: 2  
AUTHOR: Neil Thompson/EPA  
ADDRESSEE: Ken Bird/TWCA  
DESCRIPTION: Compilation of comments received by EPA and DEQ project managers for RI/FS planning documents
9. 1. . - 0000010  
DATE: 03/14/88 PAGES: 3  
AUTHOR: Martha Dibblee/DHR  
ADDRESSEE: Tom Miller/DEQ  
DESCRIPTION: Comments on RI/FS draft planning documents
9. 1. . - 0000011  
DATE: 04/04/88 PAGES: 19  
AUTHOR: Martha Dibblee/DHR, DEQ, DOE  
ADDRESSEE: Unknown/TWCA  
DESCRIPTION: Comments on RI/FS draft planning documents
9. 1. . - 0000014  
DATE: 05/11/89 PAGES: 1  
AUTHOR: Bill Dana/Oregon DEQ  
ADDRESSEE: George Toombs/Oregon State Health Division  
DESCRIPTION: Proposed changes for radionuclide analysis procedures
9. 1. . - 0000015  
DATE: 07/05/89 PAGES: 2  
AUTHOR: Carol Rushin/EPA  
ADDRESSEE: Tom Miller/Oregon DEQ  
DESCRIPTION: Request for Oregon State to identify all ARARs for use in developing ROD (SEE 9.1-0017)
9. 1. . - 0000016  
DATE: 07/10/89 PAGES: 1  
AUTHOR: William H. Dana/Oregon DEQ  
ADDRESSEE: Kristine Gebbie/Oregon State Health Division  
DESCRIPTION: RE: Consent order between EPA and DEQ to oversee cleanup of TWCA
9. 1. . - 0000017  
DATE: 07/25/89 PAGES: 1  
AUTHOR: Tom Miller/Oregon DEQ  
ADDRESSEE: Carol Rushin/EPA  
DESCRIPTION: Response to letter by Carol Rushin (see 9.1-0015) concerning identifying state ARARs for the TWCA Superfund site

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9. 1. . - 0000018  
DATE: 01/10/91 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Bill Dana/Oregon DEQ  
DESCRIPTION: Request to DEQ for list of ARARs

9. 1. . - 0000019  
DATE: 02/04/91 PAGES: 4  
AUTHOR: Bill Dana/DEQ  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Comments on draft Phase 2 RI/FS work plan

9. 1. . - 0000020  
DATE: 03/26/91 PAGES: 1  
AUTHOR: Deborah Bailey/DEQ  
ADDRESSEE: David R. Lee/TWCA  
DESCRIPTION: Notice that Addendum 4 to the RI/FS sampling and analysis plan is approved

9. 1. . - 0010138  
DATE: 01/09/92 PAGES: 2  
AUTHOR: Deborah Bailey/Oregon Dept. of Environmental Quality  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Reply to Teledyne Wah Chang's letter of 11/27/91 to Howard Orlean and clarification of state's role in determining ARARs

9. 1. . - 0010152  
DATE: 10/06/92 PAGES: 1  
AUTHOR: William H. Dana/DEQ  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Letter stating that DEQ recommends approval of PCB source removal plan

9. 1. . - 0010139  
DATE: 12/10/92 PAGES: 4  
AUTHOR: William H. Dana/DEQ  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Teledyne Wah Chang Albany Draft RI/FS Report Comments

9. 1. . - 0010153  
DATE: 12/21/92 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Deborah Bailey/DEQ  
DESCRIPTION: Letter requesting meeting to develop consensus on RI/FS comments



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9. 1. . - 1004022  
DATE: 05/20/93 PAGES: 2  
AUTHOR: Deborah Bailey/Oregon Dept. of Environmental Quality  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Revised Draft RI/FS Report Comments
9. 1. . - 0011876  
DATE: 08/26/93 PAGES: 2  
AUTHOR: Deborah Bailey/EPA  
ADDRESSEE: Noel Vaughn/Teledyne Wah Chang  
DESCRIPTION: Letter re: Management of Underground Storage Tank, SLEP
9. 1. . - 1025051  
DATE: 01/06/94 PAGES: 1  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Debbie Bailey/Oregon Dept. of Environmental Quality  
DESCRIPTION: Telephone log discussing NPDES permit renewal
9. 1. . - 1025054  
DATE: 02/02/94 PAGES: 2  
AUTHOR: Timothy C. McFetridge/Oregon Dept. of Environmental Quality  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments on the NPDES and surface water portions of the draft Record of Decision for Teledyne Wah Chang
9. 1. . - 1025016  
DATE: 02/15/94 PAGES: 1  
AUTHOR: Deborah Bailey/Oregon Dept. of Environmental Quality  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Letter re: Response to request on how DEQ might address cleanup of contaminated soils found at some time in the future to be contaminated
9. 1. . - 1025015  
DATE: 03/01/94 PAGES: 5  
AUTHOR: Deborah Bailey/Oregon Dept. of Environmental Quality  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached Comments on Draft Record of Decision for Teledyne Wah Chang Albany
9. 1. . - 1025053  
DATE: 04/04/94 PAGES: 6  
AUTHOR: Deborah Bailey/Oregon Dept. of Environmental Quality  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached comments concerning the draft Record of Decision for Teledyne Wah Chang

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9. 1. . - 1025052  
DATE: 04/06/94 PAGES: 8  
AUTHOR: Paul S. Rosenberg/Oregon Dept. of Environmental Quality  
ADDRESSEE: Kevin Rochlin/EPA  
DESCRIPTION: Cover letter and attached memoranda from Oregon Health Division to DEQ concerning the radiological survey at Teledyne Wah Chang

9. 1. . - 1021619  
DATE: 05/20/94 PAGES: 2  
AUTHOR: Paul S. Rosenberg/Oregon Dept. of Environmental Quality  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached DEQ staff comments on the concurrence copy of the Groundwater and Sediments Operable Unit Record of Decision for the Teledyne Wah Chang Albany site

9. 1. . - 1021618  
DATE: 05/24/94 PAGES: 1  
AUTHOR: Fred Hansen/Oregon Dept. of Environmental Quality  
ADDRESSEE: Carol Rushin/EPA  
DESCRIPTION: Letter stating DEQ's concurrence with remedy selected by EPA

SUB-HEAD: 9. 2. . ARARs

9. 2. . - 0010140  
DATE: 11/06/91 PAGES: 310  
AUTHOR: Deborah Bailey/DEQ  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter and attached packet of information on the preliminary lists of ARARs that have been identified by DEQ

9. 2. . - 0010141  
DATE: 12/26/91 PAGES: 3  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: David R. Lee/Teledyne Wah Chang  
DESCRIPTION: Response to letters regarding ARARs for the site

9. 2. . - 1004027  
DATE: 04/22/93 PAGES: 8  
AUTHOR: Ben Cope/EPA  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Cover letter listing suggested approaches to the issues, brief summary of the CWA sections pertinent to water quality protection attached

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

9. 2. . - 0011877

DATE: 11/18/93 PAGES: 6

AUTHOR: Thomas Miller/Oregon Dept. of Environmental Quality

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Letter re: Application of Oregon Environmental Cleanup Rules

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 10. 0. . ENFORCEMENT

SUB-HEAD: 10. 1. . Correspondence

10. 1. . - 0000001

DATE: 06/17/87 PAGES: 1

AUTHOR: James Denham/TWCA

ADDRESSEE: Deborah Gates/Curt Burkholder/EPA

DESCRIPTION: Designation of Kenneth Bird as project manager and Thomas Nelson as substitute for RI/FS

10. 1. . - 0000002

DATE: 08/10/87 PAGES: 3

AUTHOR: Tom Miller/DEQ

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Notice of lateness on delivery of RI/FS work plan with attached packing list

10. 1. . - 0000003

DATE: 04/05/88 PAGES: 1

AUTHOR: Neil Thompson/EPA

ADDRESSEE: Ken Bird/TWCA

DESCRIPTION: Approval of request to relocate monitoring well for construction purposes

10. 1. . - 0000004

DATE: 07/26/88 PAGES: 9

AUTHOR: Neil Thompson/EPA

ADDRESSEE: Ken Bird/TWCA

DESCRIPTION: Conditional approval of Chapter 4 to work plan

10. 1. . - 0000005

DATE: 11/03/88 PAGES: 1

AUTHOR: Kenneth W. Bird/TWCA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Redetermination of documents no longer considered confidential by TWCA

10. 1. . - 1025049

DATE: 12/27/91 PAGES: 1

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Andy Green/Unknown

DESCRIPTION: Telephone Log regarding burial of material on-site

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

10. 1. . - 0011880

DATE: 09/22/93 PAGES: 3

AUTHOR: Clayton Wood/City of Millersburg, Oregon

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Letter re: City owned property included in the EPA investigation of Teledyne

10. 1. . - 0011879

DATE: 10/08/93 PAGES: 15

AUTHOR: Barbara Castillo/City of Millersburg, Oregon

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Cover letter and enclosure of requested material regarding the city owned property previously owned by Teledyne

10. 1. . - 0011878

DATE: 10/27/93 PAGES: 1

AUTHOR: Paul H. Keubrich/City of Millersburg, Oregon

ADDRESSEE: Joan C. Shirley/EPA

DESCRIPTION: Letter indicating that City of Millersburg wishes to take whatever steps necessary to protect health and safety of citizens without putting undue burden on any industrial sites located within the city

10. 1. . - 1025050

DATE: 03/22/94 PAGES: 7

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Deborah Bailey/Oregon Dept. of Environmental Quality

DESCRIPTION: Letter outlining EPA expectations regarding purpose and scope of the revised Radiological Survey

SUB-HEAD: 10. 2. . Notice Letters and Requests for Information

10. 2. . - 0000001

DATE: 08/30/82 PAGES: 5

AUTHOR: Alexandra B. Smith/EPA

ADDRESSEE: Tom Nelson/TWCA

DESCRIPTION: Consideration of inclusion of TWCA on NPL

10. 2. . - 0000002

DATE: 03/03/86 PAGES: 4

AUTHOR: Charles Findley/EPA

ADDRESSEE: Tom Nelson/TWCA

DESCRIPTION: Potential liability for contamination at TWCA

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

10. 2. . - 00000003

DATE: 01/21/87 PAGES: 5

AUTHOR: Deborah Gates/EPA

ADDRESSEE: Robert Emmett/Reed Smith Shaw and McClay

DESCRIPTION: Completion of consent order negotiations by 3/31/87

10. 2. . - 00000004

DATE: 05/08/87 PAGES: 1

AUTHOR: James Denham/TWCA

ADDRESSEE: Deborah Gates, D. Henry Elsen/EPA

DESCRIPTION: Designation of Kenneth Bird as project coordinator for RI/FS

10. 2. . - 0010142

DATE: 02/12/92 PAGES: 7

AUTHOR: Philip G. Millam/EPA

ADDRESSEE: Thomas E. Nelson/Teledyne Wah Chang

DESCRIPTION: Request for Information Pursuant to Section 104 of CERCLA and Section 3007 of RCRA

10. 2. . - 0010143

DATE: 03/16/92 PAGES: 49

AUTHOR: David R. Lee/Teledyne Wah Chang

ADDRESSEE: Philip G. Millam/EPA

DESCRIPTION: Response to 2/12/92 request for information

SUB-HEAD: 10. 3. . Administrative Orders

10. 3. . - 00000001

DATE: 05/01/87 PAGES: 1

AUTHOR: Deborah Gates/D. Henry Elsen/EPA

ADDRESSEE: James Denham/TWCA

DESCRIPTION: RE: Original consent order agreed upon 4/87

10. 3. . - 00000002

DATE: 05/05/87 PAGES: 33

AUTHOR: John Wyse/Charles Findley/TWCA/EPA

ADDRESSEE: Unknown/EPA and TWCA

DESCRIPTION: Order on Consent Docket 1086-02-19-106

10. 3. . - 00000003

DATE: 07/13/88 PAGES: 2

AUTHOR: Monica Kirk/EPA

ADDRESSEE: James Denham/TWCA

DESCRIPTION: Attached proposed amendment to 5/5/87 Consent Order

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

10. 3. . - 00000004

DATE: 08/19/88 PAGES: 1

AUTHOR: A. E. Riesen/TWCA/EPA

ADDRESSEE: Unknown/TWCA and EPA

DESCRIPTION: Amendment to Order on Consent Docket No. 1086-02-19-106

10. 3. . - 00000005

DATE: 11/20/89 PAGES: 3

AUTHOR: A. E. Riesen/TWCA/EPA

ADDRESSEE: Unknown/TWCA and EPA

DESCRIPTION: Amendment to Order on Consent Docket No. 1086-02-19-106

10. 3. . - 00000006

DATE: 09/26/90 PAGES: 3

AUTHOR: A. E. Riesen/TWCA/EPA

ADDRESSEE: Unknown/TWCA and EPA

DESCRIPTION: Third Amendment to Order on Consent Docket No. 1086-02-19-106

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 11. 0. . HEALTH ASSESSMENTS

SUB-HEAD: 11. 1. . Health Assessments

11. 1. . - 0000001

DATE: 09/01/89 PAGES: 26

AUTHOR: Unknown/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Supplemental Health Risk Assessment, to RI/FS for 1st Op unit

SUB-HEAD: 11. 2. . Correspondence

11. 2. . - 0000001

DATE: 01/04/91 PAGES: 1

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Greg Thomas/ATSDR

DESCRIPTION: Request for Health Assessment, TWCA

11. 2. . - 1004023

DATE: 05/14/93 PAGES: 2

AUTHOR: Gregory D. Thomas/Agency for Toxic Substances and Disease Registry

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Letter updating on the status of a Public Health Assessment for the Teledyne Wah Chang site



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 12. 0. . NATURAL RESOURCE TRUSTEES

SUB-HEAD: 12. 1. . Correspondence

12. 1. . - 0000001

DATE: 08/16/78 PAGES: 5

AUTHOR: John Kincheloe/US Dept of Interior/Fish and Wildlife Service

ADDRESSEE: Peter McSwain/DEQ

DESCRIPTION: Review of information in application re: increased production at TWCA

12. 1. . - 0000002

DATE: 03/19/84 PAGES: 6

AUTHOR: Paul Day/EPA

ADDRESSEE: Various/Unknown

DESCRIPTION: Notification of application for TWCA for hazardous waste permit, w/attached letter from State Historic Preservation Office

12. 1. . - 0000003

DATE: 04/05/84 PAGES: 1

AUTHOR: Frederick Bender/US Dept of Interior

ADDRESSEE: Paul Day/EPA

DESCRIPTION: Comments on hazardous waste permit

12. 1. . - 0000004

DATE: 04/12/84 PAGES: 2

AUTHOR: Russell Peterson/US Dept of Interior

ADDRESSEE: Paul Day/EPA

DESCRIPTION: Comments on hazardous waste permit and endangered species

12. 1. . - 0000005

DATE: 04/17/84 PAGES: 2

AUTHOR: Jim Bottorff/US Dept of Interior

ADDRESSEE: Paul Day/EPA

DESCRIPTION: Information on listed and proposed endangered/threatened species

12. 1. . - 0000006

DATE: 09/23/87 PAGES: 9

AUTHOR: Lew Consiglieri/NOAA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Comments on sampling plan and RI/FS

12. 1. . - 0000007

DATE: 03/17/88 PAGES: 5

AUTHOR: Lew Consiglieri/NOAA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Review and comments on 2nd draft, RI/FS work plan

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

12. 1. . - 1004024

DATE: 12/27/88 PAGES: 2

AUTHOR: Bruce Blanchard/U.S. Dept. of Interior

ADDRESSEE: Charles E. Findley/EPA

DESCRIPTION: Letter stating that DOI has conducted a preliminary natural resources survey, expressing concerns and urging EPA to continue consultation with regional offices of the Fish and Wildlife Service

SUB-HEAD: 12. 2. . Reports

12. 2. . - 0000001

DATE: 06/30/85 PAGES: 4

AUTHOR: Robert Pavia/NOAA

ADDRESSEE: Neil Thompson/EPA

DESCRIPTION: Report-chemical hazard to marine resources

SUB-HEAD: 12. 3. . Memorandum of Understanding

12. 3. . - 0000001

DATE: 06/01/87 PAGES: 11

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Memorandum of Understanding among Bureau of Mines, US Dept of Interior and EPA

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 13. 0. . CONGRESSIONAL HEARINGS/INQUIRIES

SUB-HEAD: 13. 1. . Correspondence

13. 1. . - 0000001

DATE: 04/03/78 PAGES: 4

AUTHOR: L. B. Day/Oregon State Senate

ADDRESSEE: Donald Dubois/EPA

DESCRIPTION: Questions regarding regulation of TWCA

13. 1. . - 0000002

DATE: 04/21/78 PAGES: 4

AUTHOR: Donald Dubois/EPA

ADDRESSEE: Robert Straub/State of Oregon

DESCRIPTION: Hazardous waste permit and effluent limitations

13. 1. . - 0000003

DATE: 04/26/78 PAGES: 3

AUTHOR: Donald Dubois/EPA

ADDRESSEE: Al Ullman/US House of Representatives

DESCRIPTION: Water pollution control requirements and best practicable control technology

13. 1. . - 0000004

DATE: 02/09/83 PAGES: 10

AUTHOR: John Spencer/EPA

ADDRESSEE: Robert Packwood/US Senate

DESCRIPTION: Citizen concern re: disposal location for TWCA sludge

13. 1. . - 0000005

DATE: 04/16/86 PAGES: 3

AUTHOR: Michael Gearheard/EPA

ADDRESSEE: Jim Weaver/Mitchell Rothman/US House of Representatives

DESCRIPTION: Citizen concern re: wastes produced and disposed at TWCA

13. 1. . - 0000006

DATE: 01/07/88 PAGES: 7

AUTHOR: Robie Russell/EPA

ADDRESSEE: Mark Hatfield/US Senate

DESCRIPTION: Citizen concern re: delays in cleaning up TWCA

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 14. 0. . PUBLIC PARTICIPATION

SUB-HEAD: 14. 1. . Correspondence

14. 1. . - 0000001

DATE: 07/23/79 PAGES: 4

AUTHOR: Joseph Spiruta/Citizen

ADDRESSEE: Donald Dubois/EPA

DESCRIPTION: Comments on EPA circular re: hazardous waste management

14. 1. . - 0000002

DATE: 05/20/80 PAGES: 3

AUTHOR: Joseph Spiruta/Citizen

ADDRESSEE: Sharon Francis/EPA

DESCRIPTION: RE: citizen concern over perceived lack of action by EPA and DEQ  
(SEE 14.1-0015 through 14.1-0029 for related letters)

14. 1. . - 0000015

DATE: 09/01/83 PAGES: 2

AUTHOR: Lloyd K. Marbet/Forelaws on Board

ADDRESSEE: Victor Atiyeh/State of Oregon

DESCRIPTION: RE: adequacy of waste disposal laws in this state

14. 1. . - 0000016

DATE: 09/01/83 PAGES: 1

AUTHOR: Lloyd K. Marbet/Forelaws on Board

ADDRESSEE: Alexandra B. Smith/EPA

DESCRIPTION: RE: attached letter to TWCA from your office (not attached) and  
newspaper articles of August 23 and 30, followed by several  
questions.

14. 1. . - 0000017

DATE: 09/01/83 PAGES: 3

AUTHOR: Lloyd K. Marbet/Forelaws on Board

ADDRESSEE: William Young/Dept. of Environmental Quality

DESCRIPTION: Letter attaching two newspaper articles regarding response to  
hazardous industrial waste fire on the property of Teledyne, July  
25, 1983.

14. 1. . - 0000018

DATE: 09/01/83 PAGES: 1

AUTHOR: Victor Atiyeh/State of Oregon

ADDRESSEE: Lloyd Marbet/Forelaws on Board

DESCRIPTION: RE: investigation into waste disposal operations at TWCA

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 1. . - 0000019  
DATE: 01/23/84 PAGES: 1  
AUTHOR: A. Patton/Willamette University  
ADDRESSEE: Sir/Madam/Unknown  
DESCRIPTION: Requesting information on Teledyne Wah Chang
14. 1. . - 0000020  
DATE: 01/28/84 PAGES: 1  
AUTHOR: Kristen Elliott/Salem, OR  
ADDRESSEE: William Young/Environmental Quality Commission  
DESCRIPTION: Requesting information on Teledyne Wah Chang
14. 1. . - 0000021  
DATE: 01/28/84 PAGES: 1  
AUTHOR: Kristen Elliott/Salem, OR  
ADDRESSEE: Committee on Synthetic Chemicals/Salem, OR  
DESCRIPTION: Requesting information on Teledyne Wah Chang
14. 1. . - 0000022  
DATE: 01/28/84 PAGES: 1  
AUTHOR: Kristen Elliott/Salem, OR  
ADDRESSEE: Ed Zajonc/Division of State Lands, Salem, OR  
DESCRIPTION: Requesting information on Teledyne Wah Chang
14. 1. . - 0000023  
DATE: 02/09/84 PAGES: 1  
AUTHOR: Kristen Elliott/Salem, OR  
ADDRESSEE: Richard Reiter/Dept. of Environmental Quality  
DESCRIPTION: Requesting information on Teledyne Wah Chang
14. 1. . - 0000024  
DATE: 02/10/84 PAGES: 1  
AUTHOR: Ed Zajonc/Division of State Lands, Salem, OR  
ADDRESSEE: Ms. Kristen Elliott/Salem, OR  
DESCRIPTION: Response to request for information on TWCA and referring Ms. Elliott to additional resources
14. 1. . - 0000025  
DATE: 02/10/84 PAGES: 1  
AUTHOR: H. Michael Wehr/Oregon Dept of Agriculture  
ADDRESSEE: Ms. Kristen Elliott/Salem, OR  
DESCRIPTION: Response to request for information on TWCA, referring your letter to Richard Reiter, Hazardous Waste Section, DEQ

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 1. . - 0000026  
DATE: 02/16/84 PAGES: 1  
AUTHOR: Stanley G. Sturges/Dept. of Environmental Quality  
ADDRESSEE: Ms. Kristen Elliott/Salem, OR  
DESCRIPTION: Response to request for information on TWCA, inviting addressee to come to Salem office and review the files
14. 1. . - 0000027  
DATE: 02/20/84 PAGES: 1  
AUTHOR: Buford B. Roche/Unknown  
ADDRESSEE: Sir/Madam/Unknown  
DESCRIPTION: Interested in TWCA and other factories producing radioactive by products
14. 1. . - 0000028  
DATE: 02/28/84 PAGES: 1  
AUTHOR: Stanley G. Sturges/DEQ  
ADDRESSEE: Ms. A. Patton/Unknown  
DESCRIPTION: Responding to inquiry re: environmental effects at TWCA
14. 1. . - 0000029  
DATE: 03/01/84 PAGES: 1  
AUTHOR: Fred Hansen/DEQ  
ADDRESSEE: Buford B. Roche/Unknown  
DESCRIPTION: Responding to inquiry re: radioactive by-products at TWCA and other Oregon industries. Am forwarding letter to Oregon State Health Division, Attn: David Stuart-Smith.
14. 1. . - 0000003  
DATE: 03/30/87 PAGES: 6  
AUTHOR: Tim Brincefield/EPA  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Routing slip/resource list of elected officials to contact for interviews
14. 1. . - 0000004  
DATE: 04/15/87 PAGES: 1  
AUTHOR: Tim Brincefield/EPA  
ADDRESSEE: Clayton Wood/Mayor, Millersburg, OR  
DESCRIPTION: RE: assistance in setting up meeting and interviews with local residents(For related document, see 14.1-0030)
14. 1. . - 0000030  
DATE: 05/01/87 PAGES: 2  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Schedule for Community Assessment Interviews

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 1. . - 0000005

DATE: 06/02/87 PAGES: 2

AUTHOR: Ray Paris/Oregon DHR

ADDRESSEE: Lloyd Marbet/Forelaws on Board

DESCRIPTION: Citizen concern and request for information

14. 1. . - 0000006

DATE: 06/04/87 PAGES: 1

AUTHOR: Timothy Brincefield/EPA

ADDRESSEE: Lloyd Marbet/Forelaws on Board

DESCRIPTION: RE: Meeting and review of proposal from TWCA for relocation of sludges

14. 1. . - 0000007

DATE: 06/04/87 PAGES: 1

AUTHOR: Timothy Brincefield/EPA

ADDRESSEE: Joyce Martinak/League of Women Voters

DESCRIPTION: Fact sheets re: Superfund and TWCA (For related document, see 14.1-0031)

14. 1. . - 0000031

DATE: 06/05/87 PAGES: 1

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Phone message from Ray Paris to Tom Miller, asking to add Loyd (sic) K. Marbell (sic) to mailing list

14. 1. . - 0000008

DATE: 10/19/87 PAGES: 2

AUTHOR: Tim Brincefield/EPA

ADDRESSEE: File/EPA

DESCRIPTION: Draft community relations plan, fact sheets (For related documents, see 14.1-0032 and 14.1-0033)

14. 1. . - 0000032

DATE: 01/24/88 PAGES: 1

AUTHOR: Lloyd K. Marbet/Forelaws on Board

ADDRESSEE: Tom Miller/Oregon Dept of Envir Quality

DESCRIPTION: RE: resolving the final disposition of TWCA's two radioactive sludge ponds

14. 1. . - 0000033

DATE: 03/16/88 PAGES: 1

AUTHOR: Tom Miller/Hazardous and Solid Waste Division (plain paper)

ADDRESSEE: Lloyd Marbet/Forelaws on Board

DESCRIPTION: RE: request for information, welcoming addressee to come in and review available files

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 1. . - 0000009  
DATE: 03/30/88 PAGES: 4  
AUTHOR: Michael Gearheard/EPA  
ADDRESSEE: Peter Ryan/Ryan Communications  
DESCRIPTION: Clarification of EPA position on relocation of lime solids
14. 1. . - 0000011  
DATE: 08/06/89 PAGES: 1  
AUTHOR: Donald B. Driscoll/City of Millersburg, Oregon  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Comments on TWCA's cleanup alternatives
14. 1. . - 0000010  
DATE: 08/29/89 PAGES: 2  
AUTHOR: Dave Thies/Unknown  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: RE: TWCA's proposal to dump their sludge in municipal landfills
14. 1. . - 0000012  
DATE: 09/06/89 PAGES: 2  
AUTHOR: Keith Rohrbough/City of Albany  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: City of Albany comments re: TWCA alternatives
14. 1. . - 0000013  
DATE: 09/15/89 PAGES: 2  
AUTHOR: George D. Ward/George D. Ward & Associates  
ADDRESSEE: Neil Thompson/EPA  
DESCRIPTION: Brief summary of questions discussed at 9/6/89 public meeting
14. 1. . - 0000014  
DATE: 09/18/89 PAGES: 1  
AUTHOR: Michelle Pirzadeh/EPA  
ADDRESSEE: Carol Rushin/EPA  
DESCRIPTION: Request for extension of public comment period
14. 1. . - 0010144  
DATE: 10/30/91 PAGES: 1  
AUTHOR: Krista Rave/EPA  
ADDRESSEE: Records Clerk/Albany City Hall  
DESCRIPTION: Letter stating that EPA will discontinue use of the Albany City Hall as an information repository



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 1. . - 1025048

DATE: 08/27/93 PAGES: 1

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Lloyd Marbet/Unknown

DESCRIPTION: Cover letter for requested documents

14. 1. . - 0011882

DATE: 09/23/93 PAGES: 1

AUTHOR: A. E. Riesen/Teledyne Wah Chang

ADDRESSEE: Carol Rushin/EPA

DESCRIPTION: Letter requesting one month extension of public comment period

14. 1. . - 1025047

DATE: 09/29/93 PAGES: 2

AUTHOR: Howard Orlean/EPA

ADDRESSEE: Noel L. Vaughn/Teledyne Wah Chang Albany

DESCRIPTION: Letter re: comments on proposed plan

14. 1. . - 0011881

DATE: 10/22/93 PAGES: 2

AUTHOR: Mark B. Siddall/Teledyne Wah Chang

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Correction to oral testimony given at public hearing held in Albany, OR regarding the TWCA Cleanup plan

SUB-HEAD: 14. 2. . Community Relations Plan

14. 2. . - 0000001

DATE: 11/01/87 PAGES: 30

AUTHOR: Unknown/Camp Dresser & McKee, Inc.

ADDRESSEE: Unknown/EPA

DESCRIPTION: Community Relations Plan for TWCA

14. 2. . - 0010145

DATE: 10/01/91 PAGES: 6

AUTHOR: EPA/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Revised Superfund Community Relations Plan

SUB-HEAD: 14. 3. . Fact Sheets/Press Releases

14. 3. . - 0000007

DATE: / / PAGES: 9

AUTHOR: Unknown/Citizens for Responsible Radioactive Waste Disposal

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Fact sheet/Radioactive waste disposal in Oregon

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 3. . - 0000001  
DATE: 07/14/78 PAGES: 5  
AUTHOR: Unknown/DEQ  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Fact sheet/Application for renewal of National Pollutant Discharge Elimination System permit

14. 3. . - 0000002  
DATE: 02/15/87 PAGES: 1  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Press release/level of radioactivity in two TWCA sludge ponds (See related document, 14.3-0014)

14. 3. . - 0000014  
DATE: 03/20/87 PAGES: 2  
AUTHOR: Unknown/Moba Media Inc.  
ADDRESSEE: KPTV Ch. 12/Unknown  
DESCRIPTION: Press release

14. 3. . - 0000003  
DATE: 04/01/87 PAGES: 4  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/General Public  
DESCRIPTION: Fact sheet/Superfund project update

14. 3. . - 0000004  
DATE: 05/01/87 PAGES: 5  
AUTHOR: Unknown/TWCA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Press release/Relocation and storage of lime solids

14. 3. . - 0000005  
DATE: 06/22/87 PAGES: 6  
AUTHOR: Unknown/TWCA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Press release/EPA taking primary responsibility for considering TWCA request to relocate lime solids (See related document, 14.3-0015)

14. 3. . - 0000015  
DATE: 06/23/87 PAGES: 2  
AUTHOR: Jim Denham/Ryan Communications  
ADDRESSEE: Press/Unknown  
DESCRIPTION: Press release

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 3. . - 0000006

DATE: 09/01/87 PAGES: 3

AUTHOR: Neil Thompson/Jo Brooks/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Fact sheet/RI/FS work plan, draft community relations plan and sludge ponds

14. 3. . - 0000008

DATE: 02/01/88 PAGES: 4

AUTHOR: Jim Denham/TWCA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Press release/A synopsis of lime solids issue

14. 3. . - 0000012

DATE: 11/30/88 PAGES: 3

AUTHOR: Unknown/EPA

ADDRESSEE: General Public/Unknown

DESCRIPTION: Fact sheet/Update on Superfund activities at TWCA

14. 3. . - 0000009

DATE: 08/16/89 PAGES: 7

AUTHOR: Neil Thompson/EPA

ADDRESSEE: General Public/Unknown

DESCRIPTION: Fact sheet/The Proposed Plan w/announcement of public meeting and comment period

14. 3. . - 0000010

DATE: 09/27/89 PAGES: 2

AUTHOR: Neil Thompson/EPA

ADDRESSEE: General Public/Unknown

DESCRIPTION: Fact sheet/Announcement of an Extension of public comment period

14. 3. . - 0000011

DATE: 10/11/90 PAGES: 3

AUTHOR: Unknown/EPA

ADDRESSEE: General Public/Unknown

DESCRIPTION: Fact sheet/Update on Superfund activities at TWCA

14. 3. . - 0000013

DATE: 03/05/91 PAGES: 1

AUTHOR: Unknown/EPA

ADDRESSEE: General Public/Unknown

DESCRIPTION: Fact sheet/EPA Issues Unilateral Order, Overall Site Investigation Continues

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 3. . - 0010147  
DATE: 07/25/91 PAGES: 2  
AUTHOR: EPA/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Superfund Fact Sheet including information on Sludge Pond Cleanup, Community Relations Plan Update, and background information

14. 3. . - 0010146  
DATE: 02/19/92 PAGES: 2  
AUTHOR: EPA/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Superfund Fact Sheet updating the public on activities at the TWC site

14. 3. . - 0010148  
DATE: 04/01/93 PAGES: 1  
AUTHOR: EPA/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Superfund Fact Sheet update on Schmidt Lake and RI/FS

SUB-HEAD: 14. 4. . Comments and Responses

14. 4. . - 0011777  
DATE: / / PAGES: 1  
AUTHOR: Bill Kiewel/Albany Chamber of Commerce  
ADDRESSEE: Unknown/  
DESCRIPTION: Comments re: EPA Public Hearing for Teledyne Wah Chang

14. 4. . - 0000001  
DATE: 10/19/82 PAGES: 22  
AUTHOR: Unknown/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Letters/placement of TWCA on list of Superfund sites

14. 4. . - 0011775  
DATE: 09/01/93 PAGES: 1  
AUTHOR: Beverly Kauffman/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011776  
DATE: 09/10/93 PAGES: 1  
AUTHOR: R. B. Keller/Keller Enterprises, Inc.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011784  
DATE: 09/10/93 PAGES: 1  
AUTHOR: Jim Kirsch/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang Proposed Plan
14. 4. . - 1025035  
DATE: 09/10/93 PAGES: 8  
AUTHOR: C. M. Bishop/Unknown  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comment letter and attached information sent to Bishop by Teledyne Wah Chang Albany
14. 4. . - 0011840  
DATE: 09/13/93 PAGES: 2  
AUTHOR: Dwight A. Sangrey/Oregon Graduate Institute of Science and  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 1025036  
DATE: 09/13/93 PAGES: 6  
AUTHOR: Bob Evans/Evans Components  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comment letter and attached information sent to Bishop by Teledyne Wah Chang Albany
14. 4. . - 0011778  
DATE: 09/14/93 PAGES: 1  
AUTHOR: Kim Sass/First Care Health  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011780  
DATE: 09/14/93 PAGES: 2  
AUTHOR: Herbert F. Sass/Combined Metals of Chicago  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011781  
DATE: 09/14/93 PAGES: 2  
AUTHOR: Mel Joy/Albany-Millersburg, Oregon Economic Development Corp.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011786

DATE: 09/14/93 PAGES: 1

AUTHOR: R. T. Saltmarsh/Familian Northwest

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011796

DATE: 09/14/93 PAGES: 2

AUTHOR: Katherleen Dill/

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011834

DATE: 09/14/93 PAGES: 1

AUTHOR: Steve Bryant/City of Albany

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011837

DATE: 09/14/93 PAGES: 2

AUTHOR: Liz Van Leeuwen/House of Representatives, Oregon

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025039

DATE: 09/14/93 PAGES: 7

AUTHOR: Greg Look/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Letter from TWCA sent to Greg Look with Mr. Look's comments  
handwritten upon it

14. 4. . - 0011782

DATE: 09/15/93 PAGES: 1

AUTHOR: Harold Stroh/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011783

DATE: 09/15/93 PAGES: 1

AUTHOR: Robert D. Stalick/Greater Albany Public School District 8J

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011787

DATE: 09/15/93 PAGES: 1

AUTHOR: John A. Carson/Carson Oil Co.

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011789

DATE: 09/15/93 PAGES: 2

AUTHOR: Jeffrey J. Manchester/James River Corporation

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011771

DATE: 09/16/93 PAGES: 1

AUTHOR: Darrel Morgan/Santiam Liquor Store

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011790

DATE: 09/16/93 PAGES: 1

AUTHOR: Louis LaGrand/La Grand Industrial Supply Co.

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011794

DATE: 09/16/93 PAGES: 1

AUTHOR: Bob Weiler/Stephens Heating and Air Conditioning

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011804

DATE: 09/16/93 PAGES: 1

AUTHOR: Gary G. Stevens/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025042

DATE: 09/16/93 PAGES: 2

AUTHOR: Bill Machugh/Jackson Cooper Associates

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comment letter

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011785

DATE: 09/17/93 PAGES: 2

AUTHOR: Gary M. Grossman/KRKT

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011788

DATE: 09/17/93 PAGES: 1

AUTHOR: David B. Beckham/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011791

DATE: 09/17/93 PAGES: 1

AUTHOR: Concerned Citizen/Albany, OR

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011793

DATE: 09/17/93 PAGES: 2

AUTHOR: Mike Nading/Rodda Paint

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011799

DATE: 09/17/93 PAGES: 2

AUTHOR: Brian E. Nicol/Mill Supply Corp.

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011835

DATE: 09/17/93 PAGES: 2

AUTHOR: Arthur Koch/Quality Tank & Construction Co.

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025041

DATE: 09/17/93 PAGES: 1

AUTHOR: Robert S. Rapp/Diplomate, American Board of Allergy and Immunology

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comment letter



(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011774

DATE: 09/19/93 PAGES: 1

AUTHOR: Glenn Koehrsen/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011795

DATE: 09/19/93 PAGES: 1

AUTHOR: Nancy Mickleberry/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011800

DATE: 09/19/93 PAGES: 1

AUTHOR: Robert H. Williams/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011797

DATE: 09/20/93 PAGES: 1

AUTHOR: Charles Cook/Oregon Dept. of Environmental Quality

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011798

DATE: 09/20/93 PAGES: 2

AUTHOR: Stephen D. Gross/Pape Group

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011801

DATE: 09/20/93 PAGES: 1

AUTHOR: Alfred A. Rasmus/

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011803

DATE: 09/20/93 PAGES: 2

AUTHOR: Lawrence J. Hall/Albany Precision Machine Inc.

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011808  
DATE: 09/20/93 PAGES: 1  
AUTHOR: Carolyn Oakley/House of Representatives, Oregon  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011810  
DATE: 09/20/93 PAGES: 1  
AUTHOR: Louis Kimzey/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011813  
DATE: 09/20/93 PAGES: 1  
AUTHOR: James H. Jordan/Unknown  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025043  
DATE: 09/20/93 PAGES: 1  
AUTHOR: Carl B. Tyner/United Steelworkers of America  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comment letter

14. 4. . - 1025046  
DATE: 09/20/93 PAGES: 1  
AUTHOR: Russell Tripp/Unknown  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comment letter

14. 4. . - 0011773  
DATE: 09/21/93 PAGES: 1  
AUTHOR: Eric Schweitz/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011806  
DATE: 09/21/93 PAGES: 1  
AUTHOR: Fredrick C. Dunmire/Dunmire Nissan  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011809

DATE: 09/21/93 PAGES: 1

AUTHOR: David G. Brown/Steamway Cleaning

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011832

DATE: 09/21/93 PAGES: 2

AUTHOR: Mark Lottis/Valley Welding Supply Co.

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025040

DATE: 09/21/93 PAGES: 2

AUTHOR: Mae Yih/Oregon State Senate

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comment letter supporting Alternative 3

14. 4. . - 1025045

DATE: 09/21/93 PAGES: 9

AUTHOR: Leon G. Lewis/ERA Ranson & Smith Realty

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comment letter (letter sent by TWCA to Mr. Lewis attached)

14. 4. . - 0011805

DATE: 09/22/93 PAGES: 1

AUTHOR: Steve Webb/

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011827

DATE: 09/22/93 PAGES: 1

AUTHOR: Orano W. Grindahl/Grindy's Machine and Lab, Inc.

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011828

DATE: 09/22/93 PAGES: 1

AUTHOR: Mary E. Ponticia/Unknown

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011852  
DATE: 09/22/93 PAGES: 2  
AUTHOR: Maxine Humphrey/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011817  
DATE: 09/23/93 PAGES: 1  
AUTHOR: Willis R. Grafe/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011826  
DATE: 09/23/93 PAGES: 1  
AUTHOR: Bob Boucher/Wines Realty  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011833  
DATE: 09/23/93 PAGES: 2  
AUTHOR: John G. Pascone/Linn-Benton Community College  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011811  
DATE: 09/24/93 PAGES: 1  
AUTHOR: Dianne George/Toby's Auto Parts, Inc.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011822  
DATE: 09/24/93 PAGES: 1  
AUTHOR: Sharon Pascone/Creditors Collection Service, Inc.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011824  
DATE: 09/24/93 PAGES: 1  
AUTHOR: Michael T. McLaran/Albany Oregon Chamber of Commerce  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011825  
DATE: 09/24/93 PAGES: 1  
AUTHOR: Herb Smith/ERA Ransom & Smith Realty  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011829  
DATE: 09/24/93 PAGES: 1  
AUTHOR: Bradley K. Pence/Brad Pence Investments Inc.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011830  
DATE: 09/24/93 PAGES: 2  
AUTHOR: Tom AAsum/Autumn Chapel  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011831  
DATE: 09/24/93 PAGES: 2  
AUTHOR: Loren Humphrey/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011819  
DATE: 09/26/93 PAGES: 1  
AUTHOR: Debra Wendt/Sure-Flow Inc.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011814  
DATE: 09/27/93 PAGES: 1  
AUTHOR: Debbie Summers/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang
14. 4. . - 0011816  
DATE: 09/27/93 PAGES: 1  
AUTHOR: David E. Bergman/Elf Atochem  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011818  
DATE: 09/27/93 PAGES: 2  
AUTHOR: Philip E. Sanker/Federal-Metals Central Credit Union  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011821  
DATE: 09/27/93 PAGES: 1  
AUTHOR: Grant Lindsay/Hump Pilots Association  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011823  
DATE: 09/27/93 PAGES: 1  
AUTHOR: David McGarry/United Carpet Network of Oregon  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011846  
DATE: 09/27/93 PAGES: 1  
AUTHOR: William Strohlein/SRC  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025044  
DATE: 09/27/93 PAGES: 1  
AUTHOR: Robert M. Beil/Hub City Concrete Co.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comment letter

14. 4. . - 0011820  
DATE: 09/30/93 PAGES: 1  
AUTHOR: Richard A. Day/PED Manufacturing, Ltd.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025037  
DATE: 09/30/93 PAGES: 2  
AUTHOR: Jim Kersch/Unknown  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments regarding EPA's treatment of Teledyne Wah Chang Albany

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011815  
DATE: 10/04/93 PAGES: 1  
AUTHOR: Hugh E. Ballinger/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011851  
DATE: 10/04/93 PAGES: 2  
AUTHOR: Richard E. Owen/D O Engineering Services  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011812  
DATE: 10/05/93 PAGES: 24  
AUTHOR: Unknown/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Teledyne Wah Chang Albany Comments Opposing EPA's August 25, 1993  
Proposed Plan on the Teledyne Wah Chang Albany Superfund Site in  
Millersburg, Oregon

14. 4. . - 0011842  
DATE: 10/06/93 PAGES: 1  
AUTHOR: Gary F. Schaeffer/Gary & Merle's Tire Service, Inc.  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011838  
DATE: 10/17/93 PAGES: 1  
AUTHOR: Vernon A. Nelson/  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011849  
DATE: 10/18/93 PAGES: 1  
AUTHOR: Robert O. Young/United Steelworkers  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011845  
DATE: 10/22/93 PAGES: 2  
AUTHOR: Mark B. Siddall/Teledyne Wah Chang  
ADDRESSEE: Howard Orlean/EPA  
DESCRIPTION: Correction to oral testimony given at public hearing held in  
Albany, OR regarding TWCA Cleanup Plan

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 4. . - 0011841

DATE: 10/25/93 PAGES: 1

AUTHOR: James C. McKinnell/

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011839

DATE: 10/26/93 PAGES: 1

AUTHOR: Tom Cordier/

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011836

DATE: 10/27/93 PAGES: 1

AUTHOR: Paul H. Kuebrich/City of Millersburg, Oregon

ADDRESSEE: Joan Shirley/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011843

DATE: 10/27/93 PAGES: 2

AUTHOR: Chris Mebane/National Oceanic and Atmospheric Administration

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 0011848

DATE: 10/27/93 PAGES: 12

AUTHOR: Unknown/Teledyne Wah Chang

ADDRESSEE: Unknown/EPA

DESCRIPTION: Supplemental Comments on EPA's Proposed Plan for the Teledyne Wah Chang Albany Plant in Millersburg, Oregon

14. 4. . - 0011850

DATE: 10/27/93 PAGES: 1

AUTHOR: Glenn Allen Kirkindall/

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comments re: Teledyne Wah Chang

14. 4. . - 1025038

DATE: 11/01/93 PAGES: 2

AUTHOR: Francis E. Kaiser/Albany Animal Hospital

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: Comment letter regarding proposed EPA regulations for Teledyne Wah Chang Albany

SUB-HEAD: 14. 5. . Notice of Public Meetings



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14. 5. . - 0011853  
DATE: / / PAGES: 1  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/  
DESCRIPTION: Notice that Public Comment Period for the Teledyne Wah Chang Superfund Site has been extended to October 27, 1993

14. 5. . - 0011854  
DATE: / / PAGES: 1  
AUTHOR: Unknown/Albany Democrat-Herald  
ADDRESSEE: Unknown/  
DESCRIPTION: Newspaper Notice for Public Comment Period from 8/27/93 through 9/27/93

14. 5. . - 0000001  
DATE: 08/23/89 PAGES: 5  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Public voucher for Advertising for Notice of Public Comment Period

14. 5. . - 0000002  
DATE: 09/15/89 PAGES: 5  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Public voucher for Advertising for Notice of Extension of public comment period

14. 5. . - 0000003  
DATE: 07/15/91 PAGES: 1  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/General Public  
DESCRIPTION: Notice of Superfund Open House for TWCA Superfund Site

SUB-HEAD: 14. 6. . Public Meeting Transcripts

14. 6. . - 0000001  
DATE: 09/06/89 PAGES: 71  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/General Public  
DESCRIPTION: Transcript of public meeting held at Linn-Benton Community College on 9/6/89. (See also 14.6-0002)

14. 6. . - 0000002  
DATE: 10/12/89 PAGES: 1  
AUTHOR: Michelle Pirzadeh/EPA  
ADDRESSEE: Unknown/General Public  
DESCRIPTION: List of corrections for transcript of public meeting cited in 14.6-0001

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 6. . - 0011768

DATE: 09/14/93 PAGES: 108

AUTHOR: Unknown/Cowgill Court Reporting

ADDRESSEE: Unknown/EPA

DESCRIPTION: Transcript of Proceedings : Public Meeting to discuss Proposed Plan  
Teledyne Wah Chang

14. 6. . - 0011769

DATE: 10/15/93 PAGES: 70

AUTHOR: Kathey L. Holmes/Bayside Reporters

ADDRESSEE: Unknown/EPA

DESCRIPTION: Proceedings : Minutes of Meeting with Teledyne Wah Chang Group  
regarding Superfund Proposed Plan

SUB-HEAD: 14. 7. . Public Meeting Testimonies

14. 7. . - 0000001

DATE: 09/06/89 PAGES: 1

AUTHOR: Liz VanLeeuwen/Oregon House of Reps

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Re: proposed cleanup alternative

14. 7. . - 0000002

DATE: 09/06/89 PAGES: 2

AUTHOR: Mae Yih/Oregon State Senate

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Re: proposed cleanup alternative

14. 7. . - 0000003

DATE: 09/06/89 PAGES: 1

AUTHOR: John E. Buchner/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Re: support for preferred alternative

14. 7. . - 0000004

DATE: 09/06/89 PAGES: 2

AUTHOR: Larry J. Johnson/Linn Co. Board of Commissioners

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Re: support for TWCA

SUB-HEAD: 14. 8. . Proposed Plan

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

14. 8. . - 0010576

DATE: 08/25/93 PAGES: 19

AUTHOR: EPA/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Superfund Proposed Plan Teledyne Wah Chang Albany Millersburg,  
Oregon

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

HEADING: 15. 0. . TECHNICAL SOURCES AND GUIDANCE DOCUMENTS

SUB-HEAD: 15. 1. . Maps and Photographs

15. 1. . - 0000005

DATE: / / PAGES: 1

AUTHOR: Unknown/TWCA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Map/TWCA plant layout

15. 1. . - 0000001

DATE: 03/15/76 PAGES: 2

AUTHOR: Unknown/TWCA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Diagram and explanation of zirconium production

15. 1. . - 0000002

DATE: 11/28/77 PAGES: 3

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Photographs/lower river sludge pond

15. 1. . - 0000003

DATE: 03/15/82 PAGES: 1

AUTHOR: Unknown/TWCA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Map/Solid storage pond and pond #5 site plan (Actual map located at EPA Region 10 Office, Seattle, WA)

15. 1. . - 0000004

DATE: 05/21/82 PAGES: 1

AUTHOR: Unknown/TWCA

ADDRESSEE: Unknown/EPA

DESCRIPTION: Map/Location of water bodies and monitoring wells in TWCA area (Actual map located at EPA Region 10 office, Seattle, WA)

SUB-HEAD: 15. 2. . Technical Sources

15. 2. . - 1025058

DATE: / / PAGES: 42

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Statement of Work for the Remedial Design and Remedial Action for the Sitcum Waterway Problem Area and Other Areas of the Commencement Bay Nearshore/Tideflats Superfund Site Pierce County, Washington

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

15. 2. . - 1025055

DATE: 09/09/76 PAGES: 395

AUTHOR: Bonnie L. Carson/Midwest Research Institute

ADDRESSEE: Warren T. Pivar/National Institute of Environmental Health Sciences

DESCRIPTION: Zirconium : An Appraisal of Environmenal Exposure

15. 2. . - 0000001

DATE: 01/01/79 PAGES: 47

AUTHOR: Unknown/Pacific Northwest Research Center

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Report-Zirconium Hazards and Nuclear Profits

15. 2. . - 0010149

DATE: 02/01/92 PAGES: 2

AUTHOR: Chris Hall/EPA

ADDRESSEE: Howard Orlean/EPA

DESCRIPTION: (date is approximate) General Procedural Guideline to be followed under Oregon regulations concerning air toxic compounds and remediation procedures

15. 2. . - 1025060

DATE: 09/04/92 PAGES: 152

AUTHOR: Constantine Sidamon-Eristoff/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Superfund Record of Decision : Facet Enterprises, NY

15. 2. . - 1025059

DATE: 09/28/92 PAGES: 90

AUTHOR: Constantine Sidamon-Eristoff/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Superfund Record of Decision : Kin-Buc Landfill, NJ

SUB-HEAD: 15. 3. . Guidance Documents

15. 3. . - 0000001

DATE: / / PAGES: 2

AUTHOR: Unknown/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: List of guidance documents

15. 3. . - 0010567

DATE: 05/16/88 PAGES: 37

AUTHOR: J. Winston Porter/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Interim Guidance on Potentially Responsible Party Participation in Remedial Investigations and Feasibility Studies (Directive 9835.1a)

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

15. 3. . - 1021615  
DATE: 08/08/88 PAGES: 36  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: CERCLA Compliance With Other Laws Manual : Draft Guidance
15. 3. . - 0010568  
DATE: 06/02/89 PAGES: 31  
AUTHOR: Bruce M. Diamond/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Model Statement of Work for a Remedial Investigation and Feasibility Study Conducted by Potentially Responsible Parties (Directive 9835.8)
15. 3. . - 1021612  
DATE: 10/18/89 PAGES: 8  
AUTHOR: Jonathan Z. Cannon/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Considerations in Ground Water Remediation at Superfund Sites, OSWER Directive No. 9355.4-03
15. 3. . - 1021616  
DATE: 08/01/90 PAGES: 148  
AUTHOR: Unknown/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Guidance on Remedial Actions for Superfund Sites With PCB Contamination
15. 3. . - 0010572  
DATE: 10/10/90 PAGES: 9  
AUTHOR: Henry L. Longest/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Suggested ROD Language for Various Ground Water Remediation Options
15. 3. . - 0010575  
DATE: 12/03/90 PAGES: 103  
AUTHOR: Don R. Clay/EPA  
ADDRESSEE: Regional Administrators, Regions I-X/EPA  
DESCRIPTION: Final Guidance on Administrative Records for Selecting CERCLA Response Actions (Directive 9833.3A-1)
15. 3. . - 0010570  
DATE: 04/22/91 PAGES: 10  
AUTHOR: Don R. Clay/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions (Directive 9355.0-30)

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

15. 3. . - 0011862

DATE: 05/01/91 PAGES: 7

AUTHOR: EPA/

ADDRESSEE: Unknown/

DESCRIPTION: Osver Directive #9834.13FS "Summary of "Interim Policy on CERCLA Settlements Involving Municipalities and Municipal Wastes""

15. 3. . - 0010574

DATE: 07/02/91 PAGES: 28

AUTHOR: Don R. Clay/EPA

ADDRESSEE: Regional Administrators, Regionx I-X/EPA

DESCRIPTION: Supplemental Guidance on Performing Risk Assessments in Remedial Investigation/Feasibility Studies (RI/FSS) Conducted by Potentially Responsible Parties (PRPs) (Directive 9835.15a)

15. 3. . - 1021614

DATE: 08/16/91 PAGES: 76

AUTHOR: Unknown/EPA

ADDRESSEE: Unknown/Unknown

DESCRIPTION: EPA Region 10 Supplemental Risk Assessment Guidance for Superfund

15. 3. . - 0010573

DATE: 12/13/91 PAGES: 68

AUTHOR: Henry L. Longest II/EPA

ADDRESSEE: Regional Waste Management Division Directors/EPA

DESCRIPTION: Human Health Evaluation Manual, Part B: "Development of Risk-based Preliminary Remediation Goals" (Directive 9285.7-01B)

15. 3. . - 0011863

DATE: 01/07/92 PAGES: 13

AUTHOR: Bruce M. Diamond/EPA

ADDRESSEE: Director, Hazardous Waste Division/EPA, Region X

DESCRIPTION: Interim Cashout Settlement Procedures

15. 3. . - 0010569

DATE: 02/26/92 PAGES: 40

AUTHOR: F. Henry Habicht/EPA

ADDRESSEE: Assistant Administrators, Regional Administrators/EPA

DESCRIPTION: Guidance on Risk Characterization for Risk Managers and Risk Assessors

15. 3. . - 1004025

DATE: 05/01/92 PAGES: 158

AUTHOR: EPA/Unknown

ADDRESSEE: Unknown/Unknown

DESCRIPTION: Facility Pollution Prevention Guide

(TWCAR) TELEDYNE WAH CHANG ALBANY - ADMINISTRATIVE RECORD INDEX

15. 3. . - 0010571  
DATE: 05/27/92 PAGES: 13  
AUTHOR: Don R. Clay/EPA  
ADDRESSEE: Unknown/EPA  
DESCRIPTION: Considerations in Ground-Water Remediation at Superfund Sites and RCRA Facilities - Update (Directive #9283.1-06)
15. 3. . - 1004026  
DATE: 02/16/93 PAGES: 29  
AUTHOR: EPA/Unknown  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: Federal Register Notice, 2/16/93 FR/Vol. 58, No. 29/8658-8685  
Corrective Action Management Units and Temporary Units : Corrective Action Provisions : Final Rule
15. 3. . - 1021613  
DATE: 09/01/93 PAGES: 10  
AUTHOR: Richard J. Guimond/EPA  
ADDRESSEE: Unknown/Unknown  
DESCRIPTION: New Policy on Performance of Risk Assessments During Remedial Investigation/Feasibility Studies (RI/FS) Conducted by Potentially Responsible Parties (PRPs) OSWER No. 9835.15b (sent to all Regional Administrators)
15. 3. . - 0011859  
DATE: 10/04/93 PAGES: 33  
AUTHOR: Richard J. Guimond/EPA  
ADDRESSEE: Director, Hazardous Waste Division/EPA Region X  
DESCRIPTION: Memorandum "Transmittal of OSWER Directive 9234.2-25 "Guidance for Evaluating the Technical Impracticability of Groundwater Restoration"
15. 3. . - 1021617  
DATE: 06/03/94 PAGES: 5  
AUTHOR: Howard Orlean/EPA  
ADDRESSEE: Administrative Record/EPA  
DESCRIPTION: Annotated Bibliography of Some Significant Documents which were Utilized by EPA in Selecting a Remedy for Groundwater and Sediment at the Teledyne Wah Chang Albany Superfund site
- SUB-HEAD: 15. 4. . Laboratory Analytical Protocols
15. 4. . - 0010150  
DATE: 08/29/91 PAGES: 110  
AUTHOR: Accu-Labs Research/Unknown  
ADDRESSEE: Teledyne Wah Chang/Unknown  
DESCRIPTION: Laboratory Analytical Protocols Radium-226 and Radium-228