

Reynolds Metals Company (RMC)  
Superfund Site  
Troutdale, Oregon

**Record of Decision**  
for  
Interim Remedial Action

September 30, 2002

## **PART 1: THE DECLARATION**

### **Site Name and Location**

The Reynolds Metals Company's (RMC) facility, currently owned by Alcoa, Inc., is located on Sundial Road in Troutdale, Oregon. The Environmental Protection Agency (EPA) identification number is ORD009412677.

This Record of Decision (ROD) is an interim action.

### **Statement of Basis and Purpose**

This decision document presents the Selected Remedy for the RMC Site, which was chosen in accordance with Comprehensive Environmental Response Compensation And Liability Act (CERCLA), as amended, and to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record file for this Site.

The State of Oregon concurs with the Selected Remedy.

### **Assessment of Site**

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health, welfare, or the environment.

### **Description of Selected Remedy**

The Selected Interim Action Remedy for the RMC Site consists of :

- ! Removing contaminated process residue from Company Lake
- ! Excavating contaminated waste and soil from the south landfill area
- ! Excavating contaminated waste material from the eastern portion of the north landfill area, and installing a riprap (soil and rocks) cover over the western portion of the landfill
- ! Off-site disposal of excavated waste material at a permitted disposal facility
- ! Installing extraction wells in the east potliner and scrap yard areas to remove and

- ! contain groundwater contaminated with high levels of fluoride
- ! Modifying the operation of existing production wells to limit the further spread of fluoride in the groundwater
- ! Discharging groundwater from the combined production wells/focused extraction system to the Columbia River
- ! Monitoring groundwater to evaluate the effectiveness of source removal and focused extraction
- ! Limiting future use (through the use of engineering and institutional controls) of shallow groundwater and portions of the property to ensure the remedy remains protective.

### **Statutory Determinations**

The Selected Interim Action is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate for this limited-scope action and is cost-effective. This action is interim and is not intended to utilize permanent solutions and alternative technologies. Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed in the final response action. Because this remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Because this is an interim action ROD, review of this Site and of this remedy will be ongoing as EPA continues to develop final remedial alternatives for this Site.

### **Authorizing Signature**

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Michael F Gearheard, Director  
Environmental Cleanup Office  
EPA - Region 10

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Date

## **PART 2: THE DECISION SUMMARY**

### **1. SITE NAME, LOCATION, AND BRIEF DESCRIPTION**

The RMC facility, currently owned by Alcoa, is a primary aluminum reduction plant where alumina is reduced to aluminum. The plant is located about 20 miles east of Portland, Oregon, and 1.25 miles north of the City of Troutdale, Oregon (see Figure 1). The property is bordered by the Columbia River to the north, the Sandy River to the east, the Troutdale Airport to the south, and Salmon Creek to the west. Alcoa owns the 80.25 acre plant area and approximately 715 acres of surrounding rural land. A US Army Corps of Engineers (COE) dike runs approximately east-west through the northern portion of the property, then turns south at the eastern property boundary. Site areas north and east of the dike are located within the 100 year flood plain.

The plant process buildings occupy the central portion of the Site. Site areas north of the dike are wooded with heavy vegetation in some areas. The surrounding area to the west and south is mainly used for agriculture and commercial purposes.

EPA is the lead agency for this Site and the Oregon Department of Environmental Quality (DEQ) is the support agency involved.

### **2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES**

#### **2.1 Site History**

The plant was constructed for the US Government in 1941 to produce aluminum for wartime operations. RMC first leased the plant from the government in 1946 and purchased it in 1949. Alcoa Inc. recently acquired Reynolds Metals Company, including the Troutdale aluminum reduction facility. Operations at the Troutdale plant were suspended in the fall of 2000, and Alcoa recently announced permanent closure of the facility.

#### **2.2 Actions to Date**

RMC has conducted several early cleanup actions on the Site since it was added to the National Priorities List (NPL) in December 1994. The early actions were removal actions completed under EPA oversight in areas identified as high priority source areas of contamination. The following summarizes the cleanup actions undertaken at specific sources of contamination at the Site.

Cryolite Ponds - Three settling ponds south of the main production facility were used for

storage and disposal of cryolite, a waste material containing high levels of fluoride and other metals. RMC has excavated and disposed of approximately 13,900 tons of cryolite at an off-site disposal facility.

East Potliner - An area located east of the main facility was formerly used to store spent potliner, a production waste containing high levels of fluoride, cyanide, and polyaromatic hydrocarbons (PAHs). More than 11,000 tons of potliner and contaminated soil were excavated from this area and transported to an off-site disposal facility.

PCB Spill Area - Soil adjacent to the casthouse building was contaminated with PCBs. The concrete and siding outside the building were also contaminated by PCBs, and the casthouse contained PCB contaminated dust. A cleanup inside and outside the building resulted in more than 580 tons of PCB contaminated soil and debris being removed from the Site and disposed at an off-site disposal facility.

The Bakehouse Sumps - A network of 21 dewatering sumps that were located around the bakehouse to keep shallow groundwater out of the subsurface bake pits contained fluoride, cyanide, and PAHs. RMC cleaned out the contaminated sumps and disposed the waste material off-site. Surface water runoff was redirected to prevent further contamination from surface sources.

Diesel Spill Area - Two acres east of the main facility were heavily contaminated with diesel fuel and oil. Reynolds has excavated and disposed of more than 2,600 tons of contaminated soil from this area.

Production Well Abandonments - Nine wells located at the plant site that were no longer in use needed to be decommissioned properly to prevent them from acting as conduits for the spread of contamination in shallow groundwater.

Company Lake Process Residue - an estimated 3,300 cubic yards of contaminated process residue was excavated from a portion of Company Lake and transported to a permitted off-site disposal facility in October, 2001. This partial removal of process residue provided information about the feasibility of dewatering Company Lake and removing the waste using conventional mechanical equipment,

Scrap Yard - Removal of contaminated waste material from the scrap yard area will be completed this fall. An estimated 3,800 cubic yards of waste material that is contaminated with fluoride, metals, and PAHs will be excavated from the north portion of the scrap yard area. The waste material is a primary source of contamination in the South Plant area.

Other early actions completed during the remedial investigation include removal of PCB-contaminated soil from the South Wetlands area and removal of contaminated sediments and process residue from south ditch. Waste from these areas was transported to an off-site disposal facility for disposal.

### **2.3 Investigation History**

Several investigations were conducted at this Site prior to the initiation of the RI/FS. PRC Environmental Management conducted a Site reconnaissance in January 1993 and prepared a report *Final Site Inspection Prioritization Report*, October 19, 1993. RMC investigations were conducted by CH2M Hill in 1994 and 1995.

### **2.4 Enforcement History**

The Site was placed on the Superfund National Priorities List (NPL) in 1994. On September 29, 1995 EPA and RMC signed a Consent Order for preparation of an Remedial Investigation and Feasibility Study (RI/FS) and performance of early actions at the Site under EPA's oversight. RMC has undertaken several early cleanup actions and recently completed the RI/FS, which provided the results of the site investigation and analysis of cleanup alternatives.

## **3. HIGHLIGHTS OF COMMUNITY PARTICIPATION**

The Proposed Plan, Remedial Investigation Report, Feasibility Study Report, and Human Health and Ecological Baseline Risk Assessment Reports, as well as other technical and site-related documents were made available to the public in August 2002. They can be found in the Administrative Record file, which is located at the Gresham Regional Library, located at 385 NW Miller in Gresham, OR and the Superfund Records Center, EPA Region 10, 1200 Sixth Avenue, Seattle, Washington.

The public comment period for the Proposed Plan was held from August 29, 2002 to September 28, 2002. The notice of availability of the Proposed Plan and opportunity to comment was published in the Oregonian on August 28, 2002. A fact sheet summarizing the Proposed Plan was mailed to approximately 50 people on EPA's mailing list for the Site. Copies of the Proposed Plan were mailed to persons who requested copies based on the fact sheet or the public notice. No comments were received during the 30-day public comment period.

Fact sheets were issued periodically from 1995-2002, most recently in October 2001 and August 2002, providing the public with information about the Superfund process and EPA activities at the Site. A community relations plan for the Site was prepared in May 1995.

#### **4. SCOPE AND ROLE OF RESPONSE ACTION**

The early cleanup actions, described in Section 2.2 removed several sources of contamination and highly contaminated material (potliner, cryolite and other waste material) above the water table that was the source of groundwater contamination. The Selected Remedy addresses additional sources of contamination, including process and nonprocess waste and contaminated soils that pose a risk to human health and the environment and are sources of contamination in groundwater. The Selected Remedy also begins the cleanup of contaminated groundwater.

The groundwater remedy uses a phased approach to restoration. Highly-contaminated groundwater will be extracted to prevent further plume migration associated with specific sources. EPA will evaluate the effectiveness of source control and focused extraction of groundwater to confirm that intermediate and deep groundwater will be restored in a reasonable time frame.

This ROD is an interim action for this Site and, to the extent practicable, will be consistent with any planned actions. The Selected Remedy does not address the buildings and other structures in the plant process area. Alcoa announced that plant will be closed permanently. Future investigations and cleanup actions are anticipated as a result of the plant closure and Alcoa's recent decision to demolish the plant.

#### **5.0 SITE CHARACTERISTICS**

This section summarizes information obtained as part of RI/FS activities at the Site. It focuses on the Site characteristics that will be addressed by the interim remedy. This section presents sources of contamination, subsequent sampling strategies, and documented types of contamination and affected media.

Figure 2 shows key Site features..

##### **5.1 Overview**

###### **Topography and Climate**

The Site topography is generally flat (20 feet to 30 feet elevation), with some minor variation to the north and northeast. The plant process buildings occupy the central portion of the Site. The eastern part of the plant area within the dike consists of open fields and storage areas.

The study area is characterized by a mild, temperate marine climate with moderately warm, dry summers and wet winters. The average annual precipitation in the area is approximately 37 inches per

year. The average daily maximum temperature for the study area is 62 degrees F and the average daily minimum temperature is 44 degrees F.

#### Floodplains and Wetlands

The areas north and east of the COE dike are within the 100 year floodplain of the Columbia and Sandy Rivers. These areas are currently undeveloped and characterized by cottonwood-ash riparian forest and areas vegetated with blackberries and Scot's broom thickets.

Seasonal wetlands at the Site contain hydric soils and characteristic hydrophytic plants that are capable of withstanding periods of summer drying. The primary locations of seasonal wetlands are the south wetlands area south of the main plant, the low areas in Fairview Farms, the low areas northeast of the scrap yard, low areas adjacent to Company Lake and in the forest outside the COE dike,

#### Geologic conditions

The RMC Site is located in the eastern portion of the "Portland Basin," a term describing a 20-mile wide and 45-mile -long northwest -southeaset trending structural depression. The basin is filled with a complex system of unconsolidated and consolidated alluvial sediments, containing important water-bearing zones.

#### Hydrogeologic conditions

Two regional aquifer systems exist under the Site. The Unconsolidated Sedimentary Aquifer (USA) is the uppermost aquifer, and the Sand and Gravel Aquifer (SGA) is the deeper unit. The unconsolidated sediments within the uppermost regional groundwater system beneath the facility have been subdivided into four water-bearing zones for purposes of investigation. The four zones are the silt unit (generally 0 - 30 feet deep), the upper grey sand (up to 50 feet deep), the intermediate sand (up to 100 feet deep), and the deep sand/gravel. The silt unit exists in the southern portion of the Site but does generally not occur in northern portion of the Site. Groundwater generally discharges to the Columbia River in the northern portion of the Site and the Sandy River in the eastern portion of the Site.

## **5.2 Sources of Contamination**

Facility operations, including past waste disposal, spills, leaks, and other releases, were primarily responsible for soil and groundwater contamination. The waste material on the RMC Site

includes process and nonprocess residues from the aluminum reduction plant. Process wastes are primarily associated with the reduction areas, the carbon plant, and the casthouse. Nonprocess wastes include demolition debris, scrap equipment, construction materials and general refuse.

### **5.3 Sampling Strategy**

The RI/FS began in 1996 and focused on establishing the nature and extent of soil and groundwater contamination. The RI included sampling of waste, soils, groundwater, surface water and sediments. Waste and soils were characterized through surface and subsurface individual and composite samples. Test pits were excavated in the old landfill areas, including the north landfill, south landfill, and scrap yard areas to allow direct observation of buried materials and to provide access for subsurface sample collection.

Groundwater was sampled using a system of 50 groundwater monitoring wells that were installed on or adjacent to RMC property. The monitoring wells were installed at different depth in the aquifer, and were generally classified as shallow, intermediate and deep wells. Direct push sampling also measured fluoride in groundwater at depths up to 50 feet below ground. Semi-annual monitoring has been conducted at selected groundwater monitoring wells for the past several years.

### **5.4 Nature and Extent of Contamination**

The following describes the findings of the investigation by source area.

#### ***Soil and Debris Areas***

North Landfill - north landfill is a 2.4 acre landfill located north of the COE dike. The landfill contains mostly carbon waste, refractory brick, demolition waste, solid waste, and miscellaneous debris. Constituents identified include fluoride, cyanide, metals, PAHs, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs) and PCBs. An access road passes through the landfill. The eastern portion of the landfill has significantly higher levels of PAHs and a higher proportion of black carbon material compared to the western portion of the landfill. Surface composite soil data indicate total PAH concentrations of about 2,000 mg/kg for the east side soils samples and about 30 mg/kg for samples collected on the west side. Subsurface composite data are similar, with PAH concentrations of 2,500 mg/kg on the east side and about 225 mg/kg for samples collected on the west side. Fluoride concentrations in surface composite samples ranged from 400 mg/kg and 12,000 mg/kg.

Leaching of constituents from contaminated waste material appears to be the most significant mechanism for transport of constituents to groundwater. PAHs and PCBs, which have low solubilities and do not readily migrate appear to be confined to waste materials and soil. Fluoride is mobile and

the primary contaminant in groundwater. Once in groundwater, fluoride can migrate to the Columbia or Sandy Rivers via groundwater discharge.

South Landfill - south landfill is a 5.8 acre landfill used for general plant waste disposal from the early days of operation until about the late 1960s. Constituents identified include fluoride, cyanide, metals, PAHs, PCBs, and TPH. The average fluoride concentration of 12,500 mg/kg was estimated based on the results of surface and subsurface sampling. Fluoride has migrated from the south landfill to shallow groundwater. A low permeability silt layer beneath the landfill provides a natural barrier that limits leaching of contaminants to intermediate and deep groundwater.

Scrap Yard - scrap yard is a 5.7 acre former storage area. Soil samples collected from the scrap yard area identified fluoride, cyanide, PAHs, PCBs, and metals. Fluoride levels averaged over 30,000 mg/kg in the waste material, with the concentrations decreasing with depth. Scrap yard is the source of fluoride and metals contamination in the intermediate-depth sand and deep sand/gravel units lying between scrap yard and the production wells.

#### Wastewater Discharge Areas

Company Lake - a 14 acre lake north of the COE dike. During operations, stormwater and treated wastewater entered the lake from a discharge pipe at the southern end. The outfall ditch drains from the northwestern corner of Company Lake into the Columbia River. Process residue (up to 4 ft thick) from historical discharges have accumulated in the bottom of Company Lake and contains fluoride, PAHs, TPH, cyanide, and low levels of PCBs. Elevated fluoride concentrations exist in the shallow and intermediate zone groundwater beneath and adjacent to Company Lake.

South Ditch - has been part of the plant's wastewater conveyance system. The eastern part of the ditch has been used to transport stormwater, and the west portion received facility wastewater, cooling water, groundwater, and stormwater. Constituents detected in south ditch include fluoride, cyanide, metals and PAHs. Sediments were removed from portions of the ditch as part of an early action.

#### ***Groundwater***

Flow patterns within the silt unit are controlled primarily by infiltration and the influences of localized surface water features. Silt unit groundwater generally moves vertically into the UGS and horizontally over limited distances toward surface water features. The horizontal conductivity of the silt unit is approximately 1 to 2 feet per day.

Groundwater flow direction in the UGS and deeper zones beneath the RMC facility is from the

south and southeast to the north and northwest, with groundwater discharging to the Columbia and Sandy Rivers. Groundwater flow is strongly influenced by pumping from the RMC production wells and surface water features. Estimated hydraulic conductivities are 2 to 35 ft/day for the UGS, 100 to 150 ft/day for the intermediate sand, and 75 to 175 ft/day for the deep sand zones.

Fluoride concentrations exceed the federal and state Safe Drinking Water Act standards, known as maximum contaminant levels (MCLs), of 4 mg/L beneath the RMC facility, with peak values up to 1,100 mg/l in the silt unit beneath south landfill. Highest concentrations were measured in the South Plant area beneath and adjacent to the scrap yard, south landfill, and east potliner areas. Six metals (antimony, arsenic, beryllium, chromium, lead, and nickel) were detected above MCLs; recent groundwater data shows that metals and cyanide above the MCL are not widespread and generally limited to the shallow silt unit. The distribution of metals above the MCL suggests that east potliner, scrap yard, and south landfill are the sources of these contaminants in groundwater.

Fluoride contamination beneath the facility is widespread and varies with depth. Figures 3, 4, and 5 the distribution of the flouride plumes for shallow, intermediate and deep groundwater.

## **6. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES**

### **6.1 Land Use**

The Site is currently zoned for heavy industrial use for the plant property south of the dike and east of Sundial Road. Land use is reasonably expected to remain industrial for the plant site. Other surrounding property to the south and west is zoned urban future and heavy manufacturing. Property to the west and south of the site is currently used for a variety of commercial and industrial purposes. RMC property north of the dike is zoned urban future/significant environmental concern (SEC) and flood fringe (FF). The purpose of the SEC overlay is to protect and maintain significant environmental natural and manmade features of public value, and an SEC permit is required for most activities allowed under the urban future designation. The FF zoning overlay applies to areas within the 100-year flood boundary. Further development of the RMC property north and east of the COE dike is not likely because the area is subject to flooding.

### **6.2 Groundwater Use**

A survey of groundwater uses within a 1-mile radius of the Site was conducted to identify local groundwater uses. The survey identified 17 domestic wells, 5 municipal wells, and irrigation and industrial wells. Only two active wells are potentially downgradient from RMC, including an industrial well at Sundial Marine Tug & Barge Works, Inc (223 ft deep) and a domestic well (not currently used for drinking water consumption) at Gresham Sand & Gravel (127 ft deep).

On-site deep production wells supplied process water and drinking water for the aluminum reduction facility. Tap water is a composite from multiple production wells. RMC also provides bottled water for use by its employees.

### **6.3 Surface Water Use**

The RMC Site is located adjacent to the Columbia and Sandy Rivers. Beneficial uses designated by the State of Oregon for the Sandy River Basin, which includes the Columbia River from River Mile 86 to 120, are shown in Table 1.

When the facility was in operation it discharged treated wastewater and stormwater to the Columbia River under an NPDES permit. Wastewater from facility operations is not being produced or discharged since the plant ceased operations in the fall of 2000. Stormwater runoff discharges to the Columbia River via Company Lake. Groundwater with elevated levels of fluoride reaches the Columbia north of the plant site.

### **6.4 Endangered Species**

The Columbia River and Sandy Rivers are habitat for documented threatened or endangered species. Several species of special-status fish, including Snake River fall Chinook salmon, spring Chinook salmon, and sockeye salmon, occur in the Columbia and Sandy Rivers (see Table 2 for listing and status). Two terrestrial species that potentially could occur in area are federally listed: the bald eagle (threatened) and the American peregrine falcon (endangered).

## **7.0 SUMMARY OF SITE RISKS**

### **7.1 Overview**

RMC conducted a baseline risk assessment as part of the RI/FS to determine the potential current and future effects of contaminants on human health and the environment. The baseline risk assessment estimates the likelihood of health or environmental problems if no cleanup action were taken at the Site.

### **7.2 Human Health Risks**

The baseline risk assessment includes a human health exposure assessment, which identified potential exposure scenarios by which contaminants of concern in Site media could contact humans and

quantified the intensity and extent of the exposures. The human health toxicity assessment quantified the relationship between estimated exposure (dose) to a contaminants of concern and the increased likelihood of adverse effects. Risks of contracting cancer due to Site exposure were evaluated based on toxicity factors (cancer slope factors or CSFs) from IRIS. Quantification of non-cancer injuries relies on published reference doses (RfDs). Standard EPA default assumptions were used in baseline risk assessment except as noted in Table 3.

CSFs are used to estimate the probability that a person would develop cancer given exposure to site-specific contaminants. This site-specific risk is in addition to the risk of developing cancer due to other causes over a lifetime. Consequently, the risk estimates generated in risk assessments are frequently referred to as "incremental" or "excess lifetime" cancer risks.

RfDs represent a daily contaminant intake below which no adverse human health effects are expected to occur. To evaluate noncarcinogenic health effects, the human health impact of contaminants is approximated using a hazard index (HI). Hazard index values are calculated by comparing the estimates of site-specific human exposure doses with RfDs. Values greater than 1.0 represent a potential risk.

Detailed information regarding the exposure assessment and toxicity assessment is contained in the baseline risk assessment reports. This section provides a summary of the results of the human health risk assessment.

The human health risk assessment assumed that most of the Site will have industrial uses. Residential use also was evaluated for the Fairview Farms area, which is located west of the main plant area.

### **7.3 Human Health Risk Characterization**

#### ***Cancer Risks for Current Exposures***

The likelihood of any kind of cancer resulting from a Superfund site is expressed as a probability. For example, a "1 in 10,000" chance would mean that for every 10,000 people in the area, an extra cancer case may occur as a result of long-term exposure to site contaminants. EPA generally requires remedial action at sites where the excess cancer risk from exposure to contaminants exceeds 1 in 10,000.

The baseline risk assessment for the RMC Site indicates that the human population with the highest potential for increased cancer risk would be maintenance workers, trespassers, and trench workers. The risk was estimated at individual source areas. Reasonable maximum exposure (RME)

risk estimates exceed a cumulative lifetime cancer risk target of 1 in 100,000 for north landfill, south landfill, scrap yard, Company Lake, and the eastern portion of south ditch. The RME portrays the highest level of human exposure that could reasonably be expected to occur from Site contaminants. The cancer risk for exposure to contaminated soil is primarily from PAHs.

### ***Cancer Risks for Future Exposures***

The future population with the highest potential for increased cancer risk are trench workers who would be working at south landfill and scrap yard, and on-site maintenance workers who may come in direct contact with contaminated soil and waste material on the Site. The risk assessment estimated that approximately 1 person out of 10,000 with highest exposure (ie, a trench worker) may develop cancer due to the contamination. These cancer risks for exposure to soil are primarily due to carcinogenic PAHs.

### ***Non-Cancer Risks***

Non-cancer risks are measured by an evaluation system called the Hazard Index (HI) that generates a numeric value. Any HI value greater than 1.0 may indicate a need for action. The increased risk of non-cancer health impacts for current or future industrial workers on the Site did not exceed 1.0 for the individual source areas.

### ***Groundwater risk***

Risk associated with current exposure to groundwater did not exceed the HI of 1.0. Risk estimates for potential future exposure to fluoride in groundwater showed that the future off-site residential exposure scenario resulted in an HI of 3.3. The future off-site residential exposure was based on a hypothetical well located in the northeast portion of the Fairview Farms area. Future exposure from on-site consumption of groundwater would be greater if shallow or intermediate groundwater within the fluoride plume were used for drinking water

## **7.4 Ecological Risks**

The ecological risk assessment is an appraisal of the actual or potential effects of contamination at the Site on plants and animals. It includes an identification of assessment endpoints and representative measures of exposure and measures of effect. Ecological exposure estimates are quantified for selected representative ecological receptors and expressed as a hazard quotient.

### **7.5 Ecological Risk Characterization**

The baseline ecological risk assessment concluded that ecological hazard quotients (HQs) for

fluoride (for mallards and heron) and PAHs (mink) exceed corresponding background levels by at least 1. Company Lake contributes the greatest percentage of the estimated sitewide risk for fluoride and PAHs. Based on the estimated home ranges and the availability of suitable off-site habitat for the mallard and mink in the Sandy delta, the risks may be acceptable. The smaller home range for the heron, however, makes the fluoride in Company Lake a potentially unacceptable risk.

The baseline risk assessment included ecological risk estimates for groundwater discharging to the Columbia and Sandy Rivers. There are no ambient water quality criteria for fluoride available, so water aquatic toxicity data from literature sources were used to estimate toxicity potential. RMC also recently submitted a technical memorandum on the predicted effect if groundwater pumping is ceased, which included an analysis of updated projections of fluoride concentrations in groundwater and estimated future discharges of fluoride-contaminated groundwater to the Columbia and Sandy Rivers. The analysis showed that fluoride discharges to the Sandy River would be expected to increase over the next few years and continue for several decades if pumping is discontinued.

## **7.6 Uncertainties**

Risks to human health may be over- or underestimated based on the appropriateness of the assumptions regarding exposure, the availability and assumptions associated with the derivation of toxicity factors. However, the uncertainties in any risk assessment affect the estimations of risk such that EPA believes that the estimates are only accurate to within an order of magnitude. Risks to ecological receptors may be over- or underestimated based on the appropriateness of the representative receptor species and home range estimates.

## **7.7 Basis for Response Action**

PAHs and fluoride were the primary risk drivers for the source areas evaluated for this interim action. PAHs and other contaminants are commingled with fluoride in each of the source areas. Fluoride is leaching from the waste material that will be addressed in each of the source areas and is contributing to contamination of groundwater beneath the Site. Fluoride contamination in groundwater exceeds the MCL of 4 mg/l established under the Safe Drinking Water Act.

The response actions selected in this ROD area necessary to protect the public health and welfare and the environment from hazardous substances that occur in the north landfill, south landfill, and Company Lake areas and in groundwater plumes beneath the Site.

## **8.0 REMEDIAL ACTION OBJECTIVES**

The remedial action objectives for the Site:

*1) Prevent human exposure through direct contact (ingestion inhalation, and dermal contact) with contaminated soil and debris that would result in unacceptable excess lifetime cancer risk or above a Hazard Index of 1 based on industrial exposure scenarios.*

*2) Restore and maintain use of the intermediate and deep groundwater as a drinking water source. The goal for restoration is the federal and state safe drinking water standard.*

*3) Minimize the migration of contaminants from waste and soils to groundwater, reduce fluoride in shallow and intermediate groundwater, and control migration of contaminant plumes in groundwater.*

*4) Control migration of plumes to control the migration of fluoride to the Sandy River.*

Cleanup goals for the RMC Site will be based on human and ecological risks, including the state of Oregon's environmental cleanup law which requires no more than one in 1,000,000 excess cancer risk for individual contaminants and above 1 in 100,000 for additive carcinogenic contaminants. Cleanup goals will also be based on reducing the volume of wastes leaching to groundwater. The contaminants with the highest direct contact risks in the waste areas addressed by this interim action are commingled with fluoride, the primary contaminant in groundwater.

## **9.0. DESCRIPTION OF ALTERNATIVES**

### **9.1 Common Components of Alternatives**

With the exception of the No Action alternative, each of the remedial alternatives share certain components, such as institutional controls and short- and long-term monitoring. Brief discussions of the common alternative components are provided below.

#### ***Engineering and Institutional Controls***

Engineering controls are construction or equipment such as fencing and warning signs, barriers and other restrictive devices as well as personal protective gear for workers. Institutional controls are mechanisms such as restrictive easements, covenants and other deed restrictions relying on governmental or legal institutions and systems to protect receptors from contaminants of concern. The groundwater use restrictions are expected to be permanent for shallow contaminated groundwater (the

silt unit) in the south plant area. There are no current or projected uses of shallow groundwater at this Site. Ownership and use of the Site will require implementation of the Groundwater Institutional Control Plan required as part of the Selected Remedy in the Record of Decision.

Currently, the north landfill is partially fenced to prevent access from the access road that connects the plant site to the areas north of the dike.

### ***Monitoring***

Site monitoring will be conducted for all alternatives. Although specific monitoring requirements vary depending upon the alternative, it is assumed that three types of monitoring will be carried out. Short-term monitoring will be performed during remedial action implementation to ensure compliance with water quality requirements, conformational monitoring will be implemented immediately following the action to ensure the actions was implemented as designed. Long-term groundwater monitoring will be performed to ensure the performance of the remedy. Specific monitoring programs will be developed for the Site during remedial design.

## **9.2 Description of the Alternatives**

Cleanup options for the individual sources of contamination were combined into three sitewide alternatives in the feasibility study. Following the initial EPA and DEQ review, further evaluation of a partial excavation option for north landfill was considered. EPA also evaluated cleanup alternatives for the scrap yard area, a significant source of groundwater contamination, and decided it was appropriate to proceed with an early removal action. The scrap yard alternatives considered in the feasibility study are included in the discussion below. The no action alternative and the sitewide alternatives are described below.

The FS assumed that consolidation and disposal of excavated waste material would be accomplished by construction of a new landfill on the Reynolds Metals Company property or off-site disposal at a permitted or licensed hazardous waste disposal facility. The on-site landfill would be located inside the Corps of Engineers dike. The actual location and sizing of the on-site disposal facility would be designed later. For cost estimating purposes, the FS assumed that all waste would be disposed in a new on-site waste disposal facility that would be constructed on RMC property.

### ***No Action Alternative***

The no action alternative provides a baseline for comparing other alternatives. It establishes the risk levels and Site conditions if no remedial actions are implemented. No changes or restrictions would be made that would affect activities at the Site. No engineering or institutional controls would be put in place and no actions would be initiated to reduce hazard levels at the Site.

### ***Cessation of Pumping Proposal***

All of the sitewide alternatives in the feasibility study included continued pumping of specific production wells to provide hydraulic containment of contaminated groundwater. RMC recently submitted an evaluation of a “no pumping” proposal as an additional alternative for groundwater. This proposal would include groundwater monitoring but would discontinue operation of the production wells.

### ***Alternative A***

Alternative A includes a permeable cap or riprap cover at the north landfill, a soil and vegetation cap at south landfill areas, a gravel cap in the north area of scrap yard, and a permeable multilayer cap for Company Lake sediments.

To contain groundwater, the production wells would be operated to maintain a “capture zone” for contaminated groundwater. Wells PW07 and PWO8 will be pumped at an estimated 600 gallons per minute to keep fluoride and other chemicals of concern in the intermediate and deep zones under the facility. This alternative also includes institutional controls for groundwater and land use.

### ***Alternative B***

Alternative B would construct a permeable cap/riprap cover at north landfill, excavate the waste layer in the north portion of scrap yard, dredge process residue at Company Lake, and place institutional controls for south landfill. The Feasibility study assumed that excavated and dredged material would be consolidated in a new on-site landfill.

The groundwater action includes production well operation as described in Alternative A, and installs and operates an extraction well on the north side of scrap yard and an extraction well on the western portion of east potliner. The Feasibility study assumed that the wells would pump approximately 20 gallons per minute each from the US zone. The Feasibility study also assumed that extracted groundwater would be treated by calcium fluoride precipitation in the plant’s wastewater treatment facility and discharged to the Columbia River.

This alternative also includes institutional controls for groundwater and land use.

### ***Alternative C***

This alternative consists of excavation of the waste layers from north and south landfills, the northern portion of scrap yard, and the process residue at Company Lake. The feasibility study assumed that excavated and dredged material would be disposed in a new on-site landfill.

The groundwater action includes production well operation and focused extraction as described in Alternative B, plus an additional extraction well at south landfill and three extraction wells adjacent to

Company Lake. Treatment of groundwater would be by reverse osmosis, followed by treatment by calcium fluoride precipitation in the wastewater treatment system prior to discharge with plant wastewater.

This alternative also includes institutional controls for groundwater and land use.

***The Preferred Alternative***

EPA's preferred alternative modifies and combines options from Alternatives B and C. It includes excavation of the eastern portion of north landfill, excavating the waste material from south landfill, and excavating the process residue from Company Lake by dewatering and mechanical removal. Excavated material would be transported to a permitted off-site disposal facility. Groundwater would be addressed by hydraulic containment through production well operation and enhanced focused extraction of groundwater in the south plant area. The combined flow from the production wells and focused extraction wells would be discharged to the Columbia River. The anticipated flow would be approximately 1240 gallons per minute with an initial fluoride concentration of about 4 to 5 mg/l, assuming there would be no treatment prior to discharge. The fluoride concentration would decrease over time as concentrations in groundwater in the south plant area decreased. Institutional controls would be required to ensure appropriate land use and groundwater use would continue and to protect the remedies that are put in place.

**TABLE 4: Costs Associated with the Alternatives**

<b>ALTERNATIVE</b>	<b>CAPITAL COST</b>	<b>ANNUAL OP. &amp; MAINT. COST</b>	<b>NET PRESENT VALUE*</b>
<b>No Action</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>No Pumping Proposal</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>Alternative A</b>	<b>\$ 6,078,000</b>	<b>\$ 207,000</b>	<b>\$ 8,111,000</b>
<b>Alternative B</b>	<b>\$10,463,000</b>	<b>\$ 229,000</b>	<b>\$12,637,000</b>
<b>Alternative C</b>	<b>\$19,196,000</b>	<b>\$ 416,000</b>	<b>\$23,998,000</b>
<b>Preferred Alt.</b>	<b>\$17,751,000</b>	<b>\$ 284,000</b>	<b>\$21,282,000</b>

\* based on 30 years operation and maintenance and 7 per cent discount rate

## **10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES**

This section summarizes and compares the cleanup alternatives based on the nine criteria. This analysis focuses on the primary distinguishing factors EPA considered in selecting its Preferred Alternative. The “no action” alternative is not described in detail because it does not provide overall protection of human health and the environment and EPA cannot select an alternative that does not satisfy this threshold criteria.

**10.1 Overall Protection of Human Health and the Environment** *evaluates whether an alternative achieves and maintains adequate protection of human health and the environment.*

All alternatives, except the “no action” alternative, would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risks to people and wildlife. Exposure to contamination would be prevented through engineering and institutional controls. Alternative A addresses surface exposure risk by capping north landfill, south landfill, scrap yard and Company Lake sediments. The permeable caps proposed would not prevent leakage of contaminated source materials to groundwater, however, and restoration of beneficial uses of groundwater would take hundreds of years. Excavating the waste layers under Alternatives B and C would eliminate exposure for workers and trespassers by eliminating direct surface contact with chemicals of concern in surface soils/waste and it would also reduce sources of groundwater contamination. The Preferred Alternative would provide overall protection similar to Alternatives B and C.

**10.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARS)** *evaluates how each alternative complies with federal and state statutes and regulations that pertain to the site.*

All soil alternatives would meet their respective Applicable Relevant and Appropriate Requirements (ARAR’s) from Federal and State laws. Achieving compliance with the maximum contaminant levels for fluoride in intermediate and deep groundwater is estimated to take 5 to 10 years after the source control actions have been completed.

**10.3 Long-term Effectiveness and Permanence** *evaluates the ability of an alternative to maintain protection of human health and the environment over time.*

Alternative C and the Preferred Alternative provide the best long-term effectiveness and permanence by maximizing contaminant removal and minimizing maintenance for source areas. Groundwater remediation is improved by addition of focused extraction wells.

Alternative A is lower in long-term effectiveness because several landfill caps would need to be

maintained, and there is potential for exposure if the cap fails. Additionally, the caps would not prevent further leaching of fluoride to groundwater. For north landfill and Company Lake there would be a greater likelihood of washout of contaminants during severe flooding events. Groundwater remediation would rely on effectiveness of production well optimization but sources of groundwater contamination would not be addressed.

Alternative B includes removal of waste layer in Company Lake, which provides more long term protection than capping. Alternative B also provides greater protection of groundwater than Alternative A by removing source material from scrap yard and Company Lake, and removing of contaminated groundwater from the upper grey sands in the south plant area. The Preferred Alternative adds another measure of long-term protectiveness by removing additional north landfill waste material from the floodplain of the Columbia and Sandy Rivers. Both on-site and off-site disposal would be effective, but off-site disposal has the advantage of reducing future maintenance and monitoring at the Site.

**10.4 Reduction of Toxicity, Mobility, and Volume of Contaminants through Treatment** *evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.*

The alternatives for soil cleanup do not include treatment of waste material to reduce toxicity, mobility, or volume of contaminants. EPA has a policy that principal threats, highly concentrated waste that cannot be reliably contained, should be treated. Highly concentrated waste was excavated and disposed off-site as part of early cleanup actions, and the contaminated material being addressed by the proposed action is not considered to be principal threat waste. All of the alternatives, except for Alternative A, include removal of source material to reduce leaching of contaminants to groundwater. Alternative A includes capping, which would be less effective than source removal in reducing migration of contamination to groundwater.

All of the groundwater alternatives use plume containment to address the fluoride contamination in groundwater, except for RMC's "no pumping" scenario. Alternatives B and C assumed treatment of fluoride in extracted groundwater to reduce toxicity, but the treatment processes evaluated have not been shown to be effective in treating the concentrations. EPA will continue to evaluate potential treatment options as part of design for the focused extraction system under the Selected Remedy.

**10.5 Short-term Effectiveness** *evaluates the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.*

Alternatives B, C, and the Preferred Alternative involve excavation, handling and transport of

contaminated waste and present a potential for short-term exposure. The contaminants of concern are not volatile, so the risk of release is principally limited to wind blown waste material or surface water runoff containing Site contaminants. Releases can be controlled by careful materials handling, and appropriate engineering controls. Short-term risks to workers can be further reduced by adherence to proper health and safety protocols.

Company Lake will be drained under the Preferred Alternative to allow excavation of the contaminated process residue by mechanical equipment. During normal facility operations, process wastewater and stormwater from the RMC facility is discharged to Company Lake prior to discharge to the Columbia River. Process wastewater is not currently being discharged to Company Lake because the plant is shut down. Stormwater would bypass Company Lake and discharge directly to the Columbia River during and after construction of the remedy. Stormwater discharges would continue to be regulated in accordance with RMC's existing permit.

**10.6 Implementability** *evaluates the technical and administrative feasibility of implementing the alternative.*

All soil remedies use available and proven technologies. Alternative A is the easiest to implement because it does not involve excavation and transport of contaminated materials. Excavating the process residue from Company Lake will require draining the lake to allow mechanical removal. Reynolds Metals Company conducted a pilot removal from a portion of the lake in September, 2001 which demonstrated that dewatering can be achieved by a combination of eliminating inflow to the lake and limited pumping from the lake to the Columbia River.

The effectiveness of groundwater extraction will need to be determined by future monitoring and evaluation. Changes to the groundwater extraction system, including increasing pumping rates, adding more wells and pretreatment of contaminated groundwater may be needed based on future evaluations.

**10.7 Cost** *includes estimated capital and operation and maintenance costs as well as present worth costs.*

Cost estimates are expected to be accurate within a range of +50 to -30 percent. Alternative A is the least cost alternative, with an estimated present value cost of approximately \$8,111,000. Alternative B is the next lowest cost alternative, with an estimated present value cost of \$12,637,000. Alternative C is the highest cost, with an estimated present value cost of \$23,998,000. EPA's Preferred Alternative combines elements from alternatives B and C and has an estimated present value cost of \$21,000,000.

**10.8 State/Support Agency Acceptance** *evaluates whether the State of Oregon agrees with the U.S. EPA's analyses and recommendations of the RI/FS and the Proposed Plan*

The State of Oregon supports the Preferred Alternative.

**10.9 Community Acceptance** *evaluates whether the local community agrees with U.S. EPA's analyses and preferred alternative.*

The public comment period for the Proposed Plan was held from August 29, 2002 to September 28, 2002. EPA did not receive any comments on the Proposed Plan during the public comment period.

## **11.0 THE SELECTED ALTERNATIVE**

Based on consideration of CERCLA requirements and analysis of the alternatives using the nine criteria, EPA has determined that the Preferred Alternative is the most appropriate remedy for continuing the cleanup at the RMC Site. It includes the following:

- ! Removing contaminated process residue from Company Lake
- ! Excavating contaminated waste and soil from the south landfill area
- ! Excavating contaminated waste material from the eastern portion of the north landfill area, and installing a riprap (soil and rocks) cover over the western portion of the landfill
- ! Off-site disposal of excavated waste material at a permitted disposal facility
- ! Installing extraction wells in the east potliner and scrap yard areas to remove and contain groundwater contaminated with high levels of fluoride
- ! Modifying the operation of existing production wells to limit the further spread of fluoride in the groundwater
- ! Discharging groundwater from the combined production well and focused extraction system to the Columbia River through the existing NPDES outfall
- ! Monitoring groundwater to evaluate the effectiveness of source removal and focused extraction
- ! Limiting future use (through the use of engineering and institutional controls) of shallow groundwater and portions of the property to ensure the remedy remains protective

Each of these components are further described below:

### **Remove contaminated process residue from Company Lake**

The process residue in Company Lake will be removed by dewatering the Lake and excavating the waste material using conventional mechanical equipment. Company Lake contains an estimated 112,400 kg of fluoride in the process residue at an average concentration of 23,200 mg/kg. Sampling results from the Company Lake partial removal action conducted in the fall of 2001 demonstrated that removal of the process waste would also meet target risk criteria for PAHs.

The cleanup goal for Company Lake is removal of the process waste material. The waste material is dark and easily distinguished from underlying sediment. The estimated volume is approximately 43,500 cubic yards. Removal of the waste material will be verified by visual observation and post-removal sampling. The goals for waste material removal will be met by removing visible contamination as well as reduction of fluoride levels below 1,000 mg/kg, and PAH levels below 36 mg/kg.

### **Excavating contaminated waste and soil from south landfill**

For south landfill removal of the contaminant mass that contributes to fluoride contamination in groundwater will also meet target risk criteria for direct contact risk. The south landfill waste contains approximately 44,400 cubic yards of waste material, representing an estimated 681,000 kg of fluoride. This represents approximately 71 percent of the total fluoride mass of this source area (landfill waste and underlying sand and silt). The cleanup goal is removal of the waste material with fluoride levels above 4,000 mg/kg, and PAH levels consistent with PAH levels stated immediately below for the eastern portion of the north landfill, which will be confirmed by verification sampling.

### **Excavating contaminated waste material from the eastern portion of the north landfill area, and installing a riprap cover over the western portion of the landfill**

All waste material located east of the access road in the north landfill will be removed. Removal of the waste material will be confirmed by verification sampling for PAHs and fluoride. PAHs and fluoride are commingled in this landfill. EPA and DEQ target risk criteria will be attained by removing the waste material, which contains carcinogenic PAHs, from the eastern portion of the landfill. Waste removal will meet risk based remedial goals of  $1 \times 10^{-5}$  for excess lifetime cancer risks for potential future trench workers (the reasonable maximum exposure case from the risk assessment), by reducing concentrations of benzo(a)pyrene and dibenzo(a,h) anthracene below 36 mg/kg. The cleanup goal for fluoride is 4,000 mg/kg.

A riprap cover will be installed over the western portion of the landfill to protect the landfill contents from washout. The western portion of north landfill contains low levels of contaminants and removal is not required as part of the selected interim action.

### **Installing extraction wells in the east potliner and scrap yard areas to remove and contain groundwater contaminated with high levels of fluoride**

Two extraction wells will be installed in the upper grey sands horizon of aquifer in the south plant area near the east potliner area and the scrap yard area, respectively. An estimated 20 gpm will be pumped to extract contaminated groundwater. The extracted groundwater will be combined with production well water and discharged to the Columbia River via the existing NPDES permitted outfall.

The predicted fluoride concentration in the extracted groundwater is 75 mg/l. Based on the estimated flow of 40 gpm and 75 mg/l fluoride concentration, which will be combined with the production well water estimated at 1200 gpm and 2 mg/l fluoride concentration, the combined flow will be below 5 mg/l at the point of discharge to the Columbia River. If the measured concentration of fluoride from the focused extraction wells is higher than the predicted concentrations, EPA will re-evaluate whether the focused extraction water can be effectively treated to reduce fluoride concentrations.

### **Modifying the operation of existing production wells to limit the further spread of fluoride in the groundwater**

Production Wells No PW 07 and PW 08 will be operated to provide hydraulic containment of the fluoride plumes in the south plant area. The estimated pumping rates will be approximately 600 gpm each.

### **Discharging groundwater from the combined production well and focused extraction system to the Columbia River through the existing NPDES outfall**

The combined flow from the production wells and focused extraction wells will be discharged directly to the Columbia River. There are no ambient water quality criteria for fluoride available, so water aquatic toxicity data from literature sources were used to estimate toxicity potential. EPA has determined that 5 mg/l will be the standard for fluoride discharge for this action, and believes that treatment will not be needed to meet this standard based on predicted fluoride concentrations. EPA believes that the 5 mg/l standard for fluoride at the predicted flowrates will be protective of aquatic species in the Columbia River. For other constituents that may be present, EPA will use ambient water quality criteria for protection of aquatic organisms as the standard. The point of compliance will be at discharge to the Columbia River, the same as the location of the NPDES compliance point for the previous discharges under the NPDES permit for RMC.

### **Monitoring groundwater to evaluate the effectiveness of source removal and focused extraction**

The cleanup goal for fluoride in intermediate and deep groundwater is the MCL. After construction of the selected remedy, the focused extraction and production well pumping system will be monitored on a regular basis and its performance will be evaluated. Operation and monitoring for a period of five years after completion of the source control actions may be necessary to provide enough information to determine if the groundwater extraction system is adequate to maintain hydraulic control of the contaminated plume. Some adjustments of the extraction system may be needed to enhance remedy performance, including adjusting the rate of extraction or installing additional groundwater extraction wells.

The fluoride cleanup levels for the source areas were selected to achieve significant removal of fluoride-containing source material for each area. The 4,000 mg/kg level for south landfill and north landfill were based on an empirical relationship between fluoride sources and levels in groundwater that was presented in the FS. The level for Company Lake was set at 1,000 mg/kg based on results that were achieved during the partial removal action in the fall of 2001.

Groundwater monitoring will address the effectiveness of mass removal in reducing fluoride contamination in groundwater, fluoride capture and mass removal, intermediate and deep zone water quality performance in meeting MCLs.

Cleanup of shallow groundwater is not being conducted under this interim action. Cleanup of shallow groundwater does not appear to be feasible in a reasonable time-frame in the south plant area based on existing information because of low yields in this portion of the aquifer. EPA will re-evaluate shallow groundwater as part of the final remedy for this Site.

**Limiting future use (through the use of engineering and institutional controls) of shallow groundwater and portions of the property to ensure the remedy remains protective**

Implementation of this ROD will require a detailed Engineering and Institutional Control Plan, including a specific Groundwater Institutional Control Plan, to ensure adequate protection for as long as may be necessary.

**11.2 Estimated Outcomes of the Selected Remedy**

The Selected Remedy will greatly reduce the environmental impacts associated with the current waste contamination because waste that poses a direct contact risk and is a source of groundwater contamination will be removed from the Site to a permitted off-site disposal facility. Human health risk will be reduced to by at least an order of magnitude. The implementation period for this alternative is approximately 2 years for waste removal and 5 to 10 years for groundwater extraction. The short-term

impacts are minimal and do not persist through the entire period (i.e., only during construction phases).

The Preferred Alternative was selected over the other alternatives because it is expected to achieve substantial and long-term risk reduction. EPA's preference for this alternative is based on the evaluation of the alternatives against the established criteria. It meets EPA's threshold criteria for protection of human health and the environment. Based on current information, EPA believes that contaminated soil and debris can be reliably removed from the Site, and treatment of soil and debris was not found to be practicable or cost effective.

The groundwater remedy uses a phased approach to groundwater restoration. Groundwater response activities will be implemented in a series of steps so that information gathered in earlier phases can be used to refine subsequent objectives or actions. Containment of the fluoride plume will be confirmed by sampling of monitoring wells, including new wells that will be installed to assess progress.

The beneficial use of the aquifer is as a source of water for industrial uses and for drinking. Groundwater extracted from the deep portions of the aquifer has been used for this purpose both on and off-site. Based on the information obtained during the RI/FS, EPA and DEQ believe that the Preferred Alternative will restore beneficial uses in the intermediate and deep portions of the aquifer and significantly reduce the mass of fluoride in a reasonable time frame.

## **12.0 STATUTORY DETERMINATIONS**

Based on information currently available, EPA and DEQ believe the Selected Remedy provides the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. The EPA expects the Preferred Alternative to satisfy the statutory requirement in CERCLA section 121(b) to: 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective.

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements, are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

### **12.1 Protection of Human Health and the Environment:**

The Selected Remedy will be protective of human health and the environment. Human health risk and ecological risk for the sources addressed by this action will be reduced below EPA and DEQ target risk criteria. Implementation of this remedy may create some short term risk to the environment through air dispersion of contaminants, however engineering controls and construction techniques will be utilized to minimize any short term impacts.

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

The Selected Remedy will comply with all applicable or relevant and appropriate requirements as follows:

### **Safe Drinking Water Act - maximum contaminant levels**

The Safe Drinking Water Act regulations establish maximum levels of contaminants in public drinking water sources (40 CFR Part 141). The NCP states that MCLs are potentially relevant and appropriate during remediation of groundwater or surface waters that are current or potential sources of drinking water. Federal MCLs are relevant and appropriate for the RMC Site. Constituents of concern for groundwater at RMC and corresponding MCLs are listed in Table 5.

### **Clean Water Act - water quality criteria**

EPA has established federal water quality criteria under Section 304 of the Clean Water Act. Water quality criteria are set for human health and protection of aquatic life. CERCLA Section 121(d) requires water quality criteria be attained if relevant and appropriate to the circumstances of the site. Water quality criteria are relevant and appropriate at RMC for determining acceptable contaminant levels in the Columbia and Sandy Rivers. Applicable water quality criteria for the discharges of focused extraction and production well water from RMC are listed in Table 6.

### **Oregon Water Quality Standards**

Oregon Water Quality Standards under OAR 340-041 for the Willamette Basin (Columbia River) and Sandy River Basin State are relevant and appropriate for the discharges of focused extraction and production well water from RMC.

### **Toxic Substances Control Act Regulations (40 CFR 761)**

TSCA regulates disposal, handling and cleanup of material contaminated with PCBs. PCBs have not been identified in Scrap Yard, south landfill, north landfill, or company lake at concentrations that would trigger TSCA. If regulated concentrations are identified during the interim actions, TSCA regulations on handling and disposal will be applicable if such regulated wastes are encountered.

### **Federal Endangered Species Act of 1973 (16 U.S.C. 1531 et seq., 50 C.F.R. Part 200, 402)**

This statute and implementing regulations are applicable to any remedial actions performed at this Site as this area is potential habitat for threatened and/or endangered species, in addition to any consultation which may be required with species-listing federal Agencies under Section 7 of the ESA. The state and federal endangered species acts, ORS 496.012 and 16 U.S.C. 1351 and the Migratory Bird Treaty Act, 16 U.S.C. Section 703 requires protection for certain plant and animal species and their habitat. The Columbia River is habitat for documented threatened or endangered species. Federally listed Snake River fall Chinook salmon, spring Chinook salmon, and sockeye salmon migrate in the Columbia River. The Columbia River is also within the Pacific flyway, a bird migration corridor.

Requirements for consultation with National Marine Fisheries Service, US Fish and Wildlife and Oregon Fish and Wildlife are would be applicable for response actions that could affect a protected species or its habitat.

#### **U.S. Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.)**

RMC shorelines provide potential habitat for bald eagles and other avian species, and the Columbia River and Sandy Rivers are used as a salmonid migratory route. This act prohibits water pollution with any substance deleterious to fish, plant life, or bird life, and requires consultation with the U.S. Fish and Wildlife Service and appropriate state agencies. Criteria are established regarding site selection, navigational impacts, and habitat remediation. These requirements are anticipated to be relevant and appropriate for remedial activities on the site.

#### **National Archaeological and Historic Preservation Act**

Archaeological sites and cultural resources are protected under the National Archaeological and Historic Preservation Act, Executive Order 11593 and state statute (ORS 358.905). The State Historic Preservation Office (SHPO), in consultation with federal agencies, reviews projects under NHPA. Standards for excavation may be applicable for construction in previously undisturbed areas. Consultation with SHPO will be needed to assess the planned excavations and their potential for affecting protected resources.

#### **Wild and Scenic Rivers Act**

The segment of the Sandy River adjacent to the RMC facility is designated as a recreational and scenic river under the Federal Wild and Scenic Rivers Act (16 U.S.C. Section 1271) and Oregon Waterways Act (ORS 390.805). Federal agencies may not assist in construction of a water resource project that would have a direct and adverse impact on free-flowing characteristics of a designated river or that would unreasonably diminish the scenic, recreational, and fish and wildlife values present in the river corridor.

#### **Oregon Environmental Cleanup Law (ORS 465.200)**

The Oregon Environmental Cleanup Law is patterned after CERCLA, and is applicable to the extent that standards are more stringent than federal standards. The level of contaminants assumed to be

protective of human health and the environment are an excess lifetime cancer risk of 10<sup>-6</sup> for individual carcinogens, a cumulative excess lifetime cancer risk of 10<sup>-5</sup>, and a hazard index of less than or equal to 1 for systemic toxicants with similar endpoints. For protection of ecological receptors, the acceptable level of risk is at the point before significant adverse impacts are expected to occur.

### **State Discharge Permit Program/NPDES Program**

The Oregon state NPDES program provides conditions for authorizing direct discharges to surface waters and specifies point source standards for such discharges. These standards are applicable to discharges to surface waters resulting from focused extraction of groundwater.

### **Siting Requirements for Waste Management Facilities**

Federal regulations (40 C.F.R. 257.3 and 40 C.F.R. Part 258 Subpart B, and state regulations OAR 340-95-030 establish minimum siting criteria for solid waste landfills. These requirements may be relevant and appropriate to containment of waste material in north landfill if waste is left in place. North landfill is located in the floodplain, and siting criteria requirements for floodplains require controls to prevent washout of solid waste that may pose a hazard to human life, wildlife, or land or water resources.

### **Executive Order 11988, Protection of Floodplains**

This Executive Order requires that actions taken in floodplains should avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values of floodplains. E.O. 11988 is applicable to the north landfill and Company Lake actions.

### **Well Installation Requirements**

The Oregon Water Resources Department regulates the construction, abandonment, maintenance and use of water wells and monitoring wells. The requirements in OAR 690 200 through 240 would apply to wells constructed, operated or abandoned as part of the remedial action.

**Oregon Solid Waste Management Rules (OAR 340-093 through -097)** are applicable to the disposal of solid waste from the RMC Site. Section 340 093-0170 is applicable to the disposal of cleanup materials contaminated with hazardous substances that are not in themselves hazardous substances, such as petroleum contaminated soil. Such material must be disposed only in landfills meeting the RCRA Subpart D design criteria and that have been authorized to receive this type of material by DEQ. Section 340 093-0190 is applicable to the disposal of special wastes, including construction and demolition debris and oil wastes. Wastes from the RMC site will be disposed in a landfill approved for handling such special wastes.

**Oregon Hazardous Wastes Management Rules (OAR 340-100 through -120)** are applicable to waste at the site which exhibits a characteristic of hazardous wastes. Based on the RI data and history

of past facility operations, waste at the source areas addressed in this interim action does not contain state-only or listed hazardous wastes.

If RCRA TCLP or listed waste is encountered during cleanup, then waste sent off-site will comply with the Oregon RCRA rules pertaining to the generation, transportation and treatment, storage and disposal of hazardous waste.

**Oregon General Emission Standards for Particulate Matter (OAR 340-021)** is applicable to emission of particulates, including fugitive emissions, from cleanup activities that generate particulate emissions, such as dust generated from earthwork or other disturbance of on-site waste and soils.

### **12.3 Cost-Effectiveness**

In EPA's judgment, the Selected Remedy is cost effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness". (NCP 300.430(f)(ii)(D)). The Selected Alternative provides greater protection of human health and the environment than the other alternatives that meet the same cleanup goal, at a lower cost. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

### **12.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable**

The Selected Remedy is an interim action that may represent a permanent solution for the individual source areas. This criteria will be evaluated based on performance monitoring addressed in the final remedial action for this Site.

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

Because this action does not constitute the final remedy for the RMC Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will not be satisfied by this interim action. Previous actions conducted at this Site addressed highly contaminated waste sources, and the contaminated material being addressed by this interim action is not considered to be principle threat waste.

The groundwater portion of the interim action uses plume extraction and containment to reduce the mobility of fluoride in groundwater. Treatment processes evaluated in the FS were not shown to be

effective in reducing predicted contaminant concentrations. If the actual concentrations of fluoride in extracted groundwater are significantly higher than predicted in the FS, EPA will re-evaluate options for treatment to reduce toxicity and volume.

## **12.6 Five-Year Review Requirements**

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

## **13.0 DOCUMENTATION OF SIGNIFICANT CHANGES FROM THE PREFERRED ALTERNATIVE IN THE PROPOSED PLAN**

The Proposed Plan was released for public comment on August 29, 2002. It identified the Preferred Alternative, previously described in this document, for remediation. No comments were received during the 30-day public comment period. EPA did not make any significant changes to the Preferred Alternative in the Selected Remedy.

