Five-Year Review Report

First Five-Year Review Report

for

Ketchikan Pulp Company Site
Ketchikan, Alaska

August 2, 2005

Prepared by:

U.S. Environmental Protection Agency
Region 10 Environmental Cleanup Office
Seattle, Washington

Approved by:

Daniel D. Opalski
Director, Environmental Cleanup Office
US EPA Region 10

August 2, 2005
Date

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EXECUTIVE SUMMARY

The Ketchikan Pulp Company (KPC) site is located on the shoreline of Ward Cove, near Ketchikan, Alaska. The KPC site is not listed on the National Priorities List (NPL). The site is divided into two Operable Units (OUs): the Uplands Operable Unit and the Marine Operable Unit. This is the first Five-Year Review Report, and it is a statutory review.

For the Marine OU, construction of the remedial action is complete and progress is being made towards achieving RAOs. No issues or follow-up actions were identified as a result of the five-year review process. The remedy at the Marine OU is protective of human health and the environment. Long-term monitoring will continue.

For the Uplands OU, construction is complete, and institutional controls (ICs) and Restrictive Covenants remain in effect. These ICs and Restrictive Covenants remain effective and protective due to the responsible stewardship of Ketchikan Pulp Company and the Ketchikan Gateway Borough.

Issues remaining include the need for recording easements and covenants on parcels of land in the pipeline corridor, recently acquired by the Borough, and future easements and covenants on 3.11 acres of land managed by the Bureau of Land Management, to be transferred to the Ketchikan Gateway Borough. There is also a need for a site visit should extensive construction result from property development or transfer.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Ketchikan Pulp Company		
EPA ID *(from WasteLAN)*: AKD009252230		
Region: 10	**State:** AK	**City/County:** Ketchikan, Ketchikan Gateway Borough
SITE STATUS		
NPL status: ☐ Final ☐ Deleted X Other (specify) Not on the NPL		
Remediation status (choose all that apply): ☐ Under Construction X Operating X Complete		
Multiple OUs?* X YES ☐ NO	**Construction completion date:** 2 / 25 / 2005	
Has site been put into reuse? X YES ☐ NO		
REVIEW STATUS		
Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____		
Author name: Karen Keeley (Marine OU) and Jacques Gusmano (Uplands OU)		
Author title: RPMs	**Author affiliation:** EPA	
Review period:** 2 /01 / 2005 to 6/ 7 / 2005		
Date(s) of site inspection: 7/21/2004 Marine OU; 5/9-10/2005 Uplands OU		
Type of review: ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only X Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review number: X 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____		
Triggering action: ☐ Actual RA Onsite Construction at OU #____ X Actual RA Start at OU# Uplands OU (ROD signed on June 7, 2000) ☐ Construction Completion ☐ Previous Five-Year Review Report ☐ Other (specify) _____		
Triggering action date *(from WasteLAN)*: June 7, 2000		
Due date *(five years after triggering action date)*: June 7, 2005		

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

Summarize issues.
1. Marine OU. None.
2. Uplands OU. The Ketchikan Gateway Borough (Borough) is actively seeking industrial development through lease and/or sale of the former KPC property. New construction would test the protectiveness and enforcement capabilities of the institutional controls and Restrictive Covenants. A site visit may be necessary during construction to ensure proper interpretation of institutional control guidelines. Also, parcels along the pipeline corridor have recently been acquired by the Borough, and have not yet had the restrictive easements and covenants outlined in the ROD and Institutional Control Plan (ICP) recorded with the State of Alaska. Finally, a 3.11 acre parcel along the pipeline, which is currently managed by the Bureau of Land Management, is being transferred to the Borough. This property must also record the easements and covenants outlined in the ICP when the property is conveyed to the Borough.

Recommendations and Follow-up Actions:

Summarize recommendations and follow-up actions.

1. Sitewide. None.
2. Marine OU. None.
3. Uplands OU. Check with Ketchikan Gateway Borough on lease/sale activity of property formerly owned and operated by KPC at least once per year, and increase EPA oversight during time of high construction activity.

Protectiveness Statement(s):

Include individual operable unit protectiveness statements. For sites that have reached construction completion and have more than one OU, include an additional and comprehensive protectiveness statement covering all of the remedies at the site **.**

1. Marine OU. The remedial action construction is complete, and the remedial action is an operating or ongoing remedial action. The remedy at the Marine OU is protective of human health and the environment.
2. Uplands OU. The remedial action is complete. The remedy at the Uplands OU is protective of human health and the environment, and exposure pathways that would result in unacceptable risks are being controlled by institutional controls and Restrictive Covenants.
3. Sitewide. All remedies at the site are protective of human health and the environment.

Other Comments:

None.

KETCHIKAN PULP COMPANY SITE
KETCHIKAN, ALASKA

INTRODUCTION

The purpose of a Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues or deficiencies found during the review, if any, and recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this Five-Year Review pursuant to CERCLA Section 121 and the National Contingency Plan (NCP). CERCLA Section 121(c) states that:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less than each five years after initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such review.*

The EPA interpreted this requirement further in the NCP, 40 CFR Section 300.430(f)(4)(ii), which states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The EPA Region 10 conducted a five-year review of the remedy implemented at the Uplands and Marine Operable Units (OUs) at the Ketchikan Pulp Company (KPC) site in Ketchikan, Alaska. This review for the Marine OU was conducted by the Remedial Project Manager (RPM) from February through June 2005. This review for the Uplands OU was conducted by the RPM from February through June 2005. This report documents the results of the review.

This is the first five-year review for the KPC site. The triggering action for this statutory review is the Remedial Action Start for the Uplands OU, which was the date the Uplands OU Record of Decision (ROD) was signed. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

SITE CHRONOLOGY

The KPC site is not on the NPL.

Table 1 - Chronology of Site Events

Event	Date
KPC operated a dissolving sulfite pulp mill	1954 - 1997
Preliminary site investigations	1991
Preliminary site investigations	1993
EPA Consent Decree (Clean Water Act and Clean Air Act) - RI/FS work for Marine OU performed pursuant to this decree	September 19, 1995
Responsible party implements RI/FS [referred to as Detailed Technical Studies Report (DTSR)] for the Marine OU	September 1995 - March 2000
Preliminary site investigations	1997
EPA performed Expanded Site Investigation (ESI) for site	1997
EPA AOC between KPC, Louisiana-Pacific Corporation (the parent company of KPC), and the ADEC - Primarily Uplands OU	1997
Final DTSR	May 1999
Issued Proposed Plan - Marine OU	July 12, 1999
Proposed Plan and RI/FS for Marine OU made available to public	July 1999 - August 1999
Recording of “Environmental Protection Easement and Declaration of Restrictive Covenants” - Marine OU	October 28, 1999
Sale of KPC assets to Gateway Forest Products (GFP), Inc., including Ward Cove real property other than the landfill and the pipeline and dam parcels, USS 3400 and 3401.	November 5, 1999

ROD Signed - Marine OU	March 29, 2000
ROD Signed - Uplands OU	June 7, 2000
EPA approval of remedial design - Marine OU	October 24, 2000
EPA/KPC/LP/GFP Consent Decree (CERCLA) for responsible party performance of Remedial Design/Remedial Action entered by federal court	November 20, 2000
Start of remedial action - Marine OU	October 24, 2000
Field construction - Marine OU	October 2000 - February 2001
Pre-final inspection performed - Marine OU	February 28, 2001
Final inspection performed - Marine OU	April 4, 2001
EPA approval of final construction report - Marine OU	July 10, 2001
EPA approval of final Long-Term Monitoring and Reporting Plan for Marine OU	September 17, 2001
EPA approval of addendum to the Long-term Monitoring and Reporting Plan for the Marine OU	January 3, 2002
Preliminary Close Out Report signed for Marine OU	February 25, 2005
Field sampling for long-term monitoring in Marine OU	July 2004
Responsible party submits draft 2004 Monitoring Report for Marine OU	October 2004
EPA comment letter on draft 2004 Monitoring Report for Marine OU	January 14, 2005
Responsible party submits final 2004 Monitoring Report for Marine OU	June 27, 2005

BACKGROUND

Physical Characteristics

The Ketchikan Pulp Company (KPC) site is located on the shoreline of Ward Cove, approximately 5 miles north of Ketchikan, Alaska (Figure 1). The KPC site is comprised of uplands and patented tidelands in Ward Cove. Ward Cove is one mile long and has a maximum width of 0.5 miles. Ward Creek, located on the east end of Ward Cove, is the primary source of fresh water to the Cove.

The Marine OU includes all of Ward Cove and other marine areas where there has been a migration of hazardous substances from Ward Cove or the Uplands OU. The Marine OU consists of approximately 250 acres in Ward Cove, of which approximately 80 acres have been designated in the ROD as an Area of Concern where remedial action is warranted because sediment contamination poses a risk to benthic organisms. Sediments in the cove are subtidal; intertidal sediments are limited to a very small area near the mouth of Ward Creek. The shoreline of the cove is mostly rocky and relatively steep.

Located on the north shoreline of Ward Cove, the Uplands Operable Unit covers approximately 85 acres. Ward Cove is a coastal valley bounded by Slide Ridge to the north and Ward Mountain to the south.

To the north of the former pulp mill area, the terrain slopes steeply upward to a peak approximately 2,100 feet above mean sea level, at a distance of approximately one mile from the shoreline. The area surrounding the former pulp mill is largely forested with pockets of industrial/commercial and residential properties clustered along North Tongass Highway, and some properties used for recreational purposes. There is no residential area along the shoreline.

The former pulp mill was built mainly on steep bedrock. Course gravel fill and “shot rock” were used as fill material to a depth of 11 feet to 25 feet. The former mill area is fenced and has a manned gate access.

The area has a maritime climate, characterized by mild, wet conditions, receiving an average 151 inches of precipitation annually.

Groundwater in the Uplands OU consists of a transient, shallow aquifer system that exists in the fill areas above the fractured bedrock, a shallow aquifer in the fractured bedrock, and a potential discontinuous deeper aquifer within the fractured bedrock. This groundwater is considered Class III groundwater and thus, non-potable. According to the Alaska Department of Environmental Conservation (ADEC), the shallow aquifer and potential deeper aquifer are not considered a reasonably expected future source of drinking water.

A pipeline (wood stave) running from Lake Connell to the former pulp mill facility provides an industrial water supply. Drinking water for this area is supplied by the Ketchikan public water supply system and is stored in a water storage tank on site. A service road allows access to most of the pipeline. A gate limits motor vehicle access by the public. A large dam at Connell Lake

(man-made) and the four-foot diameter pipeline supplied water to the former mill and now serves as a fire prevention water source for the North Tongass Fire and EMS Service Area. There are plans for other potential industrial uses of this water supply. There are several historic small storage/disposal areas along the pipeline. The habitat along the pipeline is heavily forested and since the pipeline is gravity feed, the general gradient is downward towards Ward Cove.

The Wood Waste and Ash Disposal Landfill is located at Dawson Point, just west of the former pulp mill facility and east of Refuge Cove. The area around the landfill is heavily forested. The landfill is situated on thin soil covering fractured bedrock. Groundwater flows through fractures steeply down-gradient to Ward Cove and Refuge Cove. Groundwater is not now used as a resource and does not likely represent a future resource.

Land and Resource Use

The former KPC facility began operations as a dissolving sulfite pulp mill in 1954 and discharged pulp mill effluent to Ward Cove until March 1997, when pulping operations terminated. Equipment associated with pulp mill operations has largely been dismantled and removed from the site. In November 1999, the KPC upland mill property (excluding the landfill and the pipeline and dam parcels USS 3400 and 3401) and patented tidelands in Ward Cove were sold from KPC to Gateway Forest Products, Inc. (GFP).

For a short time, GFP operated a sawmill and a veneer mill, producing lumber and veneer, chips for pulp, and hog fuel as a by-product. GFP initiated Chapter 11 Bankruptcy proceedings in 2001, and the U.S. Bankruptcy Court dismissed the action in 2002. GFP no longer owns or operates on any property within the KPC site.

At the present, the Ketchikan Gateway Borough (the Borough) reports that it owns substantially all of the former KPC and GFP property which was subject to the consent decree and institutional controls. The only exception is that the landfill parcel is still owned by KPC.

The Borough obtained the property in 5 different ways. First, the Borough obtained 28 parcels from GFP in December 2002 in connection with the foreclosure on its deed of trust interest from a loan made in 1999. Second, the Borough foreclosed on acquired interests in a deed of trust originally granted in favor of Tymatt, Inc. and Tyler Rental concerning USS 1706 and the unsubdivided remainder of USS 1754, to which title was acquired in December of 2002. Third, the Borough foreclosed on its loan interest, a first deed of trust, on USS 1056 lot 3 and the unnamed 10.25 acre portion of ATS 1 (an odd shaped portion which contains the dock and extends both in front of the former sawmill and inland under warehouses) and obtained title in December 2002. Fourth, in December 2003, Foothill Capital transferred to the Borough USS 1862; ATS 1 portion C-1; ATS 1 portion A; USS 2090 portion B; USS 2923; and a 5.16 acre portion of USS 056 adjacent to USS 2923. Fifth, KPC transferred USS 2004 lot 1; USS 3400; and USS 3401 to the Borough. Additionally, there is a 3 acre parcel along the pipeline which was subject to an earlier agreement between the Borough and KPC for transfer to KPC once the BLM transferred it to the State of Alaska and the State of Alaska transferred it to the Borough.

With KPC transferring its interests to the Borough, this parcel will now go to the Borough once it is conveyed by BLM and the State.

The Borough is presently offering a number of these parcels for sale or lease. Since much of the land is subject to institutional controls and deed restrictions, the Borough is taking steps to ensure that prospective buyers and lessors are fully aware of the restrictions that are imposed on these properties.

The current land use for the surrounding area is recreational, residential, commercial, and industrial. The former KPC upland property is industrial/commercial and is expected to remain industrial/commercial. The primary use of Ward Cove is navigation and recreation, including fishing. Although there are potential land use changes being pursued by the Ketchikan Gateway Borough, it is anticipated that a mix of land uses similar to that described will continue into the future.

There are no public health advisories for consumption of seafood from Ward Cove.

History of Contamination

The KPC mill operated continuously from 1954 until 1997, processing raw logs into lumber, pulp, and hog fuel. The principal product of the KPC mill was dissolving-grade sulfite pulp. When pulp production began, effluent from the mill was discharged directly to Ward Cove. After 1971, effluent was treated in a wastewater treatment plant located at the mill. After treatment, wastewater was discharged to Ward Cove.

The processes and conditions considered possible sources of chemicals of concern (CoC) included wastewater discharges, wood waste and ash disposal in landfill, stormwater discharges, release of airborne contaminants from the power boilers, and spills and accidental releases.

Specifically for the Marine OU, contamination at the site was discovered through water quality and sediment studies of Ward Cove that were conducted to evaluate the potential environmental effects associated with discharges from the KPC facility. Mill operations affected sediments through the release of large quantities of organic material as by-products from wood pulping. This organic material has altered the physical structure of the sediments, and thus the type and amount of benthic (bottom-dwelling) organisms. Degradation of the organic-rich pulping and by product has led to anaerobic conditions in the sediment and production of ammonia, sulfide, and 4-methylphenol in quantities that are potentially toxic to benthic organisms in sediments on the bottom of Ward Cove. The chemicals of concern for sediments are ammonia, sulfide, and 4-methylphenol.

For the Uplands OU, sources of contamination were the use of oils and lubricants in the fuel storage areas, maintenance shop and paint shop; polychlorinated biphenyls (PCBs) from electrical transformers and capacitors; heavy metal, polynuclear aromatic hydrocarbons (PAHs) and dioxins/furans from ash generation and sludge generation in storage areas, as well as the

wood waste/ash landfill; and, naturally-occurring arsenic contamination from “shot rock” fill material.

Other areas of contamination were the aeration basins, grit chamber soils, filter plant soils and several storage/disposal areas along the pipeline. The soil contamination outlined above was remediated during pre-ROD activities. EPA supervised the removal actions, which were conducted by KPC. Imported soil and rock products containing fines to be placed on the surface at the site are controlled by a Management Plan for Arsenic in Rock and Soil. Other potential areas not discovered during the RI/FS are managed by the use of Institutional Controls and Environmental Protective Easements. The wood waste and ash landfill has been capped and is currently scheduled for monitoring for 30 years.

Initial Response

The KPC site is not listed on the NPL.

Marine OU - The sediment investigation and feasibility study was implemented pursuant to a Clean Water Act and Clean Air Act consent decree. The remediation of Ward Cove was originally part of a consent decree with KPC dated September 19, 1995. The consent decree embodied a settlement between the United States and KPC for violations at the KPC facility of the Clean Water Act and the Clean Air Act. Under the terms of the settlement, KPC agreed to pay a penalty of $3.1 million. KPC also agreed to implement requirements for operating the mill (e.g., using only certified wastewater treatment operators) and to perform certain projects.

One such project was to develop and implement the Ward Cove Sediment Remediation Project. EPA Superfund performed oversight of the RI/FS and work performed under the consent decree. Upon completion of the RI/FS, the Proposed Plan (July 1999), and the ROD (March 2000), EPA supervised the completion of the sediment remediation project pursuant to a CERCLA Remedial Design/Remedial Action consent decree with KPC, its parent company, Louisiana-Pacific Corporation, and the new owner of the Ward Cove facility, GFP.

No removal actions or responses occurred prior to the ROD.

Uplands OU - KPC/LP, EPA, and the Alaska Department of Environmental Conservation (ADEC) entered into an Administrative Order on Consent (AOC) during June 1997. The AOC required KPC/LP to undertake RI/FS activities focused on the Uplands OU. In the Uplands OU, early pre-ROD actions involved the removal of contaminated soil and upland sediment (ditch sediment). Soil removal was completed at the access road ditch, railroad track areas, compressor area, the paint shop/maintenance shop, the former bulk fuel area, and storage areas along the pipeline. KPC also conducted building demolition and cleaned out roof cisterns used for water collection and storage of drinking water in the mill vicinity. These activities were conducted between spring of 1998 and summer of 1999 with ADEC and EPA oversight.

Basis for Taking Action

Marine OU - Hazardous substances in Ward Cove sediments include ammonia, hydrogen sulfide, and 4-methylphenol. These substances potentially pose an unacceptable ecological risk to benthic (bottom-dwelling) organisms.

An ecological risk assessment was also conducted using a food-web assessment to estimate risks of bioaccumulative chemicals to representative birds and mammals at the top of the Ward Cove food web. The chemicals evaluated were arsenic, cadmium, mercury, zinc, chlorinated dioxins/furans, and PAHs. The results of this assessment indicated that there are no unacceptable risks to higher trophic level organisms in Ward Cove.

A human health risk assessment was conducted to identify potential risks posed by chemicals detected in sediments or seafood (e.g., fish, shellfish). Ingestion of seafood that may contain chemicals bioaccumulated from the sediments was identified as the only complete exposure pathway for humans. The chemicals that were evaluated included arsenic, cadmium, mercury, zinc, phenol, 4-methylphenol, chlorinated dioxins/furans, and PAHs. Results concluded that sediments in Ward Cove do not pose an unacceptable risk to human health.

Direct human contact with sediments in Ward Cove is unlikely because of the depth of water overlying the affected sediments and the cold climate. Although direct contact is unlikely, this potential exposure was evaluated in a worst-case analysis and results indicated that sediments do not pose unacceptable risks to people.

Uplands OU - The early actions taken in the Uplands OU removed the most contaminated source material, eliminated unacceptable risks from direct contact with soils, eliminated soil transport to Ward Cove, eliminated leaching of surface soil contaminants to groundwater, and minimized potential future direct contact with subsurface soils at the site.

The paint shop/maintenance shop had an excess carcinogenic risk estimate of 3×10^{-4}, exceeding industrial worker risk for the combination of total PCBs, arsenic, and benzo(a)pyrene, and a total non-carcinogenic hazard index (HI) of 8. Lead industrial soil concentrations were also exceeded at the paint shop and the pipeline. State soil cleanup levels were exceeded in several areas prior to the EPA-supervised removal activities conducted by KPC. Institutional Controls and Environmental Protective Easements will monitor subsurface use and disturbance to control and minimize exposure for industrial uses.

A baseline human health and ecological risk assessment was conducted prior to the removal actions. This assessment and State cleanup standards formed the basis for the removal actions, which were conducted at the pulp mill site and the water pipeline access road. Several pathways were fully evaluated, but did not require quantitative risk calculations due to the lack of a complete exposure pathway or lack of chemicals of potential concern for the pathways. Exposure pathways that were quantitatively evaluated in the human health risk assessment were as follows:

- Current and future adult workers in onsite areas and in areas where aerial deposition has affected industrial soils were evaluated for potential exposures to chemicals of concern (CoCs) via ingestion, dermal contact, and inhalation.

- Current or future adult workers who might contact soils along the former pipeline access road via ingestion, dermal contact or inhalation.

- Offsite residents (adults and children) in aerial deposition areas were evaluated for potential exposures to CoCs via ingestion, dermal contact, inhalation, and consumption of homegrown produce.

- Offsite residents who have amended their yards with grit were evaluated for potential exposures to dioxins in soil via ingestion, dermal contact, inhalation, and consumption of homegrown produce.

The only completed exposure pathways exceeding the human health based risk levels applied by the EPA and the State was for current adult workers at the pulp mill site (the paint shop/maintenance shop area as described above).

In addition, potential exposures for residents who use water from cisterns that may have been affected by aerial deposition of power boiler stack emissions was considered in the remedial investigation and in a separate consultation by the Agency for Toxic Substances and Disease Registry (ATSDR) in 1998. The ATSDR assessment determined that there were no adverse health effects prior to cistern cleaning.

REMEDIAL ACTIONS FOR MARINE OU

Remedy Selection

The ROD for the Marine OU of the KPC site was signed on March 29, 2000. Remedial Action Objectives (RAOs) were developed as a result of data collected during the RI to aid in the development and screening of remedial alternatives considered for the ROD.

In order to eliminate or minimize the ecological risk associated with the toxicity of Ward Cove sediments to benthic organisms, the response action is intended to achieve these RAOs:

- Reduce toxicity of surface sediments

- Enhance recolonization of surface sediments to support a healthy marine benthic infauna community with multiple taxonomic groups.

The major components of the remedy selected in the ROD are described below.

Remedy Implementation

In a Consent Decree signed with EPA on November 20, 2000, KPC/LP agreed to perform RD/RA and implement long-term monitoring and pay past and future costs for carrying out work in the Marine Operable Unit. The RD was conducted in conformance with the ROD, and was approved in 2004. The field work for RA construction was completed in February 2001, and EPA approved the final construction report in July 2001. Pursuant to Paragraphs 41 through 43 of the CERCLA Consent Decree, KPC and GFP each agreed to implement institutional controls for the property owned by each company.

The remedy that was selected for the Marine OU is listed below (verbatim from the ROD, Part 1: Declaration). Following each component of the remedy that was listed in the ROD is italicized text describing actual construction completion.

- Placement of a thin-layer cap (approximately 6- to 12-inches) of clean, sandy material where practicable. Thin-layer capping is estimated to be practicable over approximately 21-acres within the AOC. Thin-layer capping is preferable over mounding.

  Constructed thin-layer (approximately 6- to 12-inches) placement of clean, sandy material over an estimated 27 acres. The increase in acreage is due to the fact that thin-layer placement was found to be successful over a broader area, and it was not necessary to construct mounding.

- Placement of clean sediment mounds in areas where thin-layer capping is either infeasible or impracticable, and where mounding is considered to be practicable. Mounding is currently considered to be practicable in areas where the organic-rich sediments are less than 5 ft thick and have a bearing capacity that is greater than 6 psf. Mounding is estimated to be practicable over approximately 6-acres within the AOC.

  Thin-layer placement was found to be practicable over the entire 27-acres, so mounding was not constructed.

- Dredging of approximately 17,050 cubic yards (cy) of bottom sediments from an approximate 4-acre area in front of the main dock and dredging of approximately 3,500 cy of bottom sediments from an approximate 1-acre area near the shallow draft barge berth area to accommodate navigational depths, with disposal of the dredged sediments at an upland location. After dredging, a thin-layer cap of clean, sandy material will be placed in dredged areas unless native sediments or bedrock is reached during dredging.

  Dredged approximately 8,701 cubic yards (cy; pay volume) of bottom sediments from an area in front of the main dock and an area near the shallow draft barge berth area to accommodate navigational depths, with disposal of the dredged sediments at an upland location. The dredging volume estimate was less than expected because native, clean sediments were encountered at a shallower depth than anticipated. After dredging, thin-layer placement of clean, sandy material was constructed in dredged areas where native sediments or bedrock was not reached.

- Removal of sunken logs from the bottom of Ward Cove in areas to be dredged.

Sunken logs (approximately 680 tons) were removed from the bottom of Ward Cove in areas to be dredged.

- Natural recovery in areas where neither capping nor mounding is practicable. Natural recovery is estimated to be the remedy for approximately 50 acres of the 80-acre AOC, as follows:

  1) an 8-acre area in the center of Ward Cove and a 2-acre area near Boring Station 8 that exhibit a very high-density of sunken logs (>500 logs/10,000 m^2);

  2) a 13.5-acre area where water depth to the bottom of the Cove is greater than –120 ft mean lower low water (MLLW) and the depth of the sediment is currently considered to be too great to cap;

  3) a 14.5-acre area where slopes are estimated to be greater than 40 percent and are currently considered to be too steep for capping or mounding material to remain in place;

  4) an 11-acre area where the organic-rich sediments do not have the bearing capacity (i.e., strength is less than 6 psf) to support a sediment cap and are too thick (i.e., thickness is greater than 5 ft) to practicably allow for placement of sediment mounds; and,

  5) a 0.2-acre area near the sawmill log lift where maintenance dredging generally occurs on an annual basis.

  In areas where thin-layer placement was not constructed, allowed for monitored natural recovery in approximately 52 acres.

- Institutional controls requiring that post-remediation activities within the AOC that materially damage the thin-layer cap or mounds will be required to redress such damage, at the direction of EPA.

  Institutional controls requiring that post-remediation activities within the Area of Concern that materially damage the thin-layer cap or mounds will be required to redress such damage, at the direction of EPA. The Environmental Protection Easement and Declaration of Restrictive Covenants, dated October 28, 1999, designated the State of Alaska, Department of Natural Resources and the Department of Environmental Conservation as the holder of the easement for the institutional controls.

- Implementation of a long-term monitoring program for the remedial action until RAOs are achieved, at the direction of EPA.

  EPA has approved a long-term monitoring program for the remedial action, which will be implemented until RAOs are achieved.

- Subtidal investigation of sediments near the east end of the main dock, and subsequent dredging and disposal of PAH-contaminated sediments, as deemed appropriate by EPA.

  PAH-contaminated sediments were dredged along with other dredged materials.

Submerged creosote-soaked pilings were also removed from the area of PAH-contaminated sediments.

The deviations from the remedy selected in the ROD are as follows:

- Thin-layer placement occurred over a larger area than was estimated in the ROD;
- The ROD allowed for "mounding" if thin-layer placement could not be implemented - "mounding" did not occur as thin-layer placement was effective in all areas;
- The dredging volume was less than was estimated in the ROD.

EPA determined that all RA construction activities, including the implementation of institutional controls, were performed according to specifications.

The Preliminary Close Out Report was signed on February 25, 2005.

Long-Term Monitoring and Reporting

On behalf of KPC/LP, KPC is conducting long-term monitoring and reporting according to the monitoring plan that was approved by EPA in September 2001. The primary objectives of the Ward Cove long-term monitoring program include the following:

- Compare sediment toxicity in thin capped and natural recovery areas in the remediated area with sediment toxicity in reference areas located elsewhere in the cove

- Compare the characteristics of benthic communities in thin capped and natural recovery areas in the remediated area with the characteristics of communities in reference areas located elsewhere in the cove

- Evaluate temporal trends in sediment toxicity in the thin capped and natural recovery areas of the remediated area

- Evaluate temporal trends in the characteristics of benthic macroinvertebrate communities found in the thin capped and natural recovery areas of the remediated areas

- Evaluate chemical concentrations and their relationship to sediment toxicity and benthic community structure.

The specific components of sediment quality used for the monitoring program are as follows:

- Sediment chemistry - Surface sediment samples will be analyzed for conventionals, ammonia, and 4-methylphenol.
- Sediment toxicity - Surface sediment samples will be evaluated using amphipod bioassay toxicity tests.
- Benthic communities - Characteristics of benthic communities will be evaluated by collection and enumerating the organisms found in surface sediment samples.

Sampling will occur every third year in July (e.g., 2004, 2007, and 2010) until RAOs are achieved, or as modified and agreed to by EPA.

Long-term monitoring costs for the 2004 effort are estimated to be $200,000 to $300,000, and are expected to diminish over time.

REMEDIAL ACTIONS FOR THE UPLANDS OU

Remedy Selection

The selected remedy for the Uplands OU included compliance with already-existing institutional controls to ensure the former pulp mill area remains commercial/industrial and that portions of the pipeline access road where cleanup activities occurred are not developed for residential use. These institutional controls are implemented through:

- Ketchikan Gateway Borough zoning restrictions;
- Environmental Protection Easement and Declaration of Restrictive Covenants, recorded on October 28, 1999;
- Management Plan for Arsenic in Rock and Soil, prepared July 1998;
- Excavation and Soil Handling Procedures, outlined in the Institutional Controls Plan, dated June 2000.

The selected remedy for the Wood Waste and Ash Disposal Landfill was to close and cover the landfill with a geomembrane cap, place a topsoil cover over the geomembrane, establish a vegetative cover and maintain the final cover, the passive gas venting system, and the leachate treatment system. The cap was installed in 1997 with an open cell constructed on top of that cap to receive ash from the power boilers which ran until March 1998. The final cap for this remaining open cell was installed in 2001. The remedy also included long-term visual and surface water monitoring to detect the potential for public ecological receptor endangerment or water quality standard or permit violations. The Wood Waste and Ash Disposal Landfill was also included in the Institutional Control Plan, Management Plan for Arsenic in Rock and Soil, and recorded Restrictive Covenants.

Remedy Implementation

The Record of Decision was signed June 7, 2000. The Environmental Protection Easement and Declaration of Restrictive Covenants was recorded on October 28, 1999. The Institutional Control Plan was finalized in June 2000. The Management Plan for Arsenic in Rock and Soil was finalized July 1998. The Restrictive Covenants are in effect until contaminants left in the soil reach acceptable levels for unrestricted land use or until 2099, whichever comes first.

Long-Term Monitoring and Reporting

KPC conducts visual inspection and maintenance of the landfill cap and collects surface water samples to assess the site surface water, as well as maintain operation of the landfill leachate treatment and aeration ponds.

The Ketchikan Gateway Borough enforces ICs with all leaseholders and coordinates with EPA and ADEC on all potential subsurface construction projects.

PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This was the first five-year review for the site.

FIVE-YEAR REVIEW PROCESS

Administrative Components/Community Involvement/Document Review

The Five-Year Review team was comprised of the Remedial Project Managers responsible for the Marine and Uplands OU. There are no current active citizen groups associated with the KPC site. External stakeholders, including the state, were notified of the start of this five-year review on February 8, 2005. The Five-Year Review consisted of a review of relevant documents including decision documents (RODs), remedial action completion reports, long-term monitoring plans and reports, environmental laws and regulations, and enforcement documents.

Data Review - Marine OU

The 2004 long-term monitoring report was approved by EPA on June 27, 2005. Results indicated:

- Environmental conditions in many parts of the remediated portions of Ward Cove have improved since the remedy was implemented.

- The sand placed during thin-layer placement was observed at all stations (the sand did not appear to have ‘sunk’ into the underlying soft sediments).

- 2004 data show twice as many taxa, with taxa widely distributed among groups.

- For those areas where thin-layer placement was implemented and in the shallow natural recovery area with thin organic deposits, concentrations of the two chemicals of concern (ammonia and 4-methylphenol) are below site-specific sediment quality values; high amphipod survival (93-96%) was found for the amphipod sediment toxicity bioassays; and, high abundance and diversity of benthic community organisms was found (9 benthic metrics were analyzed and tested, site versus reference).

- In the other three natural recovery areas (shallow depth with thick organic deposits; moderate depth; deep depth), concentrations of the two chemicals of concern remain elevated; low amphipod survival was found for the sediment toxicity bioassays; and, the benthic community remained adversely impacted in the shallow natural recovery area with thick organic deposits as evidenced by significant differences between site and reference.

- Monitoring will continue in 2007.

For the Marine OU, a post-construction site visit by EPA occurred in July 2004. The report of this visit was reviewed to complete this report. No significant issues were identified. No activities were observed that would suggest that institutional controls associated with the Marine OU have been violated.

No interviews were conducted.

Data Review - Uplands OU

The following documents were reviewed for the Uplands OU:

- Exponent. 2000. Institutional Control Plan for the Ketchikan Pulp Company Site.
- Ecology and Environment. 1998. Final Ketchikan Pulp Company Expanded Site Inspection Report, Volume 1 and 2.
- PTI. 1997. Source Material Sampling Plan, Ketchikan Pulp Company Uplands Operable Unit.
- PTI. 1998. Technical Memorandum 7, Technical Approach for Ecological Risk Assessment of Offsite Habitats near the KPC Site in Ketchikan, Alaska.
- Exponent. 1998. Remedial Investigation Report, Ketchikan Pulp Company Site, Volume 1.
- Exponent. 1999. Technical Memorandum 9, Technical Approach for Evaluating Arsenic Bioavailability in Soil and Crushed Rock.
- US EPA. 2000. Ketchikan Pulp Company (KPC) Ketchikan, Alaska Uplands Operable Unit, Record of Decision.
- Exponent. 2000. Management Plan for Arsenic in Rock and Soil.
- ATSDR. 1998. Report - Petitioned Health Consultation, Louisiana Pacific - Ketchikan Division (a/k/a Ketchikan Pulp Company) Ketchikan, Ketchikan Gateway County, Alaska.
- Ketchikan Gateway Borough. 2005. Ketchikan Gateway Borough Sale of West Ward

Cove - Phase 2 Property Information.

In addition, interviews were conducted with the following individuals:

Lisa Machado - Ketchikan Gateway Borough, Property Manager
Steve Corporon - Ketchikan Gateway Borough, Assistant Borough Manager
Phil Benning - KPC Environmental Operations
Barry Hogarty - Technical Environmental Consulting Services
Lisa Yost, PhD - Exponent
Bill Janes - ADEC Project Manager
Curtis King - Wood Group Construction
Ralph Meraki - Local resident

Interview Records are provided in Attachment 2. Also, a site visit was conducted on May 9 and 10, 2005, and the resultant Site Inspection Checklist is provided in Attachment 3 and associated photographs are provided in Attachment 4. This visit included the mill area, the dock facilities, the pipeline and associated dam, and the landfill and treatment ponds. During this visit, Borough records and protocols for management of this property were also reviewed. Attachment 5 includes a map of the former KPC holdings that are now held by the Ketchikan Gateway Borough, and a summary of covenants, easements, and other authorities associated with institutional controls, and of other relevant real property interests or contractual terms. Attachment 5 is meant as a quick reference tool to facilitate understanding of the coverage of the various encumbrances and other authorities. For complete information, refer to the Consent Decree, its attachments, the applicable easements and covenants, etc. (see P. Benning, KPC, letter to Karen Keeley and Jacques Gusmano, EPA dated June 27, 2005).

TECHNICAL ASSESSMENT

Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Marine OU - Yes. Construction of the remedial action is complete, the first long-term monitoring effort is complete (occurred three years after remedial action completion), and all results show that the remedy is functioning as intended and that progress is being made towards achieving the RAOs.

Based on information reviewed in the 2004 Monitoring Report for the Marine OU, the remedial action continues to operate and function as designed (e.g., the thin layer placement of sand is remaining in place), and performance standards have been achieved or are expected to be achieved. Monitoring will occur in 2007.

Long-term monitoring efforts are being completed in a timely manner, and will continue pursuant to the Long-term Monitoring and Reporting Plan for the Ward Cove Sediment Remediation Project. These monitoring efforts are adequate to evaluate the protectiveness and effectiveness of the remedy.

Institutional Controls (ICs) are adequate and complete; no actions related to ICs are necessary.

Uplands OU - Most remediation activities were complete prior to the ROD. The Institutional Controls and Restrictive Covenants were designed to be protective after remediation. The following issues play a significant role in the effectiveness of the intended remedy:

- The land ownership of all parcels associated with this former KPC site, except the Wood Waste and Ash Landfill and a 3.11 acre parcel at the pipeline access road, are now in the ownership of the Ketchikan Gateway Borough.

- The Ketchikan Gateway Borough maintains excellent records of all parcels and strictly enforces the Restrictive Covenants and ICs.

- The Ketchikan Gateway Borough is actively seeking to lease and/or sell these parcels to promote industrial growth and jobs for Ketchikan, while maintaining ICs and Restrictive Covenants outlined in the ROD.

- KPC has conducted asbestos removal at the pulp mill power plant facility to address friable asbestos conditions, according to EPA and ADEC notification and disposal requirements.

- The Ketchikan Gateway Borough has contracted with Burlington Environmental Services to containerize and properly dispose of 150 drums of hazardous materials remaining in the mill buildings.

- KPC has documented landfill cap integrity through periodic monitoring, settlement surveys, and cap inspections. Monitoring and inspections have verified the stability of the engineering. Because of this success, and because a new NPDES permit (issued October 1, 2004) for the landfill has created redundant monitoring requirements, they are requesting a reduction in monitoring frequency in their State Solid Waste Comprehensive Solid Waste Monitoring Plan.

- Conveyance of parcels of land along the pipeline corridor to the Borough from KPC have not yet had easement and covenants recorded; also, 3.11 acres, held by BLM and selected by the Borough, do not have easements and covenants recorded, because transfer has not yet occurred.

Because of the above developments over the past five years, management/ownership of the properties is more clear, record keeping is thorough and complete, the ICs are enforced, and most waste originally left on site after remediation has been removed (asbestos, hazardous material). In addition, landfill closure has been successful with no runoff or unauthorized effluent apparent to date; therefore, the ICs in place are adequate and complete and there is no evidence that the original remedy is not protective and effective. Also, the completeness of Borough records and their written guidance to prospective leaseholders and purchasers indicates that, for at least the near future, these ICs will be enforced.

The parcels along the pipeline corridor recently acquired by the Borough must have easements and covenants recorded. The 3.11 acres held by the BLM must have the easements and covenants recorded after property transfer is complete.

Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) used at the Time of the Remedy Still Valid?

Marine OU - Yes. Site conditions have not significantly changed since the ROD. Land use for upland properties adjacent to the Marine OU has changed significantly since the ROD; the land owner at the time of the ROD has since filed for bankruptcy and is no longer operating a veneer or sawmill. The uncertainty in land use adjacent to the Marine OU does not bear on the protectiveness of the remedy, and the original assumptions regarding current and future land use and contaminants of concern are still valid.

The cleanup levels and RAOs for this project are still valid. There are no changes in the standards identified as ARARs in the ROD, and there are no newly promulgated standards that might be ARARs to the site, that bear on the protectiveness of the remedy.

Uplands OU - After review of the Risk Assessment and several technical memorandum produced by "Exponent" on behalf of KPC, and discussions with the original author of the Risk Assessment, Dr. Lisa Yost, and review of current State and Federal applicable or relevant and appropriate regulations (ARARs), EPA believes that the ROD exposure assumptions, cleanup levels, and RAOs are still protective.

The original risk and exposure assessment calculated a PCB bioavailability of 100 percent, so the 10 ppm cleanup level is conservative and protective.

No final dioxin and/or arsenic cleanup criteria have been established since the ROD.

Question C: Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

Marine OU - No information has come to light that could call into question the protectiveness of the remedy.

Uplands OU - No other information has come to light that could call into question the protectiveness of the remedy.

Technical Assessment Summary

Marine OU - According to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the OU that would affect the protectiveness of the remedy. Progress is being made towards achieving the RAOs identified in the ROD. There have no newly-promulgated ARARs for sediments. There have been no changes to the standardized risk assessment methodologies and input parameters

that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Uplands OU - According to the data reviewed, the site inspection, and interviews, the remedy is functioning as intended by the ROD. The physical changes that have occurred in the mill area have resulted in a reduction of potential sources of contamination (asbestos removal, hazardous material/waste removal).

There have been no newly promulgated ARARs for the chemicals of concern in the Uplands OU. There have been no changes in risk assessment methodologies and input parameters that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy. Current management monitoring and record keeping practices of KPC and the Ketchikan Gateway Borough are excellent and validate the effectiveness of the ICs and Restrictive Covenants. The parcels along the pipeline corridor need easements and covenants recorded with the State of Alaska.

ISSUES

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
The area of Ketchikan is economically depressed because of the mill closure. The Borough is actively seeking industrial development through lease and/or sale of this property. New construction would test the protectiveness and enforcement capabilities of the ICs and Restrictive Covenants. A site visit may be necessary during construction to ensure proper interpretation of IC guidelines.	(N)	(N)

RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affect Protectiveness? (Y/N)	
				Current	Future
Check with Borough on lease/sale activity and increase EPA oversight during a time of high construction activity, at least once each year. EPA should ensure that easements and covenants are recorded on newly acquired parcels along the pipeline corridor. This would require a meeting with all parties to ensure proper implementation of the ROD. This meeting must also include BLM since they are managing federal property to be excessed that has certain use restrictions. A topic of discussion at this meeting should be what signs are necessary along the pipeline corridor to notify the public of restrictions.	EPA	EPA	6/2006	(N)	(N)

Figure 1. Location of Ward Cove and KPC facility.

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Attachment 1

Record of Decision for the Uplands Operable Unit, Ketchikan Pulp Company Site
(selected text from Section 11.2, Description of the Selected Remedy)

Attachment 2

Interview Records for Uplands Operable Unit, KPC Site

Attachment 3

Site Inspection Checklist (dated 5/9-10/2005) for Uplands Operable Unit, KPC Site

Attachment 4

Photographs (dated 5/9-10/2005) taken by Jacques Gusmano (EPA)
during Site Visit
for Uplands Operable Unit, KPC Site

Attachment 5

Map - “Ward Cove Properties”, Former KPC Properties currently owned by Ketchikan Gateway Borough
(provided by Scott A. Brandt-Erichsen, Ketchikan Gateway Borough Attorney,
to Karen Keeley, EPA in 2005)

Excel Spreadsheet - “Ward Cove Properties” and Covenants, Easements, Special Language
(provided by Scott A. Brandt-Erichsen, Ketchikan Gateway Borough Attorney,
to Karen Keeley, EPA, dated July 1, 2005)

KPC Site, Ketchikan, Alaska
Five-year Review (2005)