ENVIRONMENTAL DREDGING OF CONTAMINATED

SEDIMENTS

VIDEO PROGRAM

The program opens with shots of people fishing, boating, water skiing, etc. We then see shots of a commercial fishing boat as well as a boat carrying cargo up a river.

Narrator: Valued for their recreational opportunities and prized for their scenic beauty, our nation's lakes, rivers, and bays are precious natural resources.

Many of these waterways also provide significant economic opportunities through commercial fishing and navigation.

Unfortunately, below some of their tranquil and flowing surfaces lie sediments that have become contaminated by hazardous materials.

Animation showing how sediments build up on the floor of a waterway is shown. One of the layers of sediment is labeled "contaminated sediment."

This is followed by shots of waterways with bulleted on-screen text reading "10% of lake, river, and bay sediments contain enough toxic material to contaminate fish and impair the health of people or wildlife that eat the fish." This is followed by additional text reading " State-ordered fish consumption advisories: 15% of lake acreage. 5% of river miles."

Narrator: Toxic by-products of industrial manufacturing accumulated in soils, sands and organic matter have impacted the delicate ecosystems of our waterways.

The U.S. Environmental Protection Agency estimates that 10 percent of our lake, river, and bay sediments contain enough chemicals to contaminate fish and impair the health of people and wildlife that eat them.

Health concerns have prompted states to prohibit or limit fish consumption for 15 percent of the country's lakes and 5 percent of its rivers.

Narrator: The cleanup of contaminated sediments is a complicated issue with far-reaching economic and environmental impacts. One successful approach is environmental dredging to remove contaminated sediments from our waterways.

Old black and white video footage of a bucket dredge being pulled out of the water is shown. The bucket has mud spilling over from its sides. This image slides off screen and a "modern" environmental dredge is shown.

Text also appears on the screen: "Environmental Dredging; The Safe, Precise Removal of Contaminated Sediment"-- This text dissolves off screen and new text appears: "Environmental Dredging Controls and Minimizes Resuspension of Sediments."

Narrator: Traditionally, dredging has been used to keep shipping channels deep enough to navigate. Unlike navigational dredging, which stresses the quick removal of the sediments, environmental dredging is more precise and places greater emphasis on environmentally-sound removal.

During environmental dredging, every effort is made to control and minimize the resuspension of small sediment particles in the water. Environmental dredging is done in carefully delineated areas that limit the amount of material to be dredged.

A live action shot of a silt curtain dissolves to animation of a silt curtain extending from the surface to the floor of a river.

Narrator: To protect against resuspension, work areas can be enclosed or bordered with **silt curtains**, specifically engineered barriers that float above the water surface and extend to the bottom.

There are a number of proven environmental dredge designs already in use, but virtually all fall into two basic categories, hydraulic or mechanical.

Animation begins and illustrates the hydraulic dredging process.

Narrator: A hydraulic environmental dredge can best be described as a gigantic vacuum cleaner that first loosens and then suctions sediments from the floor of a waterway.

Narrator: A centrifugal pump suctions while a cutter agitates the sediment. The head is shielded to prevent sediment resuspension and minimize inflow of excess water. Some designs also include movable shutters and grates for additional protection.

The precise electronic cut angle and swing speed is monitored at all times. The unit can also be fitted with video, and sonar equipment used to monitor for precision and any sediment resuspension. If real-time monitoring reveals turbidity, or cloudiness in the water, the operation can be immediately shut down and only restarted when the problem is corrected.

The animation ends and we see shots of waste being pumped to an onshore treatment facility.

Narrator: The dredged sediment would then be pumped through a pipeline to an on-shore facility for dewatering and treatment. Dewatering reduces the volume prior to shipment and meets disposal needs. The wastewater is treated and returned clean to the waterway. The remaining solids can then be treated using one of many proven remediation technologies.

Animation begins again and illustrates the process of mechanical ~~process of~~ dredging.

Narrator: Mechanical environmental dredging takes a somewhat different approach. It uses an overlapping, sealed clamshell-style bucket to scoop up the contaminated sediments. Like the hydraulic

system, the bucket can be fitted with video cameras, sonar, and GPS to enhance precision and provide monitoring capability.
Topside, the open bucket is positioned by computer to precise coordinates, then lowered into the water.

During its descent, a venting system allows water to pass through the bucket, minimizing sediment resuspension.

Near the bottom, the bucket is paused momentarily to confirm target and penetration depth. The bucket is then lowered to the bottom and closed, making a precise, horizontal cut. During closing, the sides overlap, effectively sealing all sediment in the bucket

The bucket is then raised to the surface just above the water line, where it is paused to allow water to drain from the vents.

The sediments are then released into a receiving container, usually a hopper barge. The bucket can also be vibrated to shake off any materials clinging to its surface.

Narrator: The empty bucket is rinsed in a tank on a barge and vibrators are again activated. The clean bucket is then raised and positioned for the next target area.

Narrator: Here too, the final step for sediments in the hopper barge is dewatering and treatment.

The animation ends and we see shots of environmental dredging activities.

Narrator: Whether to select hydraulic or mechanical environmental dredging depends on the types of materials to be dredged, water conditions and depth, as well as sediment depth targeted for removal.

But both techniques use similar approaches – such as silt curtains and real-time monitoring – to control and measure any resuspended sediment.

Animation illustrating how the monitoring stations are set up in a river is shown.

Narrator: Monitoring stations are usually positioned upstream of the work area for a baseline measurement, close to the dredging area, and downstream from the work area in front of the silt curtain. A fourth station can also be placed farther downstream for additional measurements. Again, if resuspension is detected, the operation can be immediately stopped.

The animation ends and we see shots of waste being treated onshore.

The program closes with shots of people boating and fishing.

With the right equipment, careful monitoring, and some time, environmental dredging can restore a thriving ecosystem and economy to contaminated waterways.