

Remediation Abstract:

During Remediation Activities -- Northwestern Louisiana
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A municipal water supply reservoir had contained a localized area of impacted sediments along its shoreline. Remedial activity was scheduled for the site with a primary objective being the containment of the impacted sediments during the removal phase of the project. Water filled cofferdams were considered to be an economical and also an environmentally-acceptable method of isolating the work areas as the remediation work progressed.

The AquaDams® consisted of two inner-filled membrane bags with a woven geotextile outer bag that, when filled, acted as a dam or dike. Four hundred and eleven meters (1,350 feet) of .91 meter (3 foot) high and 200 linear feet of 1.8 meter (six foot) high structures were used to enclose the remediation area. Once the structures were installed, work was initiated to remove impacted material from the enclosed work cell.

The sediments were removed from the enclosed area, dewatered and prepared for disposal. During the remediation activity, heavy rains in the area affected the level of the lake. The AquaDams® prevented the lake water from reaching the excavation area and prevented the release of the impacted sediment.

AquaDams® provided a cost-effective method for the isolation of the remediation area, eliminating the requirement for the construction and subsequent removal of earth dikes or dams. Since no backfill or earth was used to create dikes, no silt or additional sediment was introduced into the lake. The material was contained in the work zone throughout heavy rains, and additional areas of the lake were not affected. AquaDams® were a viable option for the isolation of a contaminated zone during remediation activity.

Background:

A municipal water supply reservoir contained a localized area of impacted sediments along the shoreline. Remedial activities originally proposed consisted of mechanical excavation of the impacted sediments. Before remediation could commence, isolation and dewatering of the area was required. Draining of the lake was not considered a viable option due to the potential effect on the surrounding municipality's water supply. The isolation options available were construction of an earthen containment dike or use of water containment structures. Minimal disruption to the ecosystem was considered the priority to aid the area in returning to a natural environment as quickly as possible after the remediation. After a review of the remediation requirements and the comparison between the earth berms and AquaDams®, AquaDams® were selected as the preferred containment method.

AquaDam® function like portable dams or barriers that are positioned where needed to contain or divert the movement of water. AquaDams® consist of two basic parts: 1) an exterior durable woven fabric, and 2) multiple inner tubes made of polyethylene or other membrane-type materials. The outer fabric acts as a confining system for the two inner bags which are filled with water.

When an outside force is applied to a filled AquaDam, the shear mass of the structure combined with the counter-rotating effect of the two inner bags provides the structural stability for the AquaDams. Given the inherent flexibility of both the outer and inner bag materials, AquaDams® will readily conform to most sedimentary surfaces, river beds, or other fluvial terrain.

Site Considerations:

AquaDams® are an effective method for providing a diversion or containment area, but before AquaDams® could be used, specific criteria required evaluation. Items considered were: water velocity, installation site conditions, climate/spring runoff, and water depth.

The area of the lake where remedial activities were planned consisted of a gentle grade sloping away from the shoreline. The normal water depth in the deepest areas where AquaDams® were to be placed were .91 meters (three feet) in depth, decreasing to .30 meters (one foot) and shallower approaching the shoreline area. Since the Structures would be installed in a lake, currents were not a major concern. The lake bottom in the remediation area consisted of silt and sediment type materials which would provide an effective seal at the structure/lake interface. Remediation activities were scheduled for late summer, therefore no site runoff into the area was expected with the possible exception being heavy rain. AquaDam® heights were selected based on normal expected water depths, including increased depths which could occur during normal rains. Based on these factors, 1.82 meter (six foot) high structures were selected for the deeper areas of the containment area and .91 meter (three foot) high Structures for the shallower areas.

The sediments designated for removal extended out from the shore approximately 51.81 meters (170 feet) and covered an area 213.36 meters (700 feet) in width. Remedial activities for the area necessitated that the area be divided into smaller cells. Three zones were established, each perpendicular to the shore and approximately equal in size. Each zone covered a 51.81 meter (170 foot) by 71.62 meter (235 foot) area.

Remedial Activities:

Once the AquaDams® were installed, draining of the cell commenced. Water was pumped from within the containment area ensuring that no impacted sediment was removed. Once the cell area was dry, impacted materials were removed for processing and disposal. The enclosed area was subdivided into smaller cells as required. At the completion of the remediation operations, the AquaDams® were removed and the site returned to its natural state.

Operational Problems:

During the excavation process, the local area experienced unusually heavy rains. There was a concern that water in the lake would rise to or above the height of the AquaDams® with the eventual failure. Lake levels rose several feet during the rain storm with the lake elevation reaching a point nearly as high as the AquaDams. No failure of the systems occurred, whereby the integrity and isolation of the remediation area was maintained.

Remediation activities were conducted over a 120 day period. Over 2,000 cubic yards of material were removed for treatment and eventual disposal. 1,000,000 gallons of water were treated on-site and returned to the lake area. During this period of time, remedial activities continued without any disruptions due to problems with the AquaDams.

Summary:

AquaDams® proved to be an effective system for isolating a contaminated site for remediation. The structures were installed in a short period of time without significant modifications to the terrain ensuring minimal effect on the ecosystem. AquaDams® were also cost-effective when compared to other types of isolation type operations. With the quick installation and removal, on-site time was reduced. Additionally, no additional backfill had to be transported in or out of the area.