STATE OF CALIFORNIA

PETE WILSON, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
2101 WEBSTER STREET, SUITE 500
OAKLAND, CA 94612
(510) 464-1255

March 10, 1992
File No. 2223.09(LF)

Dave Gustafson
Director of Engineering
Consumer Division
The Sherwin-Williams Company
101 Prospect Ave., N.W.
Cleveland, Ohio 44115-1075

SUBJECT: Interim Cleanup Actions at 1450 Sherwin Avenue, Emeryville, CA

T1608

Dear Mr. Gustafson:

Staff of the Regional Board have reviewed several reports prepared by Levine-Fricke Consultants concerning pollution of the soil and groundwater at the subject facility. Staff have also reviewed the recommended alternative for interim remedial action contained in the report entitled "Evaluation of Interim Remedial Measures at the Sherwin-Williams Facility Emeryville, California" dated December 20, 1991. In addition, staff have met with you and your consultants several times to discuss soil and groundwater pollution investigation and remediation options.

Based upon the review of the site data, remediation of the soil and groundwater is necessary to protect the beneficial uses of groundwater and surface waters of the State of California. The studies have found significant metals pollution in the upper soils, principally arsenic. The studies have also found groundwater polluted with VOC's, SVOC's, arsenic and TPH.

Your proposed interim remedial action, Engineered Containment, provides for capping the site, installing a slurry wall around the site keyed into the lower permeable bay muds, and providing groundwater extraction and treatment inside of the containment structures. This engineering plan, together with deed notices, should provide for the containment of the soil and groundwater problems on-site. Monitoring of this containment would be an integral part of the pollution management strategy.

Based upon the staff review of the site history, the pollution studies, and the recommended alternative contained in the December 1991 Report, I have no objection to your proceeding with the proposed interim cleanup activities. Please provide staff with implementation time schedules, a draft of the deed notice for review and comment, and a proposed groundwater monitoring plan as soon as possible. Final cleanup standards for the site will be based upon actions taken by the Regional Board at a public hearing. Recent action by the Board on a site polluted with arsenic has been discussed with staff of Levine-Fricke and they have been provided with the summary reports on that action. The Board accepted containment options in that case, where pollution levels in soils left in place were based upon

health-risk based methodologies. In that case removal actions and soil fixation technologies were required. I am unable at this time to provide you with a schedule of Regional Board action on this matter which will most likely require the preparation of health-risk based analyses of final remediation options.

Please continue to coordinate this case with Lester Feldman or his staff at (510) 464-1332.

Sincerely,

Steven R. Ritchie
Executive Officer

cc: Alameda County Health Department
State of California EPA- Department of Toxics Substances Control, Berkeley

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4/20

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10/25/93
Talked to Sam Arigala
Applied for NPDES permit
to discharge treated water w/
As levels to Temescal Creek

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246-1332

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cc: Alameda County Health Department
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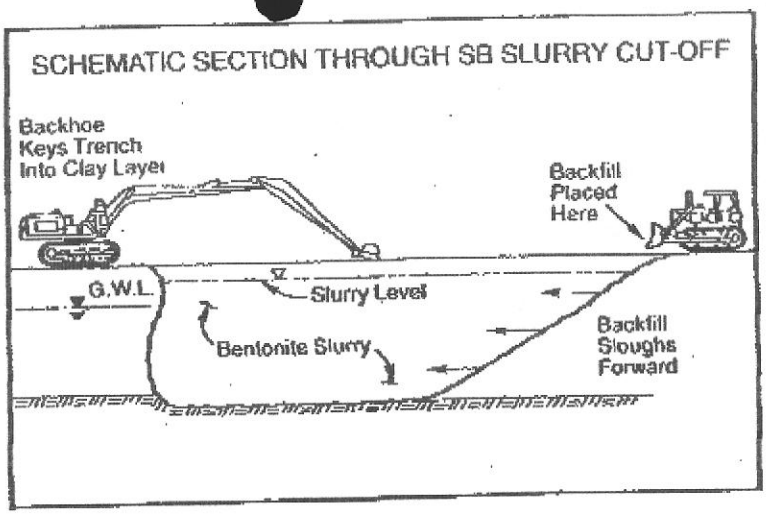
Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 4
To Susan Hugo | From Margaret Ellott
Co. Alameda Env Health | Co.
Dept. | Phone #
Fax # 569-4757 | Fax # 596-4310

SOIL-BENTONITE SLURRY WALLS

Technical Brief

Soil Bentonite Slurry Walls

Soil-Bentonite slurry walls are subsurface, non-structural walls that act as barriers to the lateral flow of groundwater and water-borne pollutants. Soil-Bentonite (SB) cutoff walls are constructed using the slurry trench technique and are composed primarily of soil and bentonite, a natural clay mineral. The principal advantages of SB cutoff walls are the low permeability of the wall and their general suitability for both new and remedial applications.



APPLICATIONS

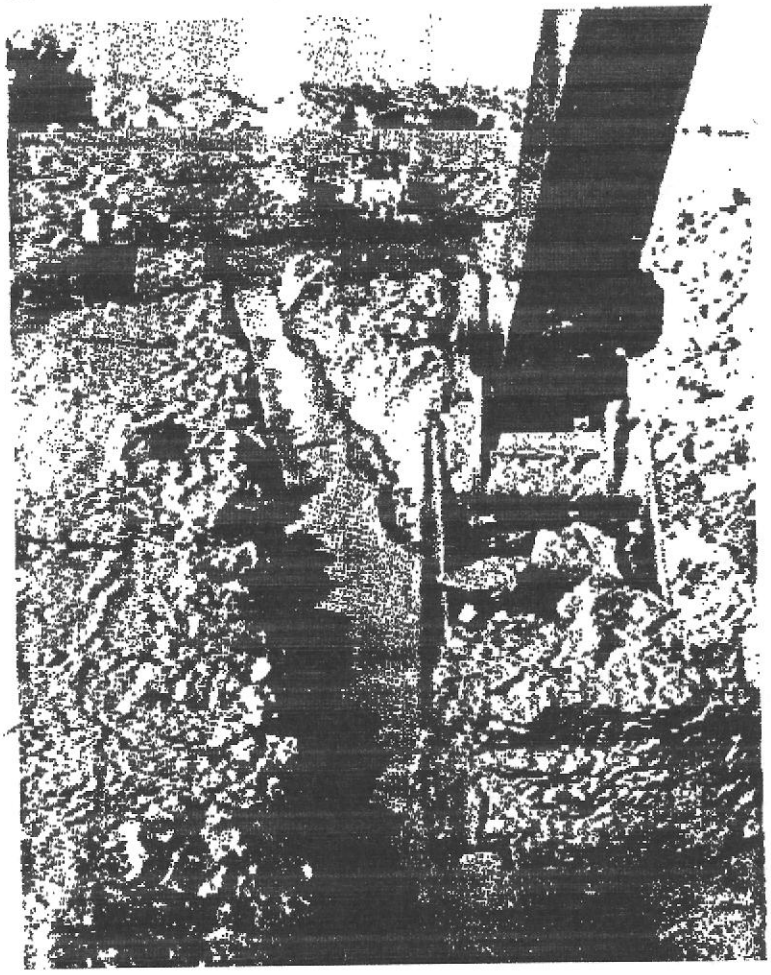
The soil-bentonite slurry trench technique has been in use in the United States since the 1940's. The early applications of soil-bentonite walls were for dewatering large excavations and as hydraulic barriers in dams and dikes. Recently, there has been a growing number of applications of SB slurry walls for pollution control, particularly on projects where a positive leachate cutoff is required. Recent advances in the capability of excavating equipment and refinements in technique have brought the cost of slurry walls down. Slurry walls are now economically competitive on projects where compacted clay cutoffs, leachate collectors, sheeting, or well points would have previously been used. Some typical applications are to:

- Seal dams and dikes
- Contain sanitary and hazardous waste landfills
- Dewater structural excavations
- Hydraulically isolate lagoons and holding ponds
- Enclose oil and chemical tank farms
- Intercept seepage from slopes
- Contain oil spills

Slurry walls are particularly well suited for remedial applications. Usually, SB walls can be constructed without disturbing the function or operation of existing facilities.

CONSTRUCTION

The construction sequence of the cutoff wall is the same whether it is to be used to cutoff groundwater or polluted leachates. The major characteristic of slurry cutoff wall construction is the use of bentonite-water slurry which allows excavation without the use of other lateral support. Slurry cutoff walls are built by excavating a narrow trench (2-4 ft. wide) while pumping in the slurry and maintaining its level at or near the top of the trench during the excavation process. Usually, the trench is keyed into an underlying



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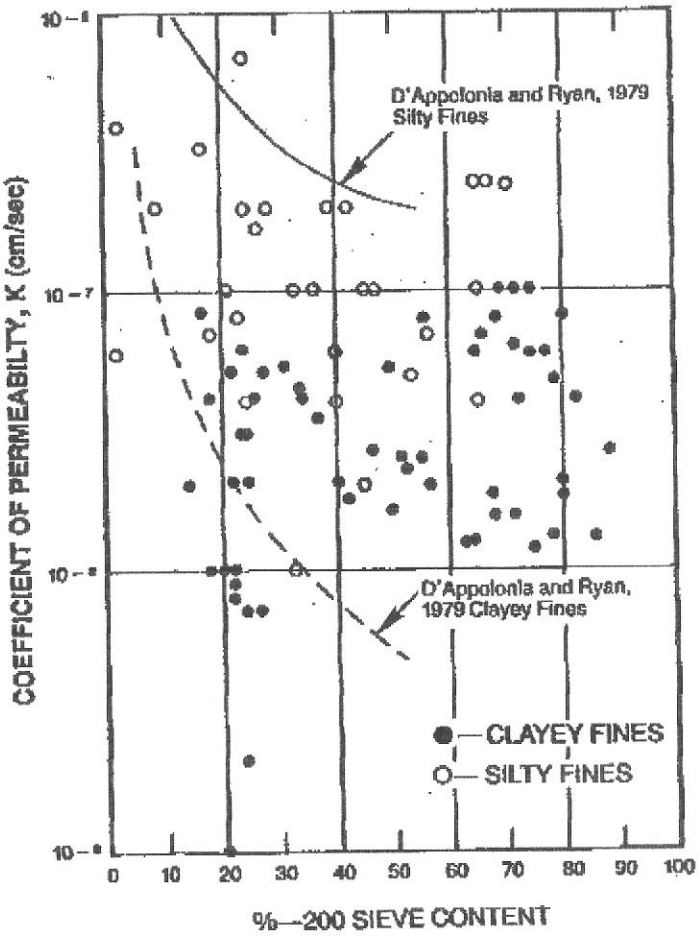
aquiclude. The aquiclude then forms the bottom and the slurry wall the sides of the containment. This narrow trench is then backfilled with impervious materials to form a permanent cutoff. When the backfill consists of a mixture of soil and bentonite, the construction work is called a soil-bentonite (SB) slurry cutoff wall.

On projects where the material excavated from the trench is suitable for use as backfill, the SB system can be most economical because of the minimum amount of backfill materials required. After the trench has been excavated under a bentonite slurry, more slurry is mixed with the soil adjacent to the trench. A buildozer is used to work the material to a consistency similar to wet concrete. It is then pushed back into the trench so that the backfill slope displaces the bentonite slurry forward. Excavation and backfilling are phased to make the operation continuous with relatively small quantities of new slurry required to keep the trench full and to mix backfill.

DESIGN

The characteristics of SB slurry cutoff walls and their usefulness in both dewatering and pollution control may be evaluated by looking at the major design considerations of a slurry cutoff wall: permeability, strength, compressibility, compatibility, and durability.

Permeability is usually the most critical design parameter. SB cutoff walls normally have a permeability less than 10^{-6} cm/sec and occasionally as low as 10^{-9} cm/sec. Improved impermeability of an SB wall is usually accomplished by increasing the natural clay content or the bentonite content. Early research on soil-bentonite indicated that the percentage of fines (material passing the No. 200 sieve) correlated closely to permeability. Recent Geo-Con data has shown that the factors affecting permeability are more complex than originally thought and that the earlier correlation is unreliable. The overall effectiveness of the wall depends both on the SB backfill and on the filter cake which is formed as slurry escapes into the surrounding soil. Although the filter cake ($k < 10^{-9}$ cm/sec) is typically ignored for design purposes, it does contribute to the impermeability of the "in situ" wall.



The percentage of coarse-grained particles has the greatest effect on both strength and compressibility. As the percentage of coarse-grained particles increases, strength increases and compressibility decreases. While soil-bentonite backfill is semi-fluid when mixed, within a short time it takes a "set" and usually ends up at a strength and consistency similar to the native soil. In heavily traveled areas which must be used before the wall has had time to gain strength, it is usually advisable to provide crossings over the SB wall. This will prevent damage to the wall and allow for unrestricted traffic. These crossings are usually constructed of compacted clay, steel plates, geofabrics, and/or reinforced concrete, depending upon the application.

Under most conditions, the only strength requirement for SB walls is that they approximately equal the strength of the surrounding soil. Gradually, as the water content of the SB backfill comes to equilibrium with the surrounding soil, this requirement is met. However, another consideration which affects both the strength and the stability of the installation concerns the amount of pressure that will build up behind the cutoff wall. In dewatering excavations the wall should be positioned far enough behind the slope to ensure the stability of the excavation.

In any permanent installation of a slurry cutoff wall, the ability of the wall to remain impervious to the underground environment is always an important question. The materials involved are bentonite clay, mixing water, and soil. In situations which involve clean water, these materials are indefinitely stable and no reduction in permeability is experienced. However, if compatibility is in question because of the presence of certain pollutants, tests can be performed using the backfill materials from the site and the actual groundwater. The bentonite mix can then be adjusted to provide a satisfactory solution for practically all cases.

Typically, the durability of the SB wall is unaffected by changes in hydraulic conditions. In order to design the wall to resist piping, the gradation of the SB backfill can be evaluated by filter criteria. Usually, a well-graded backfill is preferred. Since the wall is buried, it is highly unlikely that the wall will dry out and crack. However, to prevent desiccation, the top of the wall may be capped with clay or extra SB backfill.

CONCLUSION

Slurry cutoff walls are gaining wide recognition for use in dewatering and pollution control. They offer a cost effective solution to many groundwater problems in new and remedial work. The economy, convenience and positive control of groundwater afforded by slurry cutoff walls is bringing them acceptance and application on an increasing number of projects.

UPCOMING COMMUNITY INVOLVEMENT ACTIVITIES: SHERWIN-WILLIAMS SITE

⇒ *A factsheet will arrive to you in early July about the progress of the site cleanup.*

⇒ *An informal community meeting will be held at the 45th Street Artists' Cooperative, 1420 45th Street, on Monday, July 13, 1998 at 7 pm to discuss the cleanup and address questions and comments.*

⇒ *Tours of the Sherwin-Williams plant will be held throughout the day on July 10, 1998 and August 14,1998. Call George Stavnes at the S-W plant if you are interested in a tour. (510) 420-7215, ext.215.*

⇒ *If you have questions or comments about the project, please contact Mark Johnson of the Regional Water Quality Control Board at (510) 286-0305.*