



Van De Mark Chemical Co., Inc.

**ESTIMATED COST OF
ALTERNATIVE REMEDIAL MEASURES
Former Landfill Site**

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ALTERNATIVE REMEDIAL MEASURES
Former Landfill Site**

**February 1987
Ref. No. 1277**

**ADVANCED ENVIRONMENTAL SERVICES
CONESTOGA-ROVERS & ASSOCIATES**

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1.0 INTRODUCTION

During discussions with the State two ~~alternative~~ remedial measures were discussed. These were as follows:

- (1) Cap Site per 6 NYCRR Subpart 373.3
- (2) Groundwater Control

In order to provide comparative costs for closure, the following costs have been estimated to close the Site in compliance with the State Regulations.

2.0 CAP SITE PER SUBPART 373

Table A presents costs to cap the site per New York State Department of Environmental Conservation Regulation 6 NYCRR Subpart 373. The cap design is similar to the cap design proposed on the report entitled 'Closure Plan Former Landfill Site. This remedial cost estimate also includes provisions for the collection, storage and treatment of groundwater flowing from the seep located southwest of VDM-10 and groundwater escaping from beneath the lined ditch. Section 3.0 describes the groundwater control measures.

The total cost of closure, incorporating a 'regulation' cap and seep and ditchline groundwater controls is an estimated \$388,000. Of this total \$116,400 is attributable to the installation of groundwater controls (See Table B). Annual costs to treat the collected leachate is estimated to be \$225,000 based on a collection rate of 1,000 gpd after the cap has been installed.

3.0 GROUNDWATER CONTROL

In order to prevent groundwater seepage from the landfilled area along the underside of the clay lining of the ditch to an off-site discharge point, an interceptor drain will be dug near the downstream end of the ditch. The drain will be installed beneath the ditch lining and will extend across the ditch a distance of 5 feet beyond the outside edge of either side of the ditch. The trench in which the drain will be installed will be a minimum of two feet deep and will be backfilled with limestone. The drain will be constructed of perforated clay tile which will have a filter fabric wrapping to reduce silting. The drain tile will join a sewer lateral which will connect to the seep collection sump. Any seepage flowing along the underside of the clay lining will be intercepted, drained to the seep collection sump and then pumped to the leachate storage tank. (See Figure 1).

A Seep Collection System will be installed immediately above the existing seep area located approximately 55 feet southwest of observation well VDM-10. This system will consist of two lengths of perforated drain tile in a gravel bedding, totalling approximately 200 feet in length, flowing to a central wet well. The drain tile will be installed to a depth a minimum of 1 foot below the level of the seep. A dual pump system will pump the collected leachate to a storage tank located at the top of the slope,

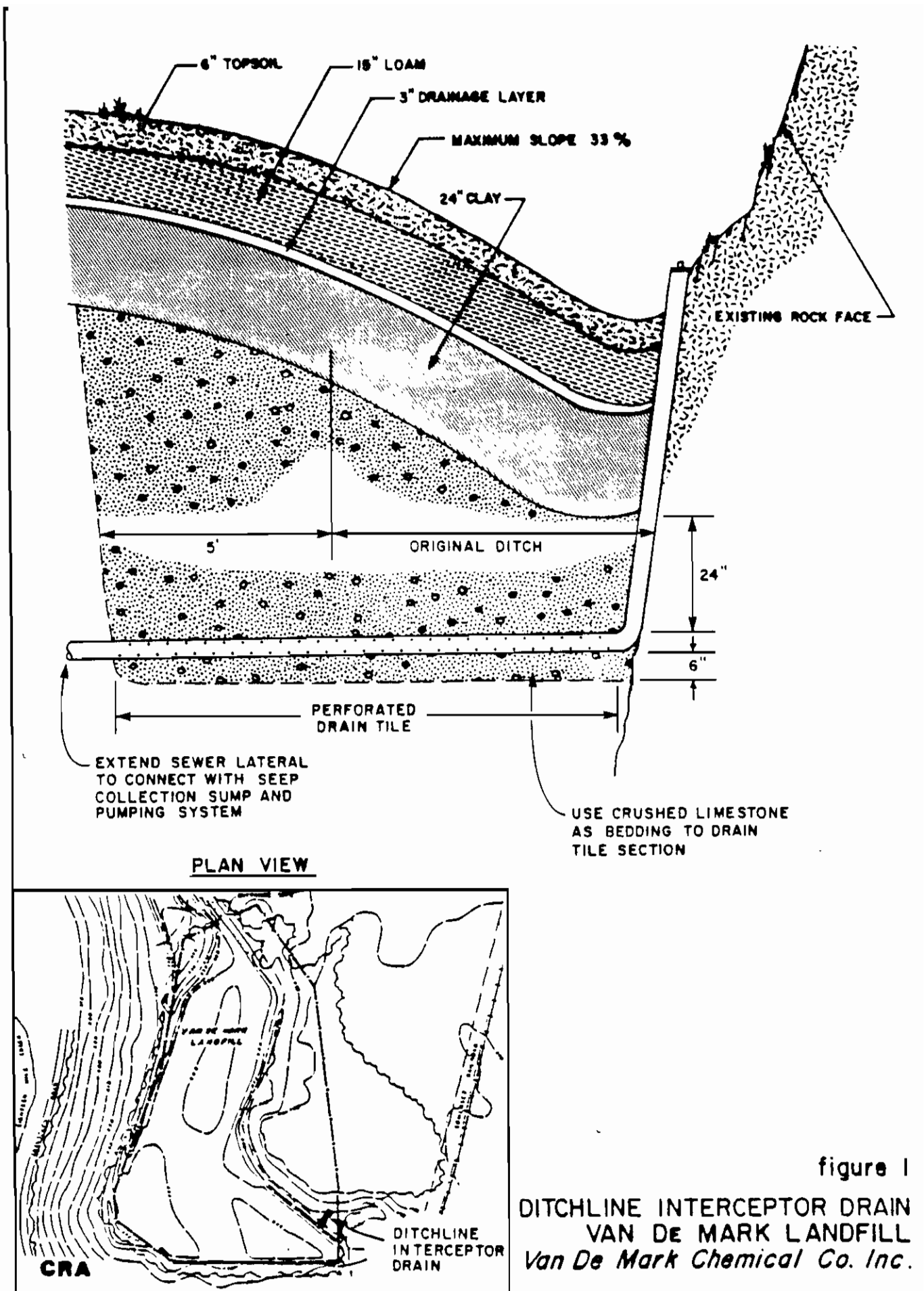


figure 1
DITCHLINE INTERCEPTOR DRAIN
VAN DE MARK LANDFILL
Van De Mark Chemical Co. Inc.

built upon the cap. The storage tank will periodically be emptied and the leachate transported to a treatment site. Permitting of the storage system will not be required as leachate will not be stored in excess of 90 days at the point of generation.

A site access road will be built on top of the cap and will allow traffic to access the leachate storage tank. The site access road will also facilitate access to the monitoring wells.

Figure 2 illustrates the proposed location of the seep collection system, leachate storage facility, ditchline interceptor, pan lysimeter and access road.

LEGEND

- BECHTEL WELL
- ▲ PREVIOUS VDM WELL
- △ PREVIOUS VDM WELL
- NEW VDM WELL

figure 2
SITE WORKS
VAN DE MARK LANDFILL
Van De Mark Chemical Co. Inc.

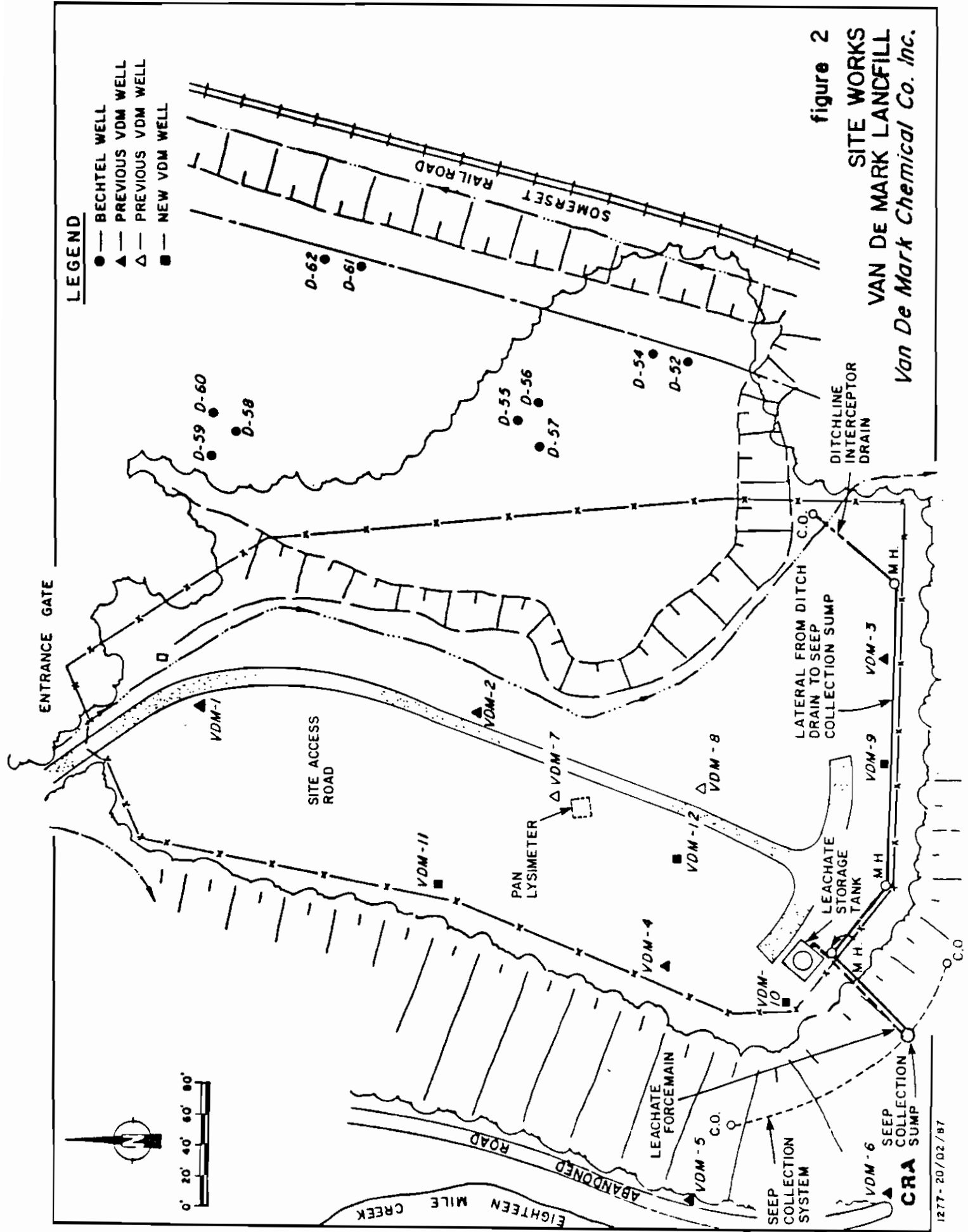


TABLE A
COST ESTIMATE
SOLID WASTE MANAGEMENT FACILITY CLOSURE

ITEM

A) Site Preparation

1. Site Grading and Proof-Rolling 2.5 acres @ \$1,200/acre	\$ 3,000.
2. Application of Powdered Lime 2.5 acres @ \$2,000/acre	\$ 5,000.
3. Survey Crew to set and check grades 2.5 acres @ \$1,000/acre	<u>\$ 2,500.</u>
SECTION A SUBTOTAL	<u><u>\$10,500.</u></u>

B) Clay Cover Installation and Testing

1. 24-inch clay layer installation 8,000 c.y. @ \$11.00/c.y.	\$ 88,000.
2. Placement of 6-inch sand drainage layer 1,000 c.y. @ \$17.00/c.y.	\$ 17,000.
3. Placement of 15-inch loam cover 5,000 c.y. @ \$12.00/c.y.	\$ 60,000.
4. Placement of 6-inch topsoil layer 2,000 c.y. @ \$12.00/c.y.	\$ 24,000.
5. Application of seed and mulch 12,000 sq. yd. @ \$0.30/sq. yd.	\$ 3,600.
6. Testing	
a) Grain size and moisture content 8 @ \$30/test	\$ 300.
b) Liquid limit and plasticity 2 @ \$50/test	\$ 100.
c) Moisture-density measurements 2 @ \$80/test	\$ 200.

TABLE A
COST ESTIMATE
SOLID WASTE MANAGEMENT FACILITY CLOSURE

ITEM

d) Remolded permeability tests 2 @ \$270/test	\$ 600.
e) In-place moisture-density 90 @ \$15/test	\$ 1,350.
f) Falling head permeability 10 @ \$220/test	\$ 2,200.
7. Construct trench in drainage ditch and backfill with crushed limestone 1 L.S. @ \$1,500	\$ 1,500.
SECTION B SUBTOTAL	<u>\$198,850.</u>

C) Seepage Control System

1. Construct Site Access Road 1 L.S. @ \$4,000	\$ 4,000.
2. Install Seep Interceptor Trench 200 ft. @ \$125/ft.	\$ 25,000.
3. Install Wet Well 1 L.S. @ \$21,800	\$ 21,800.
4. Install Forcemain to Storage Tank 60 ft. @ \$165/ft.	\$ 9,900.
5. Construct Leachate Storage System 1 L.S. @ \$16,500	\$ 16,500.
6. Install Ditchline Interceptor Drain 400 ft. @ \$30/ft.	\$ 14,000.
7. Supply Electrical Service to Site 1 L.S. @ \$10,000	\$ 10,000.
SECTION C SUBTOTAL	<u>\$101,200.</u>

TABLE A
COST ESTIMATE
SOLID WASTE MANAGEMENT FACILITY CLOSURE

ITEM

D) Closure Certification

1. Certification by land surveyor 2.5 acres @ \$300/acre	\$ 800.
2. Certification by professional engineer 1 L.S. @ \$1,000	\$ 1,000.
3. Closure Report - 1 L.S. @ \$5,000	<u>\$ 5,000.</u>
SECTION D SUBTOTAL	<u>\$ 6,800.</u>

Estimated Cost Summary

TOTAL SECTIONS A-D	\$317,350.
MOBILIZATION/DEMOBILIZATION	\$ 20,000.
CONTINGENCY (15 PERCENT)	<u>\$ 50,600.</u>
TOTAL	<u>\$387,950.</u>

TABLE B
GROUNDWATER CONTROL

1. Construct Site Access Road 1 L.S. @ \$4,000.	\$ 4,000.
2. Install Seep Interceptor Trench 200' @ \$125/ft.	\$ 25,000.
3. Install Wet Well 1 L.S. @ \$21,800	\$ 21,800.
4. Install Forcemain to Storage Tank 60' @ \$165/ft.	\$ 9,900.
5. Construct Leachate Storage System 1 L.S. @ \$16,500	\$ 16,500.
6. Install Ditchline Interceptor Drain 400' @ \$30/ft.	\$ 14,000.
7. Supply Electrical Service to Site 1 L.S. @ \$10,000	\$ 10,000.
<hr/>	
SECTION C Subtotal	\$101,200.
Contingency 15%	\$ 15,200.
TOTAL	<u>\$116,400.</u>

Annual Treatment Costs

Seepage Collection Treatment \$225,000/yr.
(based on a collection rate of 1000 gpd.)



Van De Mark Chemical Co., Inc.

1 N TRANSIT ROAD

• LOCKPORT NEW YORK 14094-2399

• 716 - 433-6764

March 3, 1987

Mr. Paul Counterman
Chief
Bureau of Hazardous Waste Technology
Division of Solid and Hazardous Waste
50 Wolf Road
Albany, New York 12233-4016
Attn: Mr. Roger Murphy

Dear Mr. Counterman:

Enclosed, please find the VanDeMark Chemical Co., Inc. response to the letter from your office dated February 2, 1987 in regard to the VanDeMark proposed landfill closure plan. This response includes the Closure Plan dated February 25, 1987, The Estimated Cost of Alternative Remedial Measures dated March 4, 1987, this cover letter and a statement from Richard G. Shotell, President of VanDeMark Chemical Co., Inc. concerning the financial status of the company. A copy of this information has also been issued to Mr. Paul Ingrisano, USEPA Region II, and Mr. Robert Miterly NYSDEC Region 9.

It is the express opinion of VanDeMark Chemical Company, and the consultants employed by the company, that the Closure plan dated February 25, 1987 that is being submitted by the company will provide more than adequate protection to the environment, meet the requirements specified in 6NYCRR Part 373, and provide a monitoring and maintenance plan that will ensure that the site will not adversely effect human health or the environment in the future.

The support of this argument is not in any way related to the ability of VanDeMark Chemicals ability to absorb the costs of this project. Support of this argument is found in the nature of the contaminants found in the site, the nature of the site, and the nature of the environment that surrounds the site.

The VanDeMark Chemical Co., Inc landfill site does not presently show any impact on the environment beyond the property boundary of the site. The southern property boundary of the site extends to the northern shore of 18 Mile Creek. 18 Mile Creek, being the receiving body for the groundwater that is passing through the site, shows no evidence of contamination from the site. This is supported by all of the sampling programs conducted to date. And the potential of this site impacting human health or the environment in the future is minimal for the following reasons. Of the hazardous constituents present, only ph and chlorides are present in significant quantities in Well VDM-12 or any other well. This indicates that the amount of hazardous constituents available to migrate from the site and

pose a threat to human health or the environment are minimal. This is again supported by the fact that the landfill site has been in existence since 1957, and to date no impact is found in 18 Mile Creek.

The main driving force behind the generation of leachate at the site is infiltration due to precipitation. The site in the unremediated state is not designed to divert infiltration due to precipitation. It is constructed with a berm that prevents runoff from flowing over the embankment. Even with the site as it presently exists, the amount of leachate that is generated from the drainage ditch and the embankment seep are small and periodic and do not show any impact beyond the property boundary of the site. To further reduce the probability that any of the contaminants contained in the site will migrate off site and adversely effect human health or the environment, the February 25th closure plan will significantly reduce the amount of leachate that presently leaves the site. Placement of powdered lime beneath the cap will provide additional buffering agent to increase the ph of the any leachate generated at the site. It is also believed that by closing the site in the manner proposed in the February 25, 1987 closure plan, the embankment seep may dry up and the leachate that is presently migrating from the site by way of the drainage ditch will be significantly reduced. The cap that is proposed in conjunction with an interceptor trench at the southern end of the ditch, has been designed to prevent leachate from leaving the site by way of surface water runoff, which has been suggested by your office to pose a threat to human health or the environment.

The nature of the environment that surrounds the site also suggests that any contaminants that may migrate from the site would have no adverse effects upon human health or the environment. The potential adverse effects of this site on off site groundwater quality are minimal. There are no downgradient users of groundwater that could be adversely effected between the site and 18 Mile Creek which is the ultimate discharge point for groundwater that passes through the site. Additionally, the property that borders the site in the direction of the groundwater flow is owned by the company so there is no potential for using that groundwater in the future. By capping the site and installing the interceptor trench, the potential of human exposure or deleterious effects upon wildlife or vegetation will be minimal. The potential for adverse effects upon hydraulically connected surface water is also minimal at the site. 18 Mile Creek is the only hydraulically connected surface water to the site. 18 Mile Creek is a class D stream with an average minimum flow of 75cfs. Considering the levels of the hazardous constituents in the site and the potential amount of those contaminants that could migrate from the site, the possibility of any of the hazardous constituents from the site and impacting water quality in the stream are minimal. This is supported by the fact that the present contributions to the stream from the site in the unremediated state, do not have an impact upon the quality of 18 Mile Creek. By installing a cap on the site the potential of the site having an adverse effect upon 18 Mile Creek, or human health will be significantly reduced by the reduced rate of leachate generation and thus reducing the migration from the site. Additionally the contaminants that have the highest potential for impacting the creek (low ph and high chlorides) are not persistent contaminants that that would tend to accumulate through time and pose a future threat to the environment in the future. The remaining contaminants are either non-persistent or are present in such low concentrations that the probability

of future impact is very low.

It is for the reasons listed above that VanDeMark Chemical Company believes that the Landfill Closure Plan dated February 25, 1987 will provide more than adequate protection to the environment and human health and meet the requirements of 6 NYCRR 373. And through the proposed monitoring plan for the site, the effectiveness of the cap and the impact of the site on water quality will be monitored to ensure that the Landfill does not adversely effect human health or the environment in the future. Additionally, the Alternative Remedial Measures dated March 4, 1987 are not necessary regardless of the costs involved.

To address the final issue that was requested, the letter attached from the president of VanDeMark Chemical Company, Inc. Richard G. Shotell, discusses the matter of financial assurance for the project and the ability of VanDeMark Chemical to absorb the costs of the February 25, 1987 Closure plan and the Alternative remedial measures for the site.

In conclusion, it is the contention of VanDeMark Chemical Company that the February 25, 1987 closure plan as submitted will meet the requirements of 6NYCRR 373 and pose no threat to human health or the environment now or in the future. This will be adequately monitored by the proposed monitoring plan, and the site maintained by the maintenance plan. Additionally, the Alternative Remedial Measures are unnecessary based upon the arguments previously stated and for the following reasons:

- 1) Collection of any leachate that might be generated after capping the site will not improve the water quality off site. This is shown by all previous sampling programs which indicate that the site without a cap does not impact 18 Mile creek.
- 2) The groundwater downgradient from the site poses no threat to human health or the environment due to the fact that there are no downgradient users of the groundwater between the site and 18 Mile creek, the area is not readily accessible, and the land is owned by VanDeMark Chemical Company.
- 3) The additional cost of installing the collection and treatment system and the annual costs of treatment of the leachate could not be absorbed by the company.

If you have any questions about this submission, or any other aspect of the proposed closure plan, please contact me at 716-433-6764.

Sincerely,



Matthew Barmasse
Safety/Environmental Director



Van De Mark Chemical Co., Inc.

1 N TRANSIT ROAD

• LOCKPORT, NEW YORK 14094-2399

• 716 - 433-6764

March 9, 1987

Mr. Paul Counterterman
Chief
Bureau of Hazardous Waste Technology
Division of Solid and Hazardous Waste
50 Wolf Road
Albany, New York 12233-4016
Attn: Mr. Roger Murphy

Dear Mr. Counterterman:

At our last meeting your department asked us to investigate the cost of adding a leachate collection and treatment system to our landfill closure plan. Conestoga & Rovers, our environmental consultants, have estimated the various costs as follows:

	Cost
Clay cap	\$261,000
Collection System	\$116,000
Leachate transportation	\$ 50,000/year
Leachate treatment	\$225,000/year

These figures add up to a first-year cost of \$672,000, and an additional cost every year thereafter of \$275,000.

Van De Mark Chemical Company is committed to operating its business in an environmentally responsible manner. We are, however, a small company, and taking on even just the estimated \$261,000 expense of capping the landfill will be a tremendous financial burden on us. We must close the landfill in such a way that provides protection to the environment, but also, we must do so in a way that does not put us out of business. We will have to borrow the money to undertake the closing of the landfill, and we do not know for sure whether we can get even the \$261,000 required for the cap. Our bankers have told us, however, that from their knowledge of our financial situation, they will not loan us \$377,000 (the amount needed to cap the landfill and to install a collection system).

The product stored in the landfill is no longer produced so we must finance the cost from our remaining phosgene business, which itself, will require a significant investment for environmental and safety projects. The closure plan and it's cost must be firmed up before I can go back to the bank to obtain the necessary funding. The ability to borrow money is very important to us, and if the bank believes that we have an open ended cost exposure with the landfill they may refuse to lend us any money for any reason. We are looking forward to resolving this issue, and hope that you understand the financial impact that a project such as this could have on our company.

Sincerely,

Richard G. Shotell

Richard G. Shotell
President

L.M.T

100.000.000

100.000.000

ADDENDUM I

CLOSURE PLAN FOR VAN DE MARK LANDFILL

March 1987

#1277

1.0 INTRODUCTION

This Addendum has been prepared in response to comments presented by the New York State Department of Environmental Conservation (NYSDEC) regarding the report entitled "Closure Plan - Former Landfill Site" for Van De Mark Chemical Company.

The NYSDEC has requested additional information regarding the following items of the Closure Plan:

- 1) Soil Loss
- 2) Clay Testing
- 3) Contingency Plan - Cap Permeability

This addendum presents the requested information.

2.0 ESTIMATED SOIL LOSS

As part of the design of the final cover, erosion rate calculations have been completed based upon the United States Department of Agriculture (USDA) universal soil loss equation.

The estimated soil loss for that part of the cap having a maximum slope of 5 percent is 0.14 tons per acre. This is based upon the following assumptions:

- A tons/acre = $RKLSCP$ = universal soil loss equation
- $R = 70$, Rainfall Erosivity Factor,
- $K = 0.3$; equivalent to cover soil consisting of loam having an organic matter content of approximately 4 percent,
- $LS = 0.66$; assumes longest slope at 5 percent is less than 150 feet in length,
- $C = 0.01$; assumes vegetative cover to be grass,
- $P = 1$; no land management practice to reduce erosion,
- The above factors have been interpreted from Tables 5, 6, 7 and 8 and from Figure 20 as presented by the USEPA publication "Evaluating Cover Systems for Solid and Hazardous Waste, SW-867, September 1982".

Similarly, the calculation of soil loss was completed for the cap boundary area which has a slope as great as 33.3 percent over a 12 foot horizontal distance. The calculated soil loss based on the following assumptions for this slope is 0.84 tons per acre:

- R = 70, Rainfall Erosivity Factor
- K = 0.3; equivalent to cover soil consisting of loam having an organic matter content of approximately 4 percent,
- LS = 4.0; equal to a 30 percent slope 25 feet long,
- C = 0.01; assumes vegetative cover to be grass
- P = 1; no land management practice to reduce erosion.

The above soil loss quantities compare favorably with the recommended maximum rate of erosion of 2.0 tons per acre for any part of a cover as presented in the "Draft RCRA Guidance Document - Landfill Design - Liner Systems and Final Cover - Issued: 7/82". It is expected that a rate of runoff of less than 2.0 tons/acre will minimize potential gully development and will not significantly increase cover maintenance.

3.0 QUALITY CONTROL OF THE CLAY

The selection of the clay borrow source will be determined in part by a review of data submitted by the clay suppliers. This determination will be supplemented by a rigorous on-site inspection program which will include testing of each unit of clay prior to placement. Prior to placement, each 1,000 cubic yards of clay cover material will be tested for grain size distribution and moisture content determination. Liquid limit, plasticity index and triaxial permeability tests will be conducted prior to placement of each 5,000 cubic yards of clay.

Compaction tests and moisture density determinations will be carried out in place on the completed site at a frequency of nine tests per acre per lift of clay. In-situ samples of the clay cap will be collected and tested for hydraulic conductivity (falling head method) at a frequency of one per acre of completed cap. Table 1 further describes the clay placement quality control program.

TABLE 1

<u>Test Description</u>	<u>Frequency</u>	<u>Clay Quantity</u>	<u>Quantity</u>	<u>Test Method</u>	<u>Approximate Cost (Each - Total)</u>
Grain Size Distribution	1/1,000 cy	8,000 cy	8	ASTM D 422	\$120 \$ 960
Moisture Content	1/1,000 cy	8,000 cy	8	ASTM D 2216	\$ 30 \$ 240
Liquid Limit	1/5,000 cy	8,000 cy	2	ASTM D 423	\$ 50 \$ 100
Plasticity Index	1/5,000 cy	8,000 cy	2	ASTM D 424	
Moisture-Density Curve	1/5,000 cy	8,000 cy	2	ASTM D 698 (5-15 blow modification)	\$ 80 \$ 160
Laboratory Permeability	1/5,000 cy	8,000 cy	2	ASTM D 698 (5-15 blow modification)	\$270 \$ 540
Moisture-Density	9/acre/lift	2.5 acres x 3 lifts	68	Nuclear Densitometer	\$ 15 \$1,020
Permeability	1/acre/lift	2.5 acres x 3 lifts	8	Falling Head	\$270 \$2,160
Estimated Testing Cost					<u>\$5,180</u>

4.0 LYSIMETER - CONTINGENCY PLAN

A pan Lysimeter will be installed at one location beneath the clay cover. The pan will measure 10'x10' and intercept moisture infiltrating through a 100 square foot area of the cap. Determination of infiltration will be made at six month intervals.

The Lysimeter will be calibrated such that infiltration can be determined by a simple water level measurement in the stand pipe connected to the Lysimeter. The water level will correspond to a calibrated volume of infiltration which in turn will be compared to the design infiltration rate of 1.0×10^{-7} cm/sec. A volume change of approximately 38 gallons is approximately equal to an infiltration rate of 1×10^{-7} cm/sec over six months.

If the volume of water intercepted by the Lysimeter is greater than 38 gallons for any six month period, the following contingency plan will be implemented:

- Increase the frequency of Lysimeter water level measurement/infiltration determination to monthly,
- Inspect integrity of cap, noting any subsidence, surface cracking, erosion and take immediate measures to restore the cap to within specified design criteria.

- If the cap appears to be in excellent condition then the cap must be inspected by excavating test pits and determining the condition of the clay layer itself.

- If the inspection and any subsequent repairs to the cap do not reduce the infiltration rate to below 1×10^{-7} cm/sec, VanDeMark and the NYSDEC will meet to discuss the situation.

5.0 SUMMARY

It is intended that the responses contained herein be attached to and incorporated into the Closure Plan for the Van De Mark Site.