

APPENDIX 3

CLOSURE PLAN – PIGEON POINT LANDFILL

OCTOBER 1985

CLOSURE PLAN

NSWF-1

Pigeon Point Landfill
New Castle County, DE

October, 1985

Delaware Solid Waste Authority
P. O. Box 455
New Castle, DE

(302) 736-5361

The NSWF-1 Landfill at Pigeon Point (Landfill), New Castle County, will reach its capacity for solid waste disposal during the fall of 1985. This facility is operated in accordance with DNREC Permit SW-84/17 along with other applicable regulations. The Permit specifies that a Closure Plan (Plan) be submitted to the DNREC for approval.

The land area affected by this Plan is shown on Figure 1. Note that the total area is approximately 160 acres, of which the City of Wilmington (City) owns approximately 100 acres, the Delaware Solid Waste Authority (DSWA) owns approximately 40 acres, and the Delaware River and Bay Authority (DRBA) owns approximately 20 acres. The DSWA will return control of the City's land to the City in accordance with the Tri-Parte Agreement (an agreement between the City, the DSWA and New Castle County concerning operation of the Landfill and use of the land). With respect to the lands owned by the DRBA, the Tri-Parte Agreement provides that all rights, duties and interests of the lease for the DRBA lands from the DRBA to New Castle County be assigned to the DSWA. This lease has a term of ten years (which ended 6/23/85) and the term shall continue until either party gives the other 60 days notice. Responsibility for maintaining the landfilled areas and buffer zones owned by the DRBA will be subject to negotiation between the DSWA and the DRBA.

BACKGROUND

The Landfill is at the site of a former dredge spoil disposal area. Landfilled areas are underlain by a varying 10 to 15 ft. thickness of the spoil which consists mainly of fine silts exhibiting low permeability. The total landfilled area is shown on Figure 1. The total thickness of the refuse deposit varies from 40 to 60 feet.

The Landfill was operated by the City of Wilmington from 1968 to 1972 and then by New Castle County from 1972 to 1980. Records indicate that approximately 4,000,000 tons of solid waste was disposed of at the landfill during this period.

The DSWA assumed operation January 1, 1981 under DNREC Permit SW-80/12. The Authority has operated the facility in accordance with this and subsequent DNREC permits (SW-81/09, SW-82/18, SW-83/22, SW-84/17), the State of Delaware Solid Waste Disposal Regulations, and with other applicable laws and regulations. This includes, but is not limited to, compaction of solid waste to a minimum of 1,000 lbs. per cubic yard; application of six inches of cover soil daily; application of final cover and vegetation of completed areas; operation of leachate collection systems; groundwater

monitoring; stormwater management; litter control; screening of wastes to prevent non-approved wastes from being disposed of; and site security to control unauthorized access to the Landfill.

During the period of DSWA operation, approximately 1,730,000 tons of solid waste have been landfilled. When the Landfill closes October 21, 1985, it is estimated that 1,830,000 tons will have been handled by the DSWA. In total, nearly 6,000,000 tons of solid waste will have been disposed of at the Pigeon Point Landfill over the period of its operation.

During DSWA operation, only non-hazardous solid waste has been accepted for disposal. This waste is a combination of household waste, commercial waste, industrial waste (non-hazardous process waste), construction/demolition waste, and residue from the Delaware Reclamation Project (DRP). All waste streams accepted were either approved for disposal at the Landfill by the DNREC as non-hazardous or were a continuation of wastes accepted while under New Castle County's operation.

THE CLOSURE PLAN

The following closure plan fully addresses all of the conditions for closure required by the Authority's operating Permit DNREC SW-84/17 and the State of Delaware Solid Waste Disposal Regulations.

1. Final Grading Plan

Fill has been placed in accordance with the grading plan attached. (Figure 2)

2. Final Cover

Final cover, consisting of at least 24 inches of cover soil, has been or will be placed over all filled areas. A typical grading section is shown as a detail on Figure 2. Erosion gullies are repaired as necessary until vegetative cover is established to prevent erosion. Experience has shown that once vegetation is well established, no erosion of the cover soil occurs.

After closure, all areas of the Landfill will be inspected periodically for erosion gullies. These will be repaired and reseeded as necessary.

3. Vegetation

All areas of the Landfill have been or will be seeded and mulched to establish vegetative cover. This vegetation will be allowed to grow naturally. The landfilled areas will be allowed to develop as an "evolving meadow." However, vegetation around manholes, pump stations, monitoring wells, etc., will be controlled with herbicide and soil sterilants to allow unobstructed access to these structures. Grassed areas around the Small Load Facility, the Landfill Office, and the landscaped island near the Landfill Scale will be mowed and maintained.

4. Leachate Collection System

The leachate collection system is shown on Figure 3. Leachate collection lines are installed along the entire perimeter of the landfilled areas as well as on portions of the interior of the Landfill. These lines consist of perforated pipe surrounded by stone. The collected leachate flows to several interconnected pumping facilities for eventual discharge to the New Castle County sanitary sewer system. The leachate is ultimately treated at the Wilmington Sewage Treatment Plant.

The pumping facilities of the system include three pump stations and two lift stations. These facilities will be checked several times per week for proper operation and will be maintained as necessary. Records will be kept of the volume of leachate pumped from these facilities and will be submitted to the DNREC. The leachate lines will be periodically inspected for proper operation, and will be maintained as necessary.

5. Stormwater Drainage System

The present system adequately drains stormwater from the site. Ditches and outfalls will be periodically inspected and maintained as necessary to provide proper drainage.

6. Groundwater Monitoring System

Figure 4 shows groundwater monitoring well location and detailed information on each well. A total of 29 groundwater monitoring wells exist at the Landfill. Twenty-five of these are outside the landfilled areas; four are

screened in the refuse to allow leachate sampling directly from the refuse mass. The "outside" monitoring wells are screened in the different geologic formations underlying the site. Well screen depths range from elevation +17 ft. to -68 ft. for the "outside" wells.

A monitoring program similar to the present one will be conducted for at least five years in accordance with DNREC Permit SW-84/17. The present program is shown on Table 1. Wells will be sampled quarterly. Groundwater depth will be measured quarterly. The monitoring wells will be maintained as necessary to assure proper sampling.

7. Site Security

The entire Landfill is surrounded by an eight foot tall cyclone fence with three barb wire strands at the top; all gates are locked when not in use; signs warning against trespassing will be posted every 100 feet on the fence. The fence will be periodically inspected and repaired as necessary. Continued activity at the DRP, the Energy Generating Facility (EGF) construction and subsequent operation, and planned construction and operation of a landfill gas recovery system, along with the perimeter fence, should preclude any illegal dumping at the Landfill.

8. Roads

The entire Landfill is surrounded by an all-weather access road. In addition, another road (designated as Road "B") provides access to the top of the Landfill. The roads allow access to all areas of the Landfill. These roads will be used to reach pump stations, monitoring wells, etc. Roads will be maintained as necessary to provide all-weather access to the Landfill.

9. Landfill Gas Control

The Wehran Energy Company, as part of a contract with the City and the DSWA, has determined that commercially recoverable quantities of landfill gas are being produced at the Landfill. Wehran has secured a market for the medium BTU gas and plans to begin construction of a landfill gas recovery system in the fall of 1985 and expects to be operational in the spring of 1986. Data concerning gas quantities and composition will be submitted to the DNREC quarterly.

Wells will be placed on approximately 200 foot centers on all portions of the Landfill to extract the gas. The gas will be collected by headers, compressors will be used to remove the moisture, and the gas will be sent by pipeline to a nearby industry for use in lieu of natural gas. Wehran estimates that 1 - 1.5 million standard cubic feet of gas per day will be recovered. This will effectively control gas migration and escape to the atmosphere. An added benefit will be to vastly reduce gas in root zones, thereby improving the vitality of the vegetative cover.

RESPONSIBLE PARTIES

The Closure Plan will at first be implemented entirely by the DSWA. Plan responsibility for City owned lands will revert to the City when the DSWA returns control of those lands to the City. Plan responsibility for DRBA owned lands will be subject to negotiation between the DSWA and the DRBA. The DNREC will be informed of the results of such negotiations. The DSWA will retain Plan responsibility for DSWA owned lands.

Responsibility for environmental problems associated with the Landfill may fall on several parties. These would include the DSWA, the City, and/or New Castle County. All three of these parties operated the Landfill at one time. The DSWA and the City own landfilled areas. In addition, the DRBA may hold some responsibility since they also own landfilled area.

T A B L E I

DNREC PERMIT SW-84/17

GROUNDWATER MONITORING PROGRAM

WELL	PARAMETERS
1R	✓ DEPTH TO WATER, STANDARDS ¹ , METALS ² , ORGANICS ³
1A	✓ DEPTH TO WATER, STANDARDS
24	DEPTH TO WATER
25R	✓ DEPTH TO WATER, STANDARDS
26R	✓ DEPTH TO WATER, STANDARDS, METALS
27R	✓ DEPTH TO WATER, STANDARDS, ORGANICS
28	✓ DEPTH TO WATER, STANDARDS, METALS
28A	DEPTH TO WATER
29	✓ DEPTH TO WATER, STANDARDS, METALS
29A	✓ DEPTH TO WATER, STANDARDS, ORGANICS
31	DEPTH TO WATER
31A	DEPTH TO WATER
32	DEPTH TO WATER
32A	DEPTH TO WATER, STANDARDS
41	✓ DEPTH TO WATER, STANDARDS, METALS, ORGANICS
41A	✓ DEPTH TO WATER, STANDARDS
42	DEPTH TO WATER
42A	DEPTH TO WATER
45	✓ DEPTH TO WATER, STANDARDS, METALS
46	DEPTH TO WATER, STANDARDS
47	DEPTH TO WATER, STANDARDS

TABLE I CONT.

<u>WELL</u>	<u>PARAMETERS</u>
48	DEPTH TO WATER, STANDARDS
49	DEPTH TO WATER, STANDARDS

1. Depth to water measured quarterly.
2. Standards include pH, TDS, TOC, TKN, NO₃-N, FE, Cl, Alkalinity measured quarterly.
3. Metals include Ba, Cr, Ag, Se, Pb, Cd, As, Zn, Ca, Mg, Mn, Hg measured annually.
4. Organics include Toluene, Benzene, Ethylbenzene, Methylene Chloride, Trichloroethylene, Tetrachloroethylene measured annually.

GENERAL NOTES

1. TOPOGRAPHIC ELEVATION FROM 3 NOVEMBER 1957 TUNNEL

2. 1957 M.S.L. 1950 M.S.L.

3. EXISTING TOPOGRAPHY MAY DIFFER FROM PROPOSED FINAL GRADING IN SOME AREAS PARTICULARLY SUBJECT TO FINAL CHECKS BY THE INSPECTOR

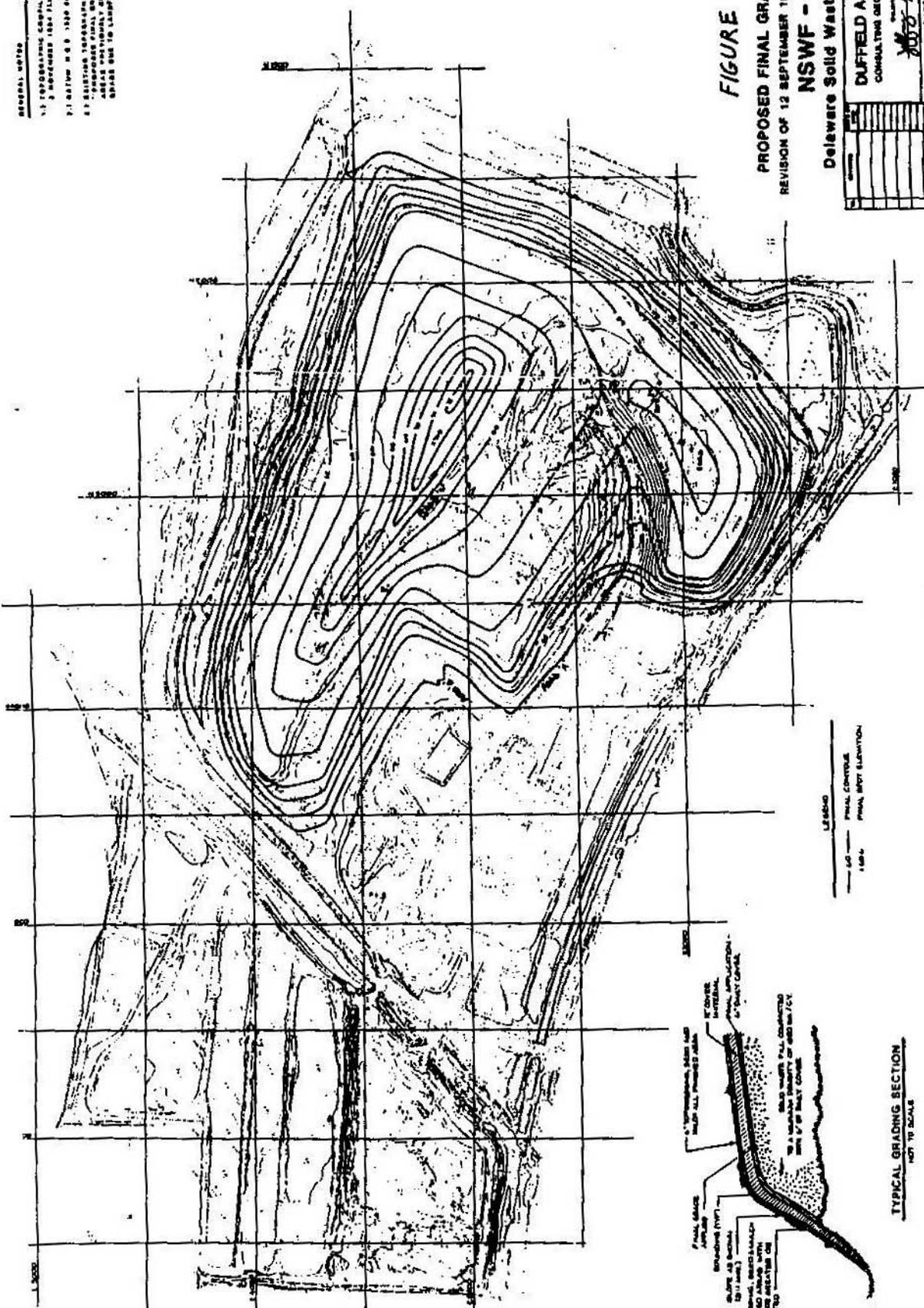


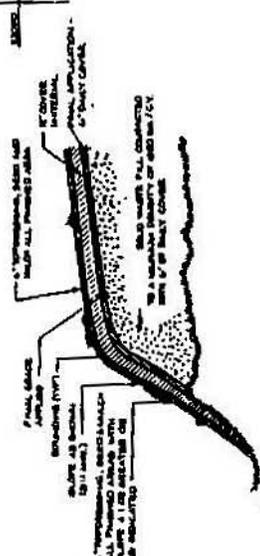
FIGURE 2

PROPOSED FINAL GRADING PLAN
REVISION OF 12 SEPTEMBER 1980 GRADING PLAN
NSWF - 1

Deleware Solid Waste Authority

DUFFIELD ASSOCIATES, INC.
CONSULTING GEOTECHNICAL ENGINEERS

NO.	DATE	DESCRIPTION
1	JAN 1980	PRELIMINARY GRADING PLAN
2	MAY 1980	REVISION OF GRADING PLAN
3	SEP 1980	REVISION OF GRADING PLAN
4	SEP 1980	REVISION OF GRADING PLAN
5	SEP 1980	REVISION OF GRADING PLAN
6	SEP 1980	REVISION OF GRADING PLAN
7	SEP 1980	REVISION OF GRADING PLAN
8	SEP 1980	REVISION OF GRADING PLAN
9	SEP 1980	REVISION OF GRADING PLAN
10	SEP 1980	REVISION OF GRADING PLAN
11	SEP 1980	REVISION OF GRADING PLAN
12	SEP 1980	REVISION OF GRADING PLAN
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48	SEP 1980	REVISION OF GRADING PLAN
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51	SEP 1980	REVISION OF GRADING PLAN
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97	SEP 1980	REVISION OF GRADING PLAN
98	SEP 1980	REVISION OF GRADING PLAN
99	SEP 1980	REVISION OF GRADING PLAN
100	SEP 1980	REVISION OF GRADING PLAN



TYPICAL GRADING SECTION
NOT TO SCALE

LEGEND
— 10' FINAL CONTOUR
- - - 10' FINAL SPOT ELEVATION



