

**OPERATIONS AND MAINTENANCE -
LANDFILL CAPS FOR SITES 4 AND 5
AT
NAVAL WEAPONS STATION - EARLE
COLTS NECK, NEW JERSEY**

Issued:

June 3, 1999

Prepared for:

**Naval Facilities Engineering Command
10 Industrial Highway
Lester, PA 19113**

Prepared by:

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One Oxford Valley - Suite 200
Langhorne, PA 19047 - 1829**

**REMEDIAL ACTION CONTRACT N62472-94-D-0398
DELIVERY ORDER NO. 0034**

INTRODUCTION

Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) has been contracted by the Northern Division, Naval Facilities Engineering Command (NORDIV) to perform maintenance on the landfill caps at Sites 4 and 5, at the Naval Weapons Station (NWS) Earle located in Colts Neck, NJ. This report is being submitted to satisfy the submittal requirements included in paragraph 1.2.1, Pre- and Post-Construction Documentation of the Statement of Services for Delivery Order No. 0034 under Remedial Action Contract No. N62472-94-D-0398.

SUMMARY OF ACTIVITIES PERFORMED

Maintenance and annual fertilization of grass was performed for the landfill caps at Sites 4 and 5 on May 11, 1999 in accordance with the Operations and Maintenance Manual for the Site 4 and Site 5 landfill. Coastal Landscaping was contracted by FWENC to perform the maintenance and to fertilize the grass.

Soil analysis, conducted in March 1999 for soils in both Sites 4 and 5, indicated the type of fertilizer best suited to the current conditions of the soils in the landfill caps. Refer to Attachment 1 for soil analysis performed by the Soils Testing Laboratory - New Jersey Agriculture Experiment Station, Cook College, Rutgers The State University of New Jersey. Each site required a specific fertilizer, both slow release, water insoluble nitrogen forms. A coverage rate of 2.5 pounds per 1,000 square feet of 37-3-3 fertilizer was used at Site 4 and seven pounds per 1,000 square feet of 14-7-14 fertilizer was used at Site 5.

Quarterly Inspections of the two landfill sites determined that additional maintenance was necessary at Site 5 in two specific locations. Refer to Attachment 2 for the Quarterly Inspection Reports. Attachment 3 contains the figure illustrating the locations where maintenance was completed at Landfill Cap-Site 5. Based on inspection, no additional maintenance was required at Site 4.

The first area in Site 5 that required maintenance was the southeastern wall adjacent the rock apron in Detention Basin #1 (Location #1 on figure). The wall was eroded from runoff exiting the southwestern swale of the landfill cap. Soils that flowed into the basin were removed with a tractor bucket and used to repair the eroded area. The existing berm was fortified with additional topsoil. The berm was placed above the basin edge. The berm extends from the rock apron to the southeastern corner of the basin. The berm was then seeded and covered with an erosion cloth to stabilize the area until the grass is established. This berm should help to divert and slow the flow of water from the swale to the Detention Basin, thereby, reducing the erosion of the basin wall.

The second area (Location # 2) at Site 5 was the sloping hillside of the former Rifle/Pistol range, northeast of the landfill cap. The hillside is fairly steep, and runoff eroded some of the soils on the slope. Soils that flowed to the bottom of the slope were replaced in the eroded area with the tractor bucket. The area was then seeded and an erosion cloth was placed to stabilize the soil until the grass germinates and takes hold. Erosion should lessen when the grass is established.

CONCLUSION

The yearly required fertilization has been performed at Site 4 and 5. Follow-up inspections will continue, and the Navy will notified of recommendations for the maintenance of the landfill caps.

ATTACHMENT 1

ANALYTICAL DATA FOR SOIL SAMPLES

Soil Test Report Lab No: 1999-0952
 Soil Testing Laboratory - New Jersey Agricultural Experiment Station
 Cook College, Rutgers The State University of New Jersey
 P.O. Box 902, Milltown, NJ 08850 (732) 932-9295

Name: Foster Wheeler
 Carl Tippmann
 Address: 2300 Lincoln Hwy E, suite 200
 Langhorne, PA 19047-1829
 Phone: (215) 702-4044
 Fax:

Date Received: 03/04/1999
 Date Reported: 03/17/1999
 Serial No:
 Sample ID: #4

SITE 4

Crop or Plant
 Est. Lawn, Cool Season - Grass

Referred To:
 Rutgers Cooperative Extension

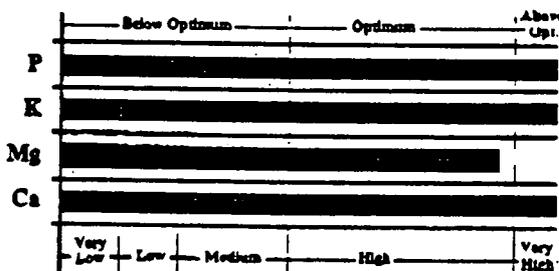
Soil Tests and Interpretation

Soil Texture: Sandy Loam
 pH: 7.20

Very slightly alkaline, indicative of overliming. Hazard of deficiency of the trace nutrients iron, copper, manganese, zinc, and boron.

Macronutrients (pounds/acre)

Phosphorus: 232 (Above Optimum)
 Potassium: 346 (Above Optimum)
 Magnesium: 289 (Optimum)
 Calcium: 4019 (Above Optimum)



Micronutrients (parts per million)

Zinc: 2.5 (Adequate) Copper: 1.5 (Adequate) Manganese: 30. (Adequate) Boron: 0.7 (Low)
 Note: One or more of your micronutrients is low.

Special Tests and Results

No special test requested.

Lime Recommendation

The soil test indicates a slightly alkaline soil and probably indicates overliming. The pH is higher than the best range for the growth of most Lawn. Do not apply any limestone, compost, or ashes to the area. The pH will decrease naturally.

Fertilizer Recommendation

Established Grass - Clippings Returned, Full Sun, None/Minimal Watering

The soil tests indicate very high phosphorus (P) and potassium (K) fertility levels. The soil should be treated with 1 pound per 1000 sq. ft. of nitrogen (N).

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (10-0-0) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 3 pounds 33-0-0, or 2.5 pounds 37-3-3

Spread the indicated amount of pounds/1000 sq. ft. per application of one of these fertilizers in 1 application evenly over

the soil in September-October or in April-May each year.

Soil Test Report Lab No: 1999-0953
Soil Testing Laboratory - New Jersey Agricultural Experiment Station
Cook College, Rutgers The State University of New Jersey
P.O. Box 902, Milltown, NJ 08850 (732) 932-9295

Name: Foster Wheeler
 Carl Tippmann
 Address: 2300 Lincoln Hwy E, suite 200
 Langhorne, PA 19047-1829
 Phone: (215) 702-4044
 Fax:

Date Received: 03/04/1999
 Date Reported: 03/17/1999
 Serial No:
 Sample ID: #5

SITE 5

Crop or Plant
 Est. Lawn, Cool Season - Grass

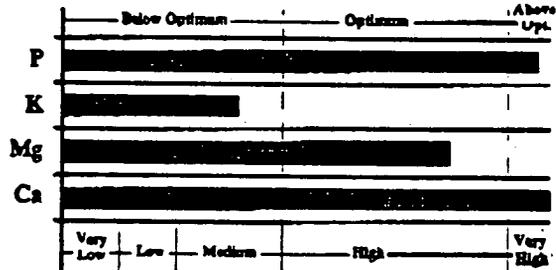
Referred To:
 Rutgers Cooperative Extension

Soil Tests and Interpretation

Soil Texture: Sandy Loam
 pH: 6.80
 Very slightly acid, slightly higher than desired for most plants.

Macronutrients (pounds/acre)

Phosphorus: 147 (Above Optimum)
 Potassium: 119 (Below Optimum)
 Magnesium: 260 (Optimum)
 Calcium: 3286 (Above Optimum)



Micronutrients (parts per million)

Zinc: 1.6 (Adequate) Copper: 4.8 (Adequate) Manganese: 18. (Adequate) Boron: 0.4 (Low)
 Note: One or more of your micronutrients is low.

Special Tests and Results

No special test requested.

Lime Recommendation

The soil test indicates a very slightly acid soil. The pH is slightly higher than the best range for the growth of most Lawn but no correction is needed. Do not apply any limestone.

Fertilizer Recommendation

Established Grass - Clippings Returned, Full Sun, None/Minimal Watering

The soil tests indicate very high phosphorus (P) and medium potassium (K) fertility levels. The soil should be treated with 1 pound per 1000 sq. ft. of nitrogen (N) and 2 pounds per 1000 sq. ft. of potash (K₂O).

Any of the following fertilizer grades and amounts may be used to supply the needed amounts of nutrients. Other fertilizer grades containing the appropriate ratio (1-0-3) of nutrients may be used. Use fertilizers containing 30-60% of the nitrogen in slow-release form (Water Insoluble Nitrogen).

Grades: 7 pounds 14-7-14, or 10 pounds 10-5-10

Spread the indicated amount of pounds/1000 sq. ft. per application of one of these fertilizers in 1 application evenly over the soil in September-October or in April-May each year.

ATTACHMENT 2

QUARTERLY INSPECTION REPORTS

SITES 04 AND 05
NWS EARLE - COLTS NECK, NEW JERSEY
FACILITY INSPECTION REPORT

LEAD INSPECTOR NAME: Michael Heffron, P.G.

SITE 04

SIGNATURE: 

POST-CLOSURE YEAR: 1999

DATE OF INSPECTION: May 6, 1999

COMPONENT/FREQUENCY	WHAT TO INSPECT	INSPECTION EVENT									OBSERVATIONS/COMMENTS
		Q1	Q2	Q3	Q4	S1	S2	A	E		
Landfill cap inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Erosion, differential settling, vegetation coverage, vegetation maintenance, and animal burrowing			X							According to soil analyses, Fertilization is required. No erosion or settling issues. No burrowing animal evidenced. Sufficient vegetation coverage
Storm drainage system inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Sediment accumulation, subsidence, erosion, vegetative growth, ponding, and obstructions to flow			X							Very minor sediment accumulation in basins.
Gas vent and monitoring well survey Annually - year 1 to 30	Survey the elevations of the benchmark points on the gas vents and the tops of the monitoring wells. Compare the elevations to the as-built elevations at the completion of construction.										N/A
Gas monitoring vents inspection/testing Quarterly - year 1 and 2 Semiannually - year 3 to 30 Annually - year 1 to 30 for field testing	Damage to riser pipes, vents, screen on vents, valves on risers, and settlement in surrounding area. Field testing of landfill gases will be performed annually with a FID.			X							Riser pipes in good condition. No visible settlement.
Access ramp inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Potholes, ruts, settlement, vegetative growth, and erosion			X							Satisfactory
Perimeter fence, sign and gate inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Damage to fence and gate, rusted or damaged locks, signs of intrusion, damaged or illegible signs			X							Satisfactory - Keys to gates should be provided to security.
Vegetation inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Bare spots larger than 6" square, vehicle ruts, erosion, need for maintenance such as mowing, watering, hydroseeding, planting, mulching, etc.			X							Fertilization required.
Groundwater monitoring system inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Rusted locks, subsidence, well casing damage, or vandalism.			X							Wells in good condition (Need to be re-surveyed)

Q-Quarter, S-Semi-annual, A-Annual, E-Event Specific

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SITES 04 AND 05
NWS EARLE - COLTS NECK, NEW JERSEY
FACILITY INSPECTION REPORT

LEAD INSPECTOR NAME: *Michael P. G.*
SIGNATURE: *[Signature]*

SITE 05

POST-CLOSURE YEAR: 1999
DATE OF INSPECTION: May 6, 1999

COMPONENT/FREQUENCY	WHAT TO INSPECT	INSPECTION EVENT									OBSERVATIONS/COMMENTS	
		Q1	Q2	Q3	Q4	S1	S2	A	E			
Landfill cap inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Erosion, differential settling, vegetation coverage, vegetation maintenance, and animal burrowing			X								Erosional problems on southern wall adjacent to rock apron on Detention Basin #1 Erosional problems on sloping hillside of the former Rifle/Pistol Range
Storm drainage system inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Sediment accumulation, subsidence, erosion, vegetative growth, ponding, and obstructions to flow			X								Sediment accumulation in Detention Basin #1 from erosional deposition.
Gas vent and monitoring well survey Annually - year 1 to 30	Survey the elevations of the benchmark points on the gas vents and the tops of the monitoring wells. Compare the elevations to the as-built elevations at the completion of construction.											N/A
Gas monitoring vents inspection/testing Quarterly - year 1 and 2 Semiannually - year 3 to 30 Annually - year 1 to 30 for field testing	Damage to riser pipes, vents, screen on vents, valves on risers, and settlement in surrounding area. Field testing of landfill gases will be performed annually with a FID.			X								Gas vents in good condition.
Access ramp inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Potholes, ruts, settlement, vegetative growth, and erosion			X								Satisfactory
Perimeter fence, sign and gate inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Damage to fence and gate, rusted or damaged locks, signs of intrusion, damaged or illegible signs			X								Satisfactory - Keys to gates should be provided to security.
Vegetation inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Bare spots larger than 6" square, vehicle ruts, erosion, need for maintenance such as mowing, watering, hydroseeding, planting, mulching, etc.			X								Bare spots associated with two erosional areas require re-seeding.
Groundwater monitoring system inspection Quarterly - year 1 and 2 Semiannually - year 3 to 30	Rusted locks, subsidence, well casing damage, or vandalism.			X								Wells in good condition (need to be re-surveyed)

ATTACHMENT 3

LANDFILL CAP-SITE 5
MAINTENANCE LOCATIONS

MONUMENT A-1
N 370,839.12
E 347,368.31
ELEV 100.83

MONUMENT B-1
N 370,839.12
E 347,368.31
ELEV 100.83

EMERGENCY SPILLWAY
CULVERT 18
CULVERT 18

DETECTION BASIN (1)
CULVERT 18
CULVERT 18

ROCK APRON 8-8
CULVERT 18
CULVERT 18

TOP SOLED DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

REPRAP DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

CULVERT 8
SOLF-18" CPV
CULVERT 8
SOLF-18" CPV

INLET BY 108.46'

LOCATION 2



ROCK APRON 8-8
CULVERT 18
CULVERT 18



LOCATION 1

TOP SOLED DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

INLET BY 103.57'

LIMIT OF DISTURBANCE

WETLANDS

DETECTION BASIN (2)
CULVERT 18
CULVERT 18

GAS VENT (TYPICAL)
CULVERT 18
CULVERT 18

FINAL COVER SYSTEM UNDER VEGETATIVE AREAS

OUTLET BY 108.04'

DRAINAGE BY 8
STA. 848+0
CULVERT 18
CULVERT 18

DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

MONITORING WELL
ADDITIONAL (TYP.)
CULVERT 18
CULVERT 18

DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

ROCK APRON 8-8
CULVERT 18
CULVERT 18

WEDGMENT/DETECTION BASIN (2)
CULVERT 18
CULVERT 18

ROCK APRON 8-8
CULVERT 18
CULVERT 18

OUTLET BY 103.04'

LIMIT OF REGRADED WASTE

LIMIT OF FINAL COVER SYSTEM

FINAL COVER SYSTEM TERMINATION

FINAL COVER SYSTEM UNDER VEGETATIVE AREAS

TOP SOLED DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

RAILROAD TRACK

DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

INLET BY 107.86'

CULVERT 8
SOLF-18" CPV
CULVERT 8
SOLF-18" CPV

OUTLET BY 107.30'

REPRAP DRAINAGE CHANNEL
CULVERT 18
CULVERT 18

EMERGENCY SPILLWAY
CULVERT 18
CULVERT 18

ROCK APRON 8-8
CULVERT 18
CULVERT 18

OUTLET BY 103.04'

WARNING SIGN
CULVERT 18 (TYP.)

AGGREGATE ACCESS ROAD

N rthern Division
Naval Weapons Station Earle

Landfill Cap-Site 5
O & M, May 1999