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Draft Report

Post-Closure, Monitoring, Maintenance, and Operations Farwell Landfill Cattaraugus County, New York

October 1999

DRAFT REPORT

POST-CLOSURE MONITORING, MAINTENANCE, AND OPERATIONS

FARWELL LANDFILL

CATTARAUGUS COUNTY, NEW YORK

Prepared for

CATTARAUGUS COUNTY, NEW YORK

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October 1999

Project No. 9018010

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FARWELL LANDFILL
CATTARAUGUS COUTY, NEW YORK

SECTION 1 - GENERAL

This Operations and Maintenance Manual has been prepared as a guidance document for the post-closure operations at the Farwell Landfill in the Town of Ischua, Cattaraugus County, NY. The Farwell Landfill was closed according to an Order on Consent (1984), and is presently maintained by the Cattaraugus County Department of Public Works. Post-closure monitoring is currently taking place according to 6 NYCRR Part 360.

The Part 360 monitoring program identified a number of contaminants of concern, namely chlorinated organic compounds, in several groundwater monitoring wells downgradient of the landfill. A subsequent remedial investigation generally verified the presence of the chlorinated organics, but also provided chemical evidence that natural attenuation was reducing the contaminant levels as groundwater migrates away from the landfill. The remedial investigation report recommended that monitored natural attenuation be considered as the preferred site remedy, and provided a general basis for future monitoring in order to verify that natural attenuation would continue to be effective.

Based on chemical data provided by the remedial investigation and previous part 360 monitoring, this O&M manual describes the implementation of monitored natural attenuation with regular cap inspections and maintenance as the post-closure remedy at the Farwell Landfill.

SECTION 2 - MONITORING REQUIREMENTS

Cattaraugus County has assumed responsibility for post-closure operations at the Farwell Landfill. The post-closure monitoring program will satisfy two basic needs: (1) fulfill post-closure monitoring requirements pursuant to 6 NYCRR Part 360; and (2) provide an ongoing means for evaluating the effectiveness of natural attenuation as the selected remedial option.

Annual baseline and quarterly routine monitoring is presently being performed on groundwater, surface water, and leachate samples collected at the Farwell Landfill, as required by 6 NYCRR Part 360. This monitoring program is being implemented for a period of 30 years from the date

of final closure, as required by NYSDEC, with periodic review and modification as appropriate and allowable by regulation. Presently, quarterly monitoring reports are provided to NYSDEC.

In addition to the above ongoing post-closure monitoring program, Cattaraugus County will implement a supplemental groundwater monitoring program to assess the continued effectiveness of natural attenuation of groundwater impacts. The specific elements of this supplemental monitoring program are presented below.

2.1 SUPPLEMENTAL GROUNDWATER MONITORING

The existing groundwater monitoring system will be expanded, and a supplemental groundwater sampling program will be implemented and maintained during the post-closure period. The protocol used to collect, preserve, and transport the samples will be in accordance with Appendix A, Field Sampling Procedures.

The existing monitoring array that is sampled under the County's current Part 360 monitoring program includes Wells MW-13D, MW-14S, MW-14I, MW-15S, MW-15I, MW-16S, MW-16D, MW-17S, and MW-17I. These wells are sampled quarterly, including three routine and one baseline event each year (Figure 2-1). The County submits quarterly monitoring reports to NYSDEC. Wells MW-14S/I, MW-15S/I, and MW-16S/D will be tied into the supplemental monitoring program for ongoing evaluation of natural attenuation.

Table 2-1 lists monitoring wells that are to be sampled as part of the County's supplemental monitoring program. This supplemental program will be in addition to the quarterly monitoring that already occurs as part of the landfill's Part 360 post-closure program.

The basic additions to the current Part 360 monitoring will be the addition of Wells MW-19S and MW-20D to the monitoring array, as well as the addition of three compliance boundary wells (MW-21S, MW-22S, MW-23S), on County property approximately 1,500 feet downgradient (south) of the edge of refuse (Figure 2-2). These five downgradient compliance wells will be installed within overburden and will be sampled quarterly for 6 NYCRR Part 360 baseline parameters, as well as the dissolved gases carbon dioxide, oxygen, and methane. Further, existing monitoring well couplets MW-14S/I, MW-15S/I, and MW-16S/D will undergo quarterly baseline monitoring plus the dissolved gases.

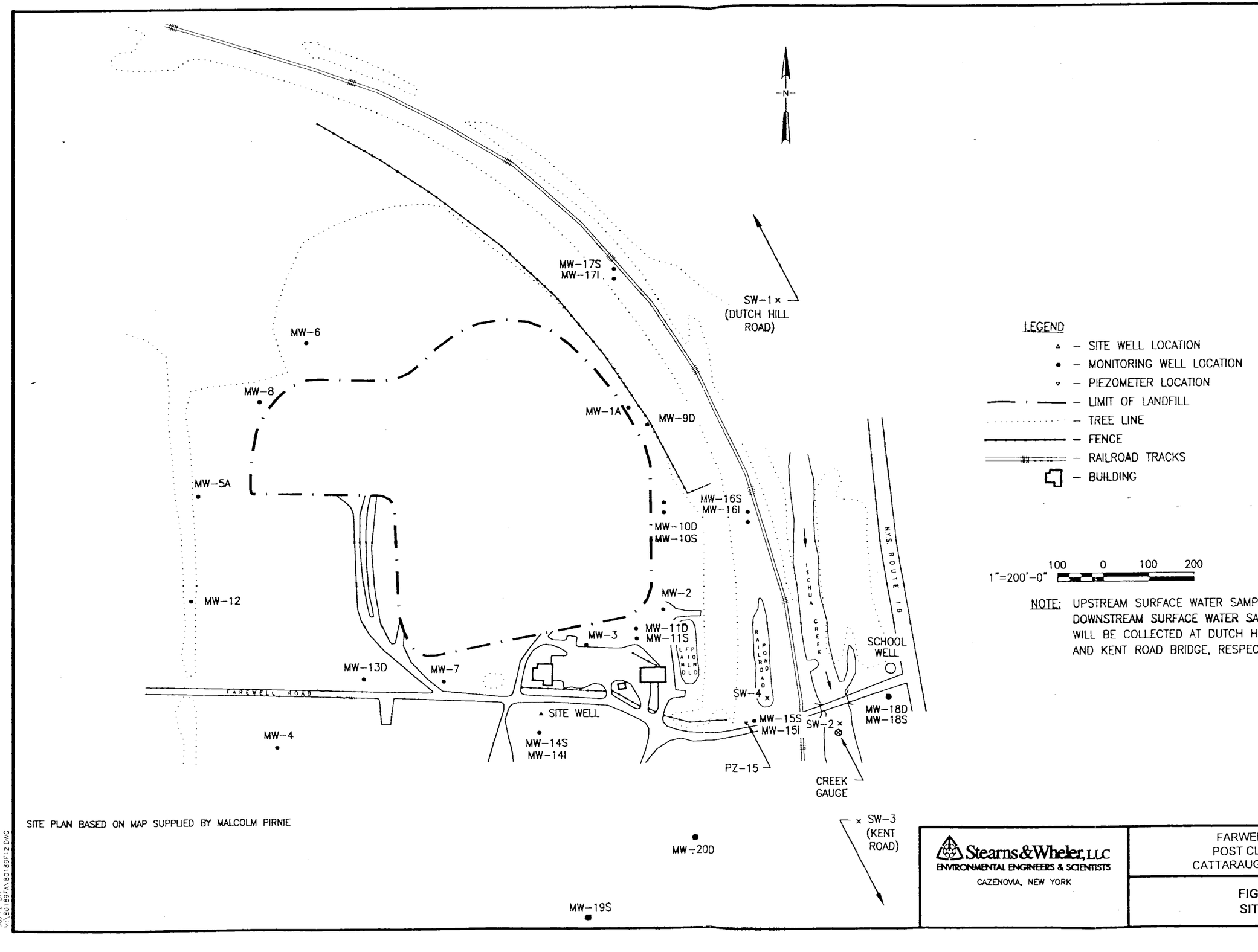
TABLE 2-1

SUPPLEMENTAL MONITORING WELL NETWORK
FOR MONITORED NATURAL ATTENUATION
Farwell Landfill Post-Closure Program
Cattaraugus County, NY

WELL I.D.	SCREENED UNIT	ANALYSES	SAMPLING FREQUENCY
MW-14S	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-14I	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-15S	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-15I	OB/BR	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-16S	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-16D	OB/BR	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-19S	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-20D	Bedrock	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-21S	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-22S	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly
MW-23S	Overburden	Part 360 baseline, dissolved gases (CO_2, O_2, CH_4)	Quarterly

Italicized wells are those already included in the ongoing post-closure monitoring program per 6 NYCRR Part 360.

Bold wells will be installed at the established compliance boundary, downgradient of the landfill, but on County owned property.



LEGEND

- ▵ – SITE WELL LOCATION
- • – MONITORING WELL LOCATION
- ▿ – PIEZOMETER LOCATION
- — · — – LIMIT OF LANDFILL
- ..... – TREE LINE
- ——— – FENCE
- ═══ – RAILROAD TRACKS
- – BUILDING

1"=200'-0" 100 0 100 200

NOTE: UPSTREAM SURFACE WATER SAMPLE (SW-1) AND DOWNSTREAM SURFACE WATER SAMPLE (SW-3) WILL BE COLLECTED AT DUTCH HILL ROAD BRIDGE, AND KENT ROAD BRIDGE, RESPECTIVELY.

SITE PLAN BASED ON MAP SUPPLIED BY MALCOLM PIRNIE

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FARWELL LANDFILL
POST CLOSURE O&M
CATTARAUGUS COUNTY, NY

FIGURE 2-1
SITE PLAN

County owned parcels bounded by thick lines

Landfill

1 mile radius

1/4 mile radius

MW-24 S/D

68.003

68.001

Compliance well boundary
(MW-21S, MW-22S, MW-23S)

N

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FIGURE 2-2
COMPLIANCE WELL BOUNDARY

The depths of the compliance wells will be determined based on one test boring that extends down to bedrock at a location approximately 1,500 feet from the landfill. Based on the types of soils encountered, a well will be screened in the test boring to intersect a zone where it appears that soils are most permeable. The other two wells would be screened at similar depths.

The primary objective of the above supplemental program will be to determine whether contaminant levels continue to decline with distance from the landfill, such that the compliance boundary marks the point beyond which groundwater quality returns to background conditions. Further, chemical data collected from the supplemental monitoring well network will be evaluated to determine whether there is chemical evidence that chemical and/or biological attenuation reactions are being sustained. Specific evaluation techniques will include:

1. An evaluation of the dissolved gases (CO_2, O_2, CH_4) which are consumed and produced during biological degradation reactions.

2. An evaluation of the ratios of parent compounds and their degradation products with distance along the groundwater flow path to determine whether it appears that attenuation is being sustained.

3. An evaluation of the decline in concentration for parameters in individual wells over time, and in general, the decline in concentration of individual compounds with distance from the landfill.

4. A comparison of more conservative inorganic parameters, such as chloride, with organic trends to determine whether the apparent attenuation of the organic contaminants of concern exceeds the dispersion (dilution) rate of the conservative tracer.

2.2 RESIDENTIAL WELL SAMPLING PROGRAM

Previous studies at the site have determined that Ischua Creek is a hydrogeologic boundary that separates the landfill, located on the west side of the creek, from areas east of the creek. Thus, there is no plausible way that groundwater flowing from the landfill can cross the creek to impact areas to the east of it.

On the west side of the creek, there are no known residential supply wells within 1 mile of the landfill in the south/southeast direction, which is hydraulically downgradient. The closest resident in an area downgradient of the landfill is approximately 2-1/2 miles away. Otherwise, it is believed that two residential wells may be located to the southwest of the landfill, within approximately 3/4 mile. However, these possible wells have not yet been field verified, and this location is not truly downgradient of the landfill.

In the interest of protecting and informing the public, the County will add the three closest residential wells on the west side of Ischua Creek, up to a maximum distance of 2-1/2 miles from the downgradient edge of the landfill, to the groundwater sampling program. These wells would be sampled once each year for baseline parameters, corresponding to the scheduled baseline event for the Part 360 monitoring program.

2.3 REPORTING

In addition to the standard Part 360 quarterly monitoring reports, the County will provide NYSDEC with quarterly reports which describe the results of the supplemental monitoring program. These reports will include:

1. A discussion of the analytical results, including instances in which water quality standards are exceeded in the supplemental program wells, and a geochemical interpretation of data that provides evidence of chemical and/or biological reactions that sustain attenuation.

2. An evaluation of attenuation that describes the changes in concentrations of contaminants of concern as groundwater travels from the landfill wells (MW-14S/I, MW-15S/I, MW-16S/D) to wells further downgradient (MW-19S, MW-20D) to the compliance boundary (MW-21S, MW-22S, MW-23S).

3. Based on the above presentations, an overall assessment of whether natural attenuation continues to mitigate groundwater impacts in a way that is protective of human health and the environment.

It is recommended that this supplemental monitoring program be reviewed by the County and NYSDEC after the first two years to determine whether the program needs to be modified, and again after another three years (i.e., five years after implementation).

SECTION 3 – MAINTENANCE REQUIREMENTS

The existing landfill cap was constructed in accordance with the requirements of a 1984 consent order and consists of a gas venting layer that extends 18 inches into refuse, covered by a barrier layer of 18 inches (at 10^{-7} cm/sec), covered by 6 inches of topsoil. The topsoil supports a variety of grasses and small non-woody vegetation. The Farwell Landfill will have reduced utility in the future, as inactive landfills generally are unsuitable for agricultural usage or construction. Because a shallow root zone is necessary to maintain the integrity of the compacted soil cover material, the landfill cannot be reforested. Vegetation should therefore be maintained as it presently exists, as grasses and small non-woody plants. The County intends to maintain both the landfill and the surrounding area within its ownership as open space. Further, the landfill will be surrounded by multi-floral rose shrubbery, which is a hardy, shallow-rooted, spiney, dense shrub that will restrict unauthorized access.

As part of the selected site remedy, the County will implement a formal landfill inspection and maintenance program. This program will occur for the 30-year post-closure monitoring period, or as subsequently amended as appropriate. An initial inspection will occur, and general cap repairs will take place based on that inspection. Repairs may include backfilling depressed areas to promote drainage and minimize infiltration, reseeding bare spots, mowing vegetation, removing trees and wood-stemmed vegetation, repairing drainage conveyances, and generally replacing cover material in damaged areas. The objective of these types of repairs will be to minimize erosion of the cap, enhance drainage of surface water away from the landfill, and minimize infiltration of water into the wastes. The combined effect will be to minimize the future production of leachate, which will reduce the level of groundwater impact over time.

Following the initial inspection and repair, routine maintenance and inspection checks will be conducted monthly from April through November when the surface is free of snow cover, and post-closure inspection reports (Appendix B) will be completed for each inspection. Copies of the monthly inspection reports will be maintained on the site and also in the County's Public Works office. Annual summary reports of the inspection program will be submitted to NYSDEC.

3.1 MAINTENANCE REQUIREMENTS

A. **Drainage Ditches and Retention Basins.** Existing drainage features will be checked for failure or obstructions once in the spring and once in the fall, as well as after the occurrence of severe storms (greater than 1 inch of rain per hour). Drainage conveyances will be maintained free of obstructions, damaged or failed sections will be repaired, and sediment build-up removed. Areas on site which are frequently eroded by drainage will be repaired, and riprap or erosion blankets will be placed on them.

B. **Cover and Vegetation.** Post-closure cover maintenance will include:

1. Mowing the vegetation as required to maintain a healthy cover. In general, it is anticipated that mowing will be performed once during the early spring (June) and again in early fall (September) to discourage the growth of woody plants.

2. Revegetating areas as needed; clearing trees and brush.

3. Repairing eroded or settled areas by adding compacted soil and/or topsoil and then reseeding. Heavy equipment and vehicular traffic should be limited to the access road to prevent damage to the cap. In areas with more than 6 inches of settlement, compacted clay fill would be used to fill the depression to within 6 inches below grade, then 6 inches of topsoil would be added and reseeded.

C. **Access Control.** Access control is to be maintained such that unauthorized entrance to the facility is prevented. There is presently no need for public access to the site, and the County owns the majority of lands immediately surrounding the landfill. These facts by themselves will naturally limit public access to the site. However, control will be expanded to include the planting and maintenance of multi-floral rose shrubbery around the landfill perimeter. This plant is shallow rooted, hardy and spiney, requires little maintenance, and will form a dense hedge wall to restrict unauthorized access. This vegetation will be inspected, repaired, and replaced as needed as part of the cover and vegetation check. Further, the landfill's existing supply well has been posted as being unsuitable for drinking. This warning sign will be maintained.

D. **Gas Venting System.** The gas venting system will be inspected for plugging and damage of the vent risers and return bends. If damage has occurred, the vent risers will be replaced from the connecting union. In addition, post-closure maintenance will include regular inspection of the landfill final cover for cracks or stressed vegetation that might signal the release of landfill gas. Areas where there are cracks or where vegetation appears to be stressed will be tested with a portable explosive gas detector. Areas of the final cover which may have been damaged should be repaired and steps taken to prevent future damage, such as the installation of additional vents.

E. **Groundwater Monitoring Wells.** During the monthly routine inspections, the groundwater monitoring wells should be checked to assure that the locks, risers, and caps are in good condition. Any evidence of damage or tampering should be noted on the inspection forms and repaired.

SECTION 4 – CONTINGENCY PLANS

The following contingency plans have been developed to address the possibility that contaminants may be detected within the established compliance boundary wells at some time in the future. The final closure and maintenance plan should minimize the amount of precipitation and overland flows that could infiltrate into landfill wastes. This should reduce the leachate impacts to surface water and groundwater over time. Continued monitoring according to the standard Part 360 monitoring program and supplemental monitoring for natural attenuation will enable the County to determine whether contaminants are migrating beyond the compliance boundary.

The standard Part 360 and supplemental attenuation monitoring programs will continue as described above, and quarterly reports will be submitted to NYSDEC. Requirements for additional analysis or further action will be determined following the first two years of supplemental monitoring, with further review of the program after five years. At these review milestones, the requirements of the supplemental monitoring and maintenance programs will be reviewed and revised. If this strategy determines that significant migration of contaminants is potentially occurring beyond the compliance boundary, or if site contaminants are detected in water supply wells, then the following contingency plans can be implemented.

If impacts, in the form of a water quality exceedance, are detected in the compliance monitoring wells or in residential wells included in the supplemental monitoring program (i.e., "program residential wells"), the County will notify NYSDEC within 24 hours of receiving the analytical results. A confirmatory sampling round of the affected compliance and program residential wells would occur within 30 days of the initial finding. A written report would be prepared and submitted to NYSDEC within 14 days of receiving the analytical results of the confirmatory round.

If the confirmatory sampling refutes the initial finding, then the quarterly monitoring program would resume for all wells involved in the supplemental monitoring program, including the affected residential wells. Annual sampling of the affected residential wells would resume if two consecutive sampling rounds are below water quality standards for all organic compounds of concern.

If confirmatory sampling verifies the initial finding that a particular well is affected, the following steps would be taken:

1. The County will notify NYSDEC within 24 hours of confirmation of results. If the data indicate a specific residential well is affected, the County would also notify that resident within 24 hours and immediately provide the resident with an alternate water supply, including bottled water and/or the installation of a new well.

2. The County would prepare a field investigation program (FIP) plan, and submit it to NYSDEC within 30 days. The FIP will describe the County's plan for investigating and mitigating the groundwater impacts.

Following the execution of the FIP, if it is determined that corrective action is needed, the County will begin a remedial action contingency plan. The remedial action contingency plan will include the following steps:

1. Complete the approved FIP.

2. Prepare a report which describes the activities of the FIP, including conclusions and recommendations, within 60 days of completing the field investigation.

3. Complete a corrective measures assessment, as needed based on the findings of the FIP, which proposes a preferred remedial alternative (within 60 days of NYSDEC acceptance of FIP report).

4. Begin remediation as outlined in the corrective measures assessment within 30 days of NYSDEC approval of plans and specifications relating to the preferred alternative.

The selected corrective measure would satisfy the following criteria:

1. Protect public health, safety, and the environment.

2. Attain an established groundwater protection standard.

3. Control the source of release to the maximum extent practical so as to reduce or eliminate future releases.

4. Comply with applicable state and federal regulations.

In addition, the County will consider the following six additional criteria when selecting the corrective measure:

1. The long-term and short-term effectiveness and protectiveness of the measure.

2. The probability of success of the corrective measure.

3. The corrective action's effectiveness in preventing the release of additional contaminants.

4. The ease or difficulty of implementation.

5. The technical and economic resources available for implementation.

6. The degree to which community concerns are addressed by the measure.

Remedial actions may include:

1. Additional drainage controls to divert flows away from the landfill to further reduce leachate production.

2. Providing a permanent potable water source to residents with affected water supplies.

3. Renovation of existing leachate collection system to further control/minimize leachate release to groundwater.

4. Implementation of groundwater control and/or recovery by extraction or cut-off wall.

APPENDICES

APPENDIX A

FIELD SAMPLING PROCEDURES

APPENDIX A

FIELD SAMPLING PROCEDURES

The monitored natural attenuation sampling program for the site consists of representative sampling of groundwater. The sampling program has been developed in order to assess the impacts of landfill-related activities on the environment, and to determine whether natural attenuation continues to provide adequate mitigation of those impacts. Samples will be handled in accordance with these field sampling procedures.

Completed laboratory information and chain-of-custody sheets will be provided by the laboratory. The minimum information to be included on the chain-of-custody form is as presented on the attached standard Form A-1. The laboratory staff will insert preservation chemicals into sample bottles prior to sample collection and provide the state documentation regarding holding times and sample preservation techniques.

A. **Bottle Preparation.** It is important to use the proper sample containers in order to protect against the alteration of the groundwater chemistry between the field and the laboratory. Sample containers will be prepared by the laboratory. Proper preservation will be performed, the jars tagged, and the chain-of-custody initiated prior to shipping.

B. **Sample Designation.** Sampling locations of a particular matrix type (surface water, groundwater) will be given a unique sample designation. The sample designation consists of matrix type, location, site name, date and time of sampling. Sample matrices are identified by a short alphanumeric prefix to the sample location number. A list of prefixes for various matrices is shown below:

MW	-	Groundwater
SW	-	Surface water
L	-	Leachate

For the post-closure monitoring for natural attenuation, only groundwater is to be sampled, so the "MW" designation shall apply. Sample bottles will be labeled individually. Each label will identify the site name, depth, matrix and sample location (i.e., MW-1, SW-1) and date and time of sample collection. Chain-of-custody forms and field log book entries should refer to each sample in the same manner. No two samples will carry the same sample designation.

C. **Monitoring Well Sampling Techniques.**

1. **Explosive and Volatile Organic Vapors.** If explosive or volatile organic vapors are suspected at the site, ambient air in the well will be measured before the well is evacuated.

2. **Documented Contamination.** For wells with documented contamination, standing water in the well will be checked for immiscible layers or other contaminants that are lighter or heavier than water (floaters or sinkers). Floaters or sinkers will be sampled and analyzed by a separate method described in Section D.5.c.11 of the field sampling procedures.

D. **Sampling Equipment and Procedures.**

1. **Recordkeeping.** Field records are the responsibility of the field sampling personnel. The field personnel are responsible for keeping the field log book and preparing the chain-of-

custody forms. All field records must be dated; kept in an organized, legible, and up-to-date form in the log book; and recorded with an indelible ballpoint pen.

2. **Decontamination.** The following materials and procedures should be used to decontaminate equipment that will come in contact with sample media. Wherever possible, dedicated or disposable sampling equipment is used to eliminate the need for decontamination and further reduce the possibility of cross contamination between samples.

MATERIALS
Five-gallon jug with pour spout, potable water source
Five-gallon bucket - wash tub
Tall, kitchen-style garbage can lined with clean garbage bag - clean equipment holder/dryer
Small Rubbermaid storage box - small parts wash tub
Alconox
Bottle brushes - 24" or more
Bristle scrub brush
Pesticide-grade methanol
Deionized water
PVC gloves
Nitrile gloves
Tyvek suit
Pipe wrench
Paper towels
Aluminum foil
Goggles

To avoid being splashed during decontamination, the sampler shall wear a Tyvek suit, goggles and a pair of nitrile gloves over PVC gloves. Outer gloves must undergo decontamination procedures simultaneously with equipment.

3. **Procedure.**

   a. Wash in alconox and water; use bottle brush on inside of bailers; use bottle brush or scrub brush as necessary; wipe with paper towel.

   b. Rinse with tap water; be sure to rinse hands (collect rinse solution in wash bucket).

   c. Rinse with methanol and allow to air dry; rinse hands.

   d. Rinse with deionized water; air dry.

   e. Dispose of rinse water properly.

4. **Groundwater Sampling by Bailer.** Below are listed step-by-step procedures for sampling monitoring wells using bailers. The protocol is designed to provide representative samples while reducing the chances for cross contamination between sampling points. Toward this end, disposable or dedicated bailers should be used. In addition, sampling shall proceed from the least likely to the most likely contaminated locations.

5. **Bailer Sampling Procedure.**

a. **Preparation.**

1) Review sampling plan.

2) Order sample bottles from laboratory.

3) Notify interested parties (regulators, client) of sampling event.

4) Receive bottles. Check for proper bottles and chain-of-custody information.

5) Attend presampling meeting.

6) Assemble and check necessary equipment (personal protection equipment, rope, bailers, field instruments, notebook).

b. **Calibration Data.** The following data must be included whenever the pH, Eh, and conductivity meters are calibrated:

1) The temperature, nominal value, and expiration date of the calibration fluids.

2) The temperature-corrected value of the calibration fluids.

3) The final (after calibration) reading of the instruments as they measure the calibration fluids and the time those readings are taken.

4) If necessary, reasons why calibration could not be achieved.

c. **Sampling.**

1) Identify the well and record the location in the field book.

2) Put on a new pair of disposable PVC gloves.

3) Put on a pair of nitrile gloves.

4) Cut a slit in the center of the plastic sheet and slip it over the well, creating a clean surface onto which the sampling equipment can be positioned.

5) Do not kick, transfer, drop or in any way let soils or other materials fall onto this plastic sheet unless it comes from inside the well.

6) Clean meters, tools, equipment, etc. before use.

7) Clean the well cap with a clean towel, remove the well cap, and plug, placing both on the plastic sheet. Do not use petroleum products or aerosol lubricants to free.

8) Using an electric water level indicator, measure the depth to the water table to the nearest 0.01 foot. If free-phase product is present, use an oil-water interface

probe or a clear bottom-valve bailer to determine the thickness of the free product. Record this information in the field book and Field Sampling Record.

9) Clean the well depth probe and rinse it with deionized water after use.

10) Compute the volume of water in the well and record this volume in the field book.

11) Attach enough polypropylene rope to a bailer to reach the bottom of the well and lower the bailer slowly into the well, making certain to submerge it only far enough to fill it one-half full. The purpose of this is to recover any oil film if one is present on the water table. If floaters or sinkers are present in the well, then thoroughly describe the color, appearance, thickness, and odor in the field book. The need for and type of chemical analysis will be determined on an as needed basis depending on the nature of the non-aqueous phase liquid.

12) Pull the bailer out of the well, keeping the polypropylene rope on the plastic sheet. Empty the groundwater from the bailer into a clean glass quart container and observe its appearance. Note: This sample will not undergo laboratory analysis and is collected to observe the physical appearance of the groundwater only.

13) Record the physical appearance of the groundwater in the field book.

14) Initiate bailing the well from the top of the water column, making certain to keep the polypropylene rope on the plastic sheet. Groundwater should be dumped from the bailer into a graduated pail to measure the quantity of water removed from the well. The purged water should be screened with the photoionization detector (PID) before disposing. PID readings above the site action level require that the purged water be drummed for proper disposal.

15) Continue bailing the well until at least three well volumes of groundwater in the well has been removed or until the well is bailed dry. If the well is bailed dry, allow sufficient time for the well to recover before proceeding with Step 18. Record this information on the groundwater field sampling record.

16) Remove the sampling bottles from their transport containers and prepare the bottles for receiving samples. Inspect labels to verify proper sample identification. Be sure labeling is complete before filling containers. Sample bottles should be kept cool with their caps on until they are ready to receive samples. Arrange the sampling containers to allow for convenient filling. Always fill the containers for volatile organic compounds first. Filter and add preservatives to appropriate samples.

17) Record time sampling begins, and note the interval between bailing (purging) and sampling. To provide comparable samples, maintain same interval between well evacuation and sampling.

18) To minimize agitation of the water and obtain a sample fresh from the surrounding formation, initiate sampling by lowering the bailer slowly into the well, making certain to submerge it only far enough to fill it completely. Fill sample bottles and return each to its proper transport container. Keep samples on ice. If required, seal each container with chain-of-custody seals.

19) If the sample bottles cannot be filled quickly, keep them cool with the caps on until they are filled. The vials (three) labeled purgeable priority pollutant analysis should be filled from one bailer, then securely capped.

20) After the last sample has been collected, record the date and time and empty one bailer of water from the surface of the water in the well into a beaker and measure and record the pH, Eh, conductivity, turbidity, and temperature of the groundwater following the procedures outlined in the equipment operation manuals. Record this information in the field book. The beaker must then be rinsed with distilled water prior to reuse.

21) If turbidity is greater than 50 NTUs, filtered samples should be obtained for metals analysis.

22) Begin the chain-of-custody record. A separate entry is required for each well with the required analysis listed individually.

23) Replace the well cap and lock the well protection assembly before leaving the well location.

24) Place the polypropylene rope and disposable bailer, gloves, rags and plastic sheeting into a plastic bag for disposal.

D. **Corrective Action.** The field sampling procedure will be followed as described in this document. In the event of a problem, any corrective measures taken will be documented in the sampling report submitted to the NYSDEC. The documentation will include a description of the deficiency, the corrective action taken, and the persons responsible for implementing the corrective action. Any alterations to the field sampling procedures shall be included as an amendment to the SAP.

E. **Field QA/QC.** In addition to water samples collected from the monitoring wells, two types of "blanks" will be collected and submitted to the chemical laboratory for analyses. The blanks will consist of 40 ml VOA vials as follows:

1. **Trip Blank.** A trip blank will be prepared before the sample bottles are sent by the laboratory. It consists of a sample of distilled, deionized water which accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of samples where sampling and analysis for 6 NYCRR Part 360 volatiles is planned (water matrix only). The trip blank will be analyzed for volatile organic compounds as a measure of the internal laboratory procedures and their effect on the results.

2. **Field (Wash) Blanks.** Field wash blanks are analyzed to check the effectiveness of decontamination. Each sample consists of distilled deionized water (prepared by the laboratory) poured through a decontaminated bailer or other sampling apparatus. It is usually collected as a last step in the decontamination procedure prior to sampling of a monitoring well. The wash blank can be analyzed for all or some of the compounds which the subsequent monitoring well sample is scheduled for. In the event dedicated sampling equipment (i.e., disposable bailers) is used such that decontamination procedures are not warranted, field blanks will not be included for analysis.

3. **Duplicate Samples.** One duplicate sample will be collected during each sampling event. The duplicate sample will be collected from one of the monitoring wells sampled in that event,

and will be analyzed for either routine, baseline, or expanded parameters, consistent with whichever parameter list is being targeted for that particular sampling event. The sample containers for the duplicate sample will not reveal the identity of the well from which the sample is collected. The results of the duplicate analyses will be used to check for analytical integrity.

F. **Sample Handling And Analysis.** The following sections describe what to do with samples once they have been collected. Examples of paperwork are attached for reference.

1. **Packaging.** Samples processed for analyses must be packaged for shipment in accordance with current U.S. Department of Transportation (DOT) regulations. Required government and commercial carrier shipping papers must be filled out. Information can be obtained from the carrier (i.e., Federal Express) before field sampling begins.

The following checklist should be followed regardless of transport method:

a. Samples will be transported in metal ice chests or sturdy plastic coolers (cardboard or styrofoam containers are unacceptable).

b. Remove previously-used labels, tape and postage from cooler.

c. Ship filled sample bottles in same cooler in which empty bottles were received. Coolers should have a permanent identification number affixed to the outside walls or lid.

d. Affix return address label to cooler.

e. Check to see that sample bottles are tightly capped.

f. Be sure bottle labels are completed.

g. While packing cooler, fill out chain-of-custody form.

h. Wrap sample bottles in bubble pack and place in cooler.

i. Pack bottles with extra bubble pack, vermiculite, or styrofoam "peanuts". Be sure to pack trip blank if applicable.

j. Keep samples refrigerated in cooler with bagged ice or frozen cold packs. Do not use ice for packing material; melting will cause bottle contact and possible breakage.

k. Separate sampler's copy of chain-of-custody and keep with field notes.

l. Tape paperwork (COC, manifest, return address) in ziplock bag to inside cooler lid.

m. Close cooler and apply signed and dated custody seal in such a way that the seal must be broken to open cooler.

n. Securely close cooler lid with packing or duct tape. Be sure to tape latches and drain plugs in closed position.

2. **Shipping.** Because holding times are very important for accurate laboratory analyses, it is imperative that samples arrive at the lab as soon as possible following sampling. Samples must be hand delivered on the same day as sampling or sent via overnight mail.

When using a commercial carrier, follow the steps below.

a. Securely package samples and complete paperwork.

b. Weigh coolers for air transport.

c. Complete air bill for commercial carrier (air bills can be partially completed in office prior to sampling to avoid omissions in field). If necessary, insure packages.

d. Keep customer copy of air bill with field notes and chain-of-custody form.

e. When coolers have been released to transporter, call receiving laboratory and give information regarding samplers' names, method of shipment, cooler identification numbers, and expected time of arrival.

f. Call lab on day following shipment to be sure samples arrived intact. If bottles are broken, locations can be determined from chain-of-custody and resampled.

FORM A-1

CHAIN OF CUSTODY RECORD

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
One Remington Park Drive
Cazenovia, New York 13035
(315) 655-8161 fax 315.655.4180

Job #_____ Due Date_____

Sample Type	Container Type
1. wastewater	P - plastic
2. soil	G - clear glass
3. sludge	AG - amber glass
4. sediment	V - voa
5. drinking water	
6. water (gw/mw/sw)	
7. other (specify)	

Company:	
Address:	
Phone #: ( )	Fax #: ( )
Contact Person:	

Lab ID	Sample ID	Sample Type	Container Size / Type	Sampling Date/Time	Preservative Information	ANALYSES							

Sampled By:	Date/Time:	°C:			
Relinquished By:	Date/Time:	°C:	Received By:	Date/Time:	°C:
Relinquished By:	Date/Time:	°C:	Received By:	Date/Time:	°C:
Method of Shipment:					

SWCOC.XLS

Make and Keep a Copy of This Document Prior to Forwarding With Samples!!

APPENDIX B

POST-CLOSURE INSPECTION FORM

APPENDIX B

POST-CLOSURE INSPECTION FORM
Farwell Landfill, Cattaraugus County, New York

INSPECTOR (PRINT)	
INSPECTOR (SIGNATURE)	
DATE OF INSPECTION	

1. Fencing, Gates, and Access	
Fence intact	
Gates working	
Locks operable	
Access road condition	
2. Landfill Cover	
Visible refuse	
Signs of vector activity	
Signs of erosion	
Signs of stressed vegetation	
Leachate seeps	
Detectable odor	
Areas of subsidence	
3. Waterways and Ditches	
Signs of erosion	
Blockage of drainage pathway	
Culverts clear of obstructions	
Ponded water areas	
4. Monitoring Wells (well casing, cap, and locks in place and in good condition)	
M-1	
M-2	
M-3	
M-4	
MW-10	
MW-11	
DO-1	
DO-2	

Action Required:

Review by Public Works Director:	
Signature	Date