PROPOSED SCOPE OF WORK

SECOND PHASE REMEDIAL INVESTIGATION

GORICK C&D LANDFILL

NYSDEC SITE NO. 7-04-019

WORK ASSIGNMENT NO. D002340-5

APRIL 1991

URS CONSULTANTS, INC.

282 DELAWARE AVENUE

BUFFALO, NEW YORK 14202

KIR 001092

INTRODUCTION

The work proposed in this document is intended to provide sufficient information to complete the Remedial Investigation of the Gorick C&D Landfill. The results of the first phase remedial investigation are contained in the document, "Draft Remedial Investigation of the Gorick C&D Landfill" (URS Consultants, April 1990) (submitted separately) and will not be repeated here. The final Remedial Investigation report, including the results of this proposed second phase investigation, will be used to provide the basis for the assessment of the risk posed by the landfill to public health and the environment, and of the degree to which the landfill contravenes Federal, State or local standards.

This proposed scope of work is also designed to encompass testing necessary to support recommendations made in the Feasibility Study for the landfill. The first portions of this process are contained in the "Preliminary Draft Feasibility Study of the Gorick C&D Landfill" (URS Consultants, March 1991).

All work proposed herein will be performed as described in the Work Plan, Field Sampling Plan and Quality Assurance Procedures Plan (URS, July 1990), except where noted.

1.0 RECOMMENDATIONS

The recommended second round field activities include: resampling of all monitoring wells sampled during the Phase I investigation; the installation and sampling of seven monitoring wells (three nested well pairs and one addition to an existing well pair); sampling of three additional surface soil locations; sampling of three soil borings installed to ten feet; sampling of two surface water/stream sediment locations; air monitoring in well heads and landfill vent holes; additional surface soil sampling for geotechnical characterizations; and laboratory and in-situ permeability testing of the till underlying the aquifer. The proposed Phase II field investigation is illustrated in Figure 1-1. This figure also includes all existing and abandoned wells, borings, and stream gauge locations (both from previous investigations and Phase I). Table 1-1 summarizes the samples proposed for collection and laboratory analysis.

1.1 Monitoring Well Installation

Installation of seven new groundwater monitoring wells is proposed for the second round of field activities. The seven wells will consist of three nested well pairs and one single well added to an existing well nest. Table 1-2 summarizes the proposed well locations and justifications for their placement.

The three shallow wells proposed for the second phase are primarily intended to provide information on the elevation of the water table necessary to accurately delineate the flow in the vicinity of the landfill, and also to provide water quality information for the shallow aquifer zone. The deeper wells will attempt to bound the contaminant plume to the north and south, and allow measurement of the quality of the groundwater entering and leaving the site to provide a more accurate assessment of the degree to which the landfill is contaminating the aquifer.

Monitoring well MW-6D will be installed near the existing MW-6S/6I well pair. This well will be screened at the base of the aquifer to monitor contaminant migration offsite towards the west and north in the deepest portion of the aquifer. This is necessary since MW-5D showed significant VOC contamination in this portion of the aquifer south of this location. This boring, to be logged only below the elevation of MW-6I, will also serve to better define the geologic stratification of the site in this area.

Well pair MW-11S and MW-11I are intended to provide data pertaining to water table configuration and water quality downgradient of the landfill to the north, in both the shallow and intermediate aquifer zones. They are placed here to attempt to bound the contaminant plume to the north, since Phase I did not provide a northern boundary to the contamination, especially for the intermediate zones. If they do not succeed in bounding the plume, they should at least show contamination

trends. Together with the more refined flow map, this should allow a more accurate determination of the VOC source area (landfill or north of the landfill). The borings will also further define the geology of the aquifer downgradient of the landfill.

Well pair MW-12S/12D is intended to assess the upgradient groundwater quality south of the landfill in the area that is anticipated to be a major source of groundwater to the fill area. All wells in this area monitored during Phase I, except for those adjacent to the Town wells, are shallow wells. Phase I showed that most contamination is in the intermediate zone, however. Thus, no southern bound to the contaminant plume has been identified, as yet. Additionally, the fill wells were all shallow and did not monitor this intermediate zone. Only two of the four fill wells, MW-8S and MW-9S, showed high levels of VOCs, so it is still not possible to rule out the possibility that contamination is flowing from the south beneath the landfill, even though the southernmost shallow wells did not detect any contaminants. The deep well will be set in the alluvial aquifer as close to the screened elevation of Town Well No. 3 as is possible. The shallow well will provide upgradient groundwater flow and water quality data. Both wells will also monitor groundwater quality downgradient of the American Pipe and Plastic facility. This pair will be placed in the approximate location of the abandoned USGS Well #3 (GS-3).

Well pair MW-13S/13I is proposed in order to monitor for water table configuration and the quality of groundwater entering the landfill from

the northeast (assumed upgradient of the landfill), in both the shallow and intermediate aquifer zones. It is difficult to predict the saturated thickness of the aquifer in this area, but if an inadequate thickness is encountered to install both wells with their screens vertically separated by a minimum five feet, only the shallow well will be installed.

1.1.1 Well Development

In an attempt to minimize the time and expense involved with developing the monitoring wells, it is proposed that well development be discontinued once the standard parameters (pH, temperature and specific conductivity) have stabilized. Every attempt will be made to develop the wells to meet turbidity criteria (less than 50 NTUs), but as long as sufficiently clear water for the analyses required can be obtained in sampling (see Section 1.1.2), the deciding factor in classifying a well as developed will be stabilization of the standard parameters. Groundwater elevations within each new well will be monitored daily from the time of installation until they have stabilized.

1.1.2 Groundwater Sampling

First phase groundwater samples contained very low levels of semivolatile compounds. TAL metal contaminants detected exceeded ARARs in very few instances, mostly of iron and manganese. Those cases where other metals exceeded ARAR values occurred with one exception, magnesium, onsite. No pesticides or PCBs were detected in any groundwater samples.

It is therefore recommended that all wells sampled during the second round of sampling (including location PW-1, raw water from Town Well No. 3) be analyzed only for TCL volatile organic compounds and total phenols. These are the only two classes of contaminants which the Gorick Landfill appears to be contributing in significant quantities to the surrounding environment. This reduction in the scope of analyses will greatly reduce the laboratory costs while still providing a valid database on groundwater quality and movement of the contaminants of concern.

1.1.3 Water Surface Elevation Monitoring

Water table surface and river surface elevations will be measured weekly during second phase field activities in all new monitoring wells and stream gages together with those monitored during the first phase field activities. This will provide a database on the dynamic relationship between the elevation of the water table surface and the stage of the river. Information on the river stage was lost during the first phase investigation when the first stream gage (SG-1) was destroyed during a flood before it could be surveyed.

Monthly monitoring of the water table surface is proposed for the period from the end of the second phase field activities until the Final Remedial Investigation Report is issued. First phase measurements were taken in late fall and early winter. Second phase activities will occur in late spring and early summer. It is desired to obtain readings in mid-summer when precipitation will be lowest.

1.2 Surface Water and Stream Sediment Sampling

Two surface water/stream sediment samples will be collected from the Susquehanna River during the second round of environmental sampling. One of these sample locations (SW/SS-8) is a resample of the first round location. This sample location is situated upstream of the landfill. The other sample (SW/SS-11) is a new location, replacing SW/SS-9, but located downstream of the landfill site in the Susquehanna. This sample will allow the estimation of the quantity of contaminants reaching the river from the landfill, including the northern portion, where the greatest quantity of contaminants was found during the first phase investigation. Also, MW-6I, located between the northern portion of the landfill and the river, contained the highest concentrations of VOCs of any well sampled. The Phase I location, SW/SS-9, was not far enough downstream to include the effects of groundwater inflow to the river from the northern portion of the landfill. It was intended to monitor only for impacts from the drainage stream adjacent to the landfill on the Susquehanna. These samples will be submitted to the laboratory for full TCL and TAL analyses. Sample locations are depicted on Figure 1-1.

1.3 Surface Soil Samples

Three additional shallow surface soil samples are proposed to allow an accurate assessment to be made of the health risk associated with the landfill. Upgradient sample SPS-1 collected during the first round of sampling was found to contain elevated levels of PAH compounds and pesticides. Therefore, it is proposed that sample SPS-8 be collected upgradient of the landfill in a "clean" area to serve as a background sample. It is expected that by moving the sampling location southwards from SPS-1 into the wooded area, a sample free from the impacts associated with the apartment complex may be obtained. A composite surface soil sample (SPS-6) will be collected within the tank area on the east side of the landfill, to determine if any impacts have resulted from the presence of the tanks. The third sample (SPS-7) will be collected in the southern portion of the fill in an area where no previous samples have been taken. These three samples will be submitted for the same analyses as for Phase I surface soil samples (TCL and TAL analyses).

1.4 Subsurface Soil and Waste Samples

Subsurface soil samples are proposed at three locations downgradient from the tank disposal area near the railroad tracks. This area is a possible suspect for the VOC source area, since it is upgradient from MW-8S where the highest hits of TCE were found in a shallow well. To investigate this possibility, three soil borings will be installed in a fan-shaped pattern downgradient from the tanks, to a depth of 10 feet each

(Figure 1-1 and Table 1-2). The borings will be logged for stratigraphic purposes, but will be carefully screened with a PID for VOCs, or other visible evidence of contamination. If, and only if, contamination is found, the sample will be submitted for the complete TCL and TAL analyses, as well as for EP-Toxicity. The purpose of these three borings is to check for past leakage or spills from these tanks into the subsurface, where migration could occur along permeable sand seams or bedding planes towards the aquifer to the west and north of here. This area is expected to be underlain by till, and not aquifer, so that a monitoring well is infeasible.

Waste samples are not proposed for the second round of field sampling. Data compiled from the sampling and analyses during the first phase investigation have adequately assessed the degree of contamination present in these media.

1.5 Geotechnical Sampling

Second round geotechnical concerns include: classifying (according to USCS) the surficial soil of the landfill to estimate existing infiltration through the fill and as a first step in the landfill cap design process; and determining the hydraulic conductivity of the till unit that underlies the sand and gravel aquifer, to determine its suitability as a barrier to contaminant migration. This information will be used to assess the degree of contaminant migration into any deeper aquifers which may exist beneath the site and to determine the possibility

that a vertical barrier (slurry wall or sheetpile wall) may be successfully connected to it.

Five soil samples will be collected from the surface of the landfill and submitted for grain size (including hydrometer) analysis. This is a necessary first step in determining the suitability of the existing cover material as support for a cap. These samples will be taken at widely spaced locations over the landfill to most accurately represent the surface material. Because these locations will be determined in the field, they are not shown in Figure 1-1.

In order to determine the hydraulic conductivity of the till unit below the sand and gravel aquifer, attempts will be made while drilling the deep monitoring wells to secure undisturbed Shelby-tube samples of the upper layers of this material. Should these attempts prove unsuccessful due to the density and coarse nature of the till, split-spoon samples of the material will be submitted to the laboratory, where the soil will be re-molded to its approximate in-place density. The necessary field measurements and lab tests (moisture content, etc.) will also be performed in order to determine the dry density of the till. The samples obtained be either method will then be subjected to triaxial or rigid wall permeability testing. A field hydraulic conductivity test (packer test or falling head test) of the till is also proposed at the location of MW-6D. This will corroborate and provide back-up for the laboratory permeability test. This location is chosen because it is in the area of greatest downgradient contamination, and because boring to the top of till has

already been proposed here for other purposes. This procedure will involve advancing a hole of predetermined size and length below the augers and into the till. A packer assembly will then be positioned inside the test hole and inflated in order to properly seal off the test interval. With the till unit segregated, testing will proceed by one of the above referenced methods.

1.6 Air Monitoring

The Phase II air monitoring program will be conducted to screen for the presence of volatile organic vapors (utilizing a PID meter) and explosive gases (using an LEL meter) being produced by the landfill. This will include, in addition to the standard air monitoring that will be performed during drilling operations, a screening of all vent holes and monitoring well heads on the landfill surface for VOCs and explosive gases. This will help in determining whether gases are migrating offsite through either the subsurface or surficial soils onsite in contravention of NYSDEC Part 360 [360-2.17(f)(1)] requirements.

1.7 Stream Hydrology

To further define the overall hydrology of the site and its surrounding area, an additional stream gage (SG-4) will be installed in the Susquehanna River downstream of the landfill (Figure 1-1 shows its location). This will allow for an accurate determination of the elevation of the river surface near the northern portion of the site. The current

estimate is based upon the regional gradient of the river, from upstream of the site. With this information, an accurate calculation can be made of the rate of groundwater flow from the northern portion of the site into the river. Monitoring of both the new and existing gages will be performed concurrently with groundwater elevation monitoring.

TABLE 1-1

PROPOSED SAMPLES FOR PHASE II INVESTIGATION

Sample Matrix	Locations	No. of Samples	Parameters Analyzed
Groundwater	All new and Phase I monitoring wells (including Town Well #3)	28	TCL VOAs Total Phenols
Surface Soil	Shallow probe samples (SPS) over landfill surface and in background soil	3	TCL VOAs TCL Semivolatiles TCL Pesticides/PCBs TAL Metals Total Cyanide Total Phenols Miscellaneous parameters
	Geotechnical samples of landfill surface	5	Grain size (including hydrometer)
Subsurface Soil	Downgradient soil borings from tank disposal area	3*	TCL VOAs TCL Semivolatiles TCL Pesticides/PCBs TAL Metals Total Cyanide Total Phenols EP-Toxicity
Surface Water/Stream Sediments	Upgradient and downgradient of the site on the Susquehanna	2	TCL VOAs TCL Semivolatiles TCL Pesticides/PCBs TAL Metals Total Cyanide Total Phenols Miscellaneous parameters
Till		1	Laboratory Permeability

Note: Samples will be submitted for chemical analysis only if elevated PID readings or obviously contaminated zone is encountered.

TABLE 1-2

PROPOSED GROUNDWATER MONITORING WELL
PHASE II INVESTIGATION

Well I.D.	Approximate Boring Depth (ft.)	Groundwater Monitoring Interval	Summary Reason for Location
MW-11S	30	Shallow	Additional groundwater flow and monitoring point for shallow, downgradient flow
MW-11I	50	Intermediate	Monitor for northern intermediate groundwater contamination
MW-12S	20	Shallow	Additional groundwater flow and quality data upgradient of landfill, to the south, and downgradient of AP&P plant
MW-12D	45	Deep (15 ft. well screen)	Same as MW-12S, but at screened elevation of Town Well #3
MW-13S	30	Shallow	Upgradient shallow monitoring point for groundwater quality and flow data
MW-13I	45	Intermediate	Determine upgradient intermediate groundwater quality. The intermediate well will only be placed if a sufficient thickness of aquifer is encountered.
MW-6D	60	Deep	Monitor for deep migration of contaminants to north and west of site. Define aquifer depth, determine permeability of underlying aquitard (during boring).
B-14	10	None	Check for soil contamination downgradient of tank disposal area.
B-15	10	None	Check for soil contamination downgradient of tank disposal area.
B-16	10	None	Check for soil contamination downgradient of tank disposal area.

Note: Well screen lengths will be 10 feet unless otherwise noted.

1-200 02/14/91

N

RIVER

SUSQUEHANNA

FLOW

LINK FLIGHT SIMULATION COMPANY

MW-11I
MW-11S
MW-13S
MW-13I
SPS-2
SG-4
SW/SS-11
MW-7S
SPS-5
MW-6D
MW-6I
MW-6S
WS-1
SPS-3
MW-8S
GS-12
TANKS
SW/SS-9
MW-20
MW-5D
MW-5S
MW-5I
GS-9A
GS-9B
MW-9S
GS-16A
GS-16B
MW-35
MW-36
SW/SS-7
MW-41
MW-4S
GS-10
MW-37
GS-11
TOWN WELL No.3
MW-33
MW-32
MW-31
SG-2
GS-8A
GS-8B
MW-34
VO-3
TOWN WELL No.1
TOWN WELL No.2
SW/SS-8
SG-3
GS-7
MW-3S
SW/SS-6
SW/SS-5
B-3A
SW/SS-4
GS-2
MW-10S
SPS-7
B-10A
VO-5
11-35
GS-15A
GS-15B
APP-N
APP-S
MW-12S
MW-12D
GS-3
10-33
B-14
B-11
B-15
TANKS
SPS-6
B-16
WS-2A
SPS-4
16-24
GS-13
PW-1
MW-2S
LS/WS-3
LS/WS-2
SW/SS-10
TANKS
GS-1
14-21
15-15
AMERICAN PIPE & PLASTIC
MW-1S
SPS-1
APARTMENT COMPLEX
SPS-8
SW/SS-1
KIRKWOOD WATER TREATMENT PLANT
CONRAIL
RAILROAD
KIRKWOOD
PARKWAY
(RTE. 11)
854
844
864

LEGEND

- MONITORING WELL; INSTALLED BY URS ALSO SOIL BORING SAMPLE LOCATION, EXCEPT AT MW-7S, MW-8S, MW-9S AND MW-10S WHERE WASTE SAMPLES WERE COLLECTED
- EXISTING MONITORING WELL INSTALLED BY LAKE ENGINEERING
- SURFACE WATER AND STREAM SEDIMENT SAMPLE
- WASTE SAMPLE
- LEACHATE SEEP SAMPLE AND WASTE SAMPLE
- SHALLOW PROBE SOIL SAMPLE
- POTABLE WATER SAMPLE
- PROPOSED PHASE II MONITORING WELL
- PROPOSED STREAM GAUGE
- PROPOSED SHALLOW PROBE SOIL SAMPLE
- PROPOSED SURFACE WATER AND STREAM SEDIMENT SAMPLE
- PROPOSED SOIL BORING

NOTES:

1. MAPPING BASE IS FROM AERIAL PHOTOGRAPHY DATED APRIL 1, 1990 AND COMPILED BY LOCKWOOD MAPPING, ROCHESTER, NEW YORK.
2. PROPERTY LINES SHOWN ARE APPROXIMATE, FOR REFERENCE ONLY, AND SHOULD NOT BE USED FOR CONVEYANCE OF REAL PROPERTY. PROPERTY LINES WERE INTERPOLATED FROM A TAX MAP PREPARED BY THE TOWN OF KIRKWOOD, BROOME COUNTY, NEW YORK.

KIR 001106

0 100 200
SCALE IN FEET

PROPOSED PHASE II FIELD INVESTIGATION

URS CONSULTANTS, INC.

FIGURE 1-1

C-2110