PHASE II REPORT

HYDROGEOLOGIC INVESTIGATIONS
AT
THE GREENBUSH DISPOSAL FACILITY

GREENBUSH, MAINE

November 1993

Prepared by

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For

University of Maine System

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1.0 INTRODUCTION

This report presents the results of hydrogeologic investigations and ground-water sampling and testing at the University of Maine's disposal facility at Greenbush, Maine and covers activities that began October 1991 and have been ongoing through November, 1993.

The Greenbush Disposal Facility is located approximately 26 miles north-northeast of Bangor, Maine in a wooded area approximately 0.6 miles north of Scotts Corner, on the west side of Goulds Ridge Road. The roughly 60 ft. X 60 ft. site is located on a late Wisconsinan esker at approximate elevation 250 ft. There is an irrigation pond 0.3 miles to the southwest of the site at about elevation 175 ft. Olamon stream is located 1.0 mile southwest at approximate elevation 125 ft. (U.S. Geological Survey, 1988) (see Figure 1).

The work reported in this document was authorized by the University of Maine System, Office of Facilities, on October 1, 1991 as part of the Agreement For Consulting Services with Stone & Webster Environmental Technology & Services Inc. (Stone & Webster) dated March 20, 1989.

2.0 SITE HISTORY

The disposal site was used by the University of Maine during the 1960s and 1970s and was closed in 1979, at which time a synthetic membrane and soil cover was placed over the buried waste. The disposal site is known to contain small quantities of low-level radioactive waste plus dioxane and toluene, as well as other laboratory waste. An inventory of documented landfill contents is presented in Appendix 1.

Responding to concerns that some contents of the landfill might pose a threat to ground-water and the public, the University contracted with Stone & Webster to investigate the site. Stone & Webster originally proposed (June 27,1989) a scope of work that included a monitoring well network of eight well nests with each nest consisting of one shallow well and one deep well. The shallow wells would be screened across the water table and would be designed to detect light NAPLs (Non-Aqueous Phase, or hydrophobic, Liquids), which would tend to float at the water table. The deeper wells would be screened across the till-bedrock interface and would be designed to detect both water soluble contaminants which could occur below the water table, and dense contaminants, which might tend to collect at the base of the unconsolidated glacial sediments near the top of the relatively non-porous bedrock. All three types of potential contaminants (NAPLs, water soluble and dense contaminants) are known to exist within the landfill. Water samples collected from the proposed wells would be subjected to a comprehensive analytical testing program.

Following discussions with the University, the work was divided into two phases. Phase I consisted of constructing four wells located adjacent to the disposal site followed by one round of ground-water sampling and a limited analytical testing program. The Phase I wells are identified as wells A, B, C, and D (see Figure 2). Phase I drilling and well construction was completed in December, 1991. The Phase I exploration revealed that the water table was very close to top of bedrock, and that a single well that was screened into rock but with the top of the screen extending above the unconfined water table, could monitor for light NAPLs, dense contaminants and water soluble contaminants. As a result, the original plan for nests of one shallow and one deep well per location, was modified in favor of one well per location. The four Phase I wells were sampled May 7 and 8, 1992. Also, a soil vapor sample was taken from beneath the hypalon cap that covers the landfill. The water samples were tested for Gross Alpha, Gross Beta, Gamma Spectral Analysis, and volatile organic compounds. The soil gas samples were tested for volatile organics. Laboratory testing was completed June 15, 1992, and these results, plus details of the well construction and sampling work, were presented in a Phase I Report submitted to the University in November, 1992. None of the Phase I samples had contaminants that could be attributed to the disposal site.

Phase II drilling and well construction was completed in July, 1993 and consisted of four additional wells located around, but further away from the disposal site than the four Phase I wells. These outer wells were designed to provide additional sampling points and also to provide better control for assessing horizontal hydraulic gradients through and near the disposal site. These wells are identified as wells E, F, G, and H (Figure 2). Phase II well construction was similar to Phase I, that is, each well has a screen that extends across the water table and downward into bedrock.

All the wells (Phase I and Phase II) were sampled on October 13 and 14, 1993. In addition, two wells that had been installed by the University prior to Stone & Webster involvement (MW1 and MW2, see Figure 2) were also sampled, for a total of ten wells. A soil vapor sample was also taken from beneath the hypalon liner during this round of sampling. Results of laboratory testing of these samples are presented in Section 6 of this report.

A land survey of the disposal site and surrounding area was conducted during July and August, 1993. Locations and elevations of the ground surface and tops of standpipes for all ten monitoring wells were determined at this time (Figure 2).

Depths to water were measured in all wells on November 18, 1993, in order to determine water-table elevations and ground-water horizontal hydraulic gradients. Results of these measurements are discussed in Section 4 of this report.

3.0 MONITORING WELL INSTALLATION

3.1 Early Installations

The first monitoring wells placed near the site were drilled by Haskell Drilling of Orrington, Maine, during the summer of 1982, and are identified as MW1 and MW2 (Figure 2). These wells were drilled using the cable tool method. Well MW1 was extensively reworked, and PVC well-screen and standpipe installed, on October 15, 1986 (see well log, Appendix 2).

3.2 Phase I Installation

The four Phase I monitoring wells (wells A, B, C, and D) were installed around the site perimeter during the period November 6 to December 18, 1991 by All Terrain Drilling of Greenland, NH, using a mobile B-47 rotary rig with water as a drilling fluid. The wells ranged in depth from 80.5 ft. to 110.1 ft. Monitoring well B was advanced to 60.8 ft. by driving 6 in. casing with a 300 lbs. hammer after cleaning out ahead of the casing with a 5 5/8 in. rollerbit. After refusal at 60.8 ft. a spinning shoe was installed on the 6 in. casing and the hole was advanced utilizing spinning techniques until refusal at 70.0 ft. At 70.0 ft. 4 in. casing with a spinning shoe was telescoped down through the 6 in. casing. The hole was then advanced spinning the 4 in. casing down to bedrock using a 3 5/8 in. rollerbit ahead of the casing.

Monitoring wells A, C, and D were all installed by advancing the hole with a 3 5/8 in. rollerbit and driving 4 in. casing until refusal. After refusal the casing was advanced utilizing spinning techniques. While advancing wells C and D through the till layer, water loss was 100%.

In all of the monitoring wells the holes were advanced through the bedrock using a standard 4 in. H rock core barrel. Drilling was smooth during each core run with rock core recoveries approaching 100%. While coring wells C and D drilling fluid (water) loss was 100%.

To avoid contaminating the wells during installation, the use of petroleum based lubricants was not permitted. The only lubricant used during the installation of the wells was a vegetable oil based lubricant that was used on the 6 in. casing in well B. Water used to wash the cuttings out of the hole was continuously monitored for both volatile organic carbon and Υ radiation.

All material used to install the wells including casing, rods, driving shoes, spinning shoes, and rollerbits were monitored for volatile organic compounds and Υ radiation. All equipment used to develop the wells, including a Watera pump and a teflon bailer, were new, having not been used on other sites.

While drilling, a half barrel and a T-adapter were utilized to recirculate the drilling fluids. This was done to prevent drilling fluid from moving off the site. Any drilling fluid that spilled during the drilling process or circulated to the surface while spinning down the casing was absorbed by the soil in close proximity to the hole. In addition, all fluid that was used to flush the hole before installing the wells was disposed of in close proximity to the hole and also was absorbed by the formation.

Below the water table, 2.0 in. ID, type 304, stainless steel, 10 slot, wire-wound screens were used in all wells with a 2.7 in. stainless steel silt trap. Above the well screen the inner casing consisted first of 10.0 ft. of 2.0 in. ID, type 304, stainless steel, riser pipe. From the top of the stainless steel riser pipe to the top-of-well the inner casing was made of 2.0 in. ID, PVC pipe. A filter pack composed of well-graded filter sand was placed from the bottom of each well to a minimum depth of 10.0 ft. above the well screens. Above the filter pack a 5.0 ft. minimum thickness bentonite seal was installed in each well. Cuttings or filter sand was placed above the bentonite seals to the base of the stand-up guard pipes where an additional bentonite seal was placed. Cuttings or filter sand was then placed on top of the surface seal to permit water to drain out below the stand-up guard pipes. The 5.0 ft. long, 6.25 ft. ID, steel, stand-up guard pipes with locking caps were installed at least 2.3 ft. above ground surface. All four Phase I wells are seated in bedrock.

Depth-to-water measurements were made in all the wells shortly after construction, with values ranging from 72.6 ft. on the north side of the site, to 69.7 ft. on the west. The maximum difference in the elevation of the water table between all four wells was 2.9 ft.

In order to confirm the depth of the water table, monitoring well B was bailed. Approximately 5 gallons of water were removed from the well, drawing down the water level 0.5 ft. to a depth of 76.5 ft. The water level in the well fully recovered in 105 seconds. To further confirm the depth of the water table a daily record was kept of the ground-water levels in the completed wells during the drilling program. Over a period of 21 days, the water level in well B fluctuated 0.15 ft. In well A, over a 7 day period, the depth to the water table fluctuated 0.10 ft., in well D over a 3 day period it fluctuated 0.25 ft. As Well C was completed last, fluctuations could not be measured in this well over a meaningful time period.

While drilling through the till and coring the bedrock in wells C and D, drilling fluid loss was 100%. This, and the rapid recovery noted while bailing well B, indicates high transmissivity of the till medium.

During the monitoring well installation and during the sampling activities an HNu volatile organic compound vapor monitor and a gamma radiation indicator were present on the site at all times. The HNu was calibrated daily and no unusual drift was observed. Background levels with the HNu and the gamma indicator were established each day prior to the commencement of work activities and averaged approximately 0.4 ppm on the HNu and 0.1 mR/h on the gamma indicator. Measurements were taken every 0.5 hour or every 5.0 ft. during rapid advancement of the hole. During prolonged periods of inactivity on the site, measurements were taken less frequently as deemed appropriate. Monitoring with the HNu was performed in the breathing zone, while monitoring with the gamma indicator was performed at waist level. Monitoring with both the HNu and the gamma indicator was also performed at the well head.

Throughout the drilling program there was only one reading on the HNu exceeding the 5 ppm action level. This occurred in well B at 57.5 ft., on 11-8-91 at 0715. After advancing the casing to 59.0 ft., the driller was washing the cuttings at 57.5 ft. when it was noted that the drilling fluid was effervescing. A reading of approximately 20.0 ppm was observed at the wellhead on the HNu at this time, while only background levels were noted in the breathing zone. Background levels were also observed with the gamma indicator in both the breathing zone and at the well head. The drillers were subsequently instructed to move off the site and drilling activities were suspended.

At 0830 Dick Skryness, Larry Picking, and Larry Cohen of Stone & Webster were contacted and it was decided to return to the site and monitor the breathing zone and the well head. Upon returning, the breathing zone and the well head were at background levels on both the HNu and the gamma indicator. At 0920 drilling activities resumed and effervescing was again noted in the drilling fluid. At this point the drillers were instructed to again move off the site and drilling activities were suspended.

At 1000 Dick Skryness and Jim Skrabak were contacted and it was decided to resume drilling and to monitor the breathing zone and the well head every 15 minutes, and avoid skin contact with the drilling fluid. Upon the resumption of drilling, background levels were observed in the breathing zone with both the HNu and the gamma indicator. At the well head, while washing out the cuttings at 59.0 ft., readings on the HNu were observed to be 2.0 ppm at 1050. At 1105 readings of 10.0 ppm were noted. After advancing to 60.8 ft. a reading of 2.0 ppm was noted at 1150. Background levels were observed with the gamma indicator at the well head throughout. At 1215, while monitoring the cuttings from 55.0 ft.-60.0 ft., readings of 20.0+ ppm were noted with the HNu and background levels were observed with the gamma indicator. After casing off the hole to 60.8 ft., no unusual readings were noted on the HNu or the gamma indicator.

The effervescing observed in the drilling fluid plus the absence of elevated (gamma) readings indicates the presence of a naturally occurring gas. The response was detected at 57.5 ft. near the gradational interface between the upper sand and the lower till. Therefore, it could be the result of an organic-rich silt deposit present at this depth, too small to be identified in the drill cuttings. This response also appears to be locally isolated and was not observed in any of the other monitoring wells.

Background levels were observed with the gamma indicator in all borings throughout the drilling program.

3.3 Phase II Installation

The Phase II wells (wells E, F, G and H, Figure 2) were installed from June 30, 1993 through July 21, 1993. The drilling and well construction was performed by The Hydro-Group of Dracut, Massachusetts, using a Barber rig, Model 12/26-400/900, and the air-rotary method. The hole is advanced by a 4 3/4 in. button-type drill bit on rods turning inside a larger diameter (6 in. ID) steel casing, also equipped with a button-type drilling shoe. The hole and the casing are advanced at essentially the same time with air or, if required, an air-water mist, to cool the bits and carry the cuttings from the hole. Cutting samples can be collected for soil/rock analysis from a cyclone separator. This drilling method is very efficient, the only disadvantage is that soil/rock samples represent a composite over an interval of about 5 ft. Determination of strata changes and soil classification are somewhat subjective as a result.

None of the lubricants used on the tools or drill rods was petroleum based. All activities and drill cuttings were monitored for volatile organic compounds and gamma radiation. No readings were detected above background at any time during the work.

Well E was drilled on July 1 to a depth of 81 ft. Bedrock was encountered at a depth of 76 ft. Little groundwater was evident during drilling, but water filled the hole to a depth of 66.2 ft. after the hole was left standing overnight. Subsequent water levels were measured after completing the well with 2 in. ID stainless steel screen and 2 in. ID PVC riser pipe, and the water level appeared to be stable at or near the 66 ft. depth. Well E was developed on July 21 by hand bailing to a clear condition. After bailing the water level returned to static within a minute or two.

Drilling started on well F on July 7 and on the same day reached a total depth of 90.7 ft. Bedrock was encountered at 71 ft. with no indications of any water in the hole. As a result, the boring was advanced another 20 ft., to a total depth of 90.7 ft.

Some water was evident during the deeper rock drilling and the boring was allowed to stand idle overnight. During this period, water levels recovered to a depth of 77 ft. which is below top-of-rock. The well was completed with 25 ft. of 2 in. ID stainless steel screen and 2 in. ID PVC riser pipe. Well F was developed on July 21 by both hand bailing and pumping with a portable, hand operated pump. The discharge was initially very cloudy with brown silt. The well cleaned up somewhat after about 8 gallons were removed but the discharge never became clear. Development was hindered by very slow recovery of water levels after a period of pumping or bailing. Depth to water stabilized at about 76 ft.

Well H was started on July 8 and on July 9 reached a total depth of 87 ft. Ground water was encountered at about 67 ft. and bedrock was at about 81 ft. Flow from the open hole was estimated to be continuous at about 13 gpm, based on water coming from the cyclone and measured using a bucket and watch. Well H was completed with 25 ft. of 2 in. ID stainless steel screen and 2 in. ID PVC riser. The well was developed by bailing and pumping on July 21. Initial flow from the well was gray and totally clouded. Discharge was considerably clearer at the end of development but was still somewhat cloudy. Approximately 115 gallons of water was removed from the well during development. Recovery of the well to its static level was nearly instantaneous.

The final well, well G, was started on July 12 and on July 13 reached a total depth of 88 ft. Bedrock was encountered at a depth of 80 ft. with initial indications of ground water at about 79 ft. The well was completed with 30 ft. of 2 in. ID stainless steel well screen and 2 in. ID PVC riser pipe. The well was developed by bailing on July 21. Removal of 5 gallons of water had little effect on the cloudy condition of the water. Development was hindered by slow water inflow, similar to that of well F, that made it possible to bail the well to near dryness.

The drill rig was demobilized on July 14, 1993. All the wells were developed on July 21, 1993, fulfilling the terms of the drilling contract with The Hydro Group.

The monitoring program for VOCs and gamma radiation revealed no levels above background during the course of the work.

3.4 Monitoring Well Logs

Graphical logs of wells A, B, C, D, E, F, G, and H, based on the Stone & Webster Geologists descriptive field logs, along with the earlier wells MW1 and MW2, are presented in Appendix 2 of this report.

4.0 SITE HYDROGEOLOGY

4.1 Stratigraphy

Surficial deposits in the site area are dated by Thompson and Borns (1989) as late Wisconsinan in age and range in thickness from 70.5 ft. (well F) to 86.2 ft. (well A). These deposits are composed of two unconsolidated units - an upper sand with traces of gravel and boulders, and a lower till, which lies directly on the bedrock unit. These three units are described by the Stone & Webster geologists during the drilling programs, as follows:

Upper Sand

The upper sand with traces of gravel and boulders is an esker deposit and ranges in thickness from 51.5 ft. (well D), to nearly 75 ft. (wells G and H). This unit is composed primarily of interbedded well-graded and poorly graded brown to gray sands with 0-5% nonplastic fines and occasional rounded, fine gravel (to 0.5 in.), cobbles and boulders.

Lower Till

The lower unit is a till that ranges from nonexistent (well F) to 34.2 ft. (well A). This unit is composed of interbedded well-graded and poorly graded gray sands with 0-5% nonplastic fines, and widely graded sandy gravels with 0-5% nonplastic fines. Boulders are abundant throughout the interval.

Bedrock

Bedrock in the area is composed of slates and sandstones of the Silurian Allsbury Formation (Osberg et al., 1989). The Allsbury Formation is part of the Maine Slate Belt, which forms the core of the Kearsarge-Central Maine synclinorium. The Allsbury Formation is dominated by intervals of slate and quartz-rich graywackes (Roy, 1981; Osberg et al., 1989). Fossils contained within the Slate Member of the formation collectively indicate an age in the Silurian between Late Llandoverian to Early Ludlovian and mineral assemblages indicate a low green schist grade of metamorphism (Roy, 1981).

Rock cores retrieved while drilling the Phase I monitoring wells and cuttings retrieved from the Phase II drilling confirm the presence of green to gray slate at the site. The slate was generally found to be moderately fractured to sound with both steeply dipping close, tight, planar, smooth joints along foliation and steeply dipping, close, open, irregular, rough joints at an angle to foliation. Quartz veins are prominent throughout the cores, as are healed joints. Oxidized joints are also present throughout the cores, indicating seepage of oxygenated ground water through the bedrock.

The geologic profile described above plus the depths to ground water noted in Section 2.0 of this report, and later confirmed during sampling of the monitoring wells (Section 5.0), indicate that the esker deposits are unsaturated, and the esker upon which the site is located is not an aquifer. At the site and within the immediate region, ground water in usable quantities occurs only in the uppermost fractured zone of bedrock and in the lowermost zone of the overlying till.

4.2 Hydrodynamics

An indication of directions and rates of ground-water movements can be derived from the Bedrock Surface Map (Figure 3), the Potentiometric Surface Map (Figure 4), and the Hydrogeologic Profile (Figure 5). From the northern-most data points (wells G and H) to about the southern edge of the disposal site (well D), contours of the potentiometric surface reveal a very moderate horizontal hydraulic gradient of about 0.002 and trending to the south. From the southern boundary southward, however, the gradient steepens dramatically to about 0.13, to about well F. From this point southward, to MW1, a "ground-water sink" (Sink) is interpreted. The Sink is an area where the near-region groundwater flows into and is carried eastward. This interpretation is based on the fact that the water level elevation in MW1 is the same as that in well F, precluding further flow in a southerly direction, and the ground water elevations in both F and MW1 are lower than all other reference points to the west (the Smith House well at elevation 171 ft., the nursery pond at about elevation 175 ft.), and to the north, where all the other monitoring well water-level elevations are about ten feet higher. The nearest reference point with a lower elevation and not separated from the Sink by a higher water elevation, is the wetland to the east, across Goulds Ridge Road and beyond the gravel pit, which is at an elevation of about 158 ft. (see Figures 1 and 3).

The likely flow direction for ground water, therefore, is to the south across the disposal site to the Sink, where it mixes with other ground water coming from the west, and is then carried eastward and "daylights" in the wetlands east of Goulds Ridge Road and the gravel pit. Based on this interpretation, ground water at the disposal site must travel at least 2,000 ft. before it is accessible to environmental or human receptors. The only exception to this would be any water supply wells east of the highway and located near the easterly extension of the Sink, with a dynamic (ie., while being pumped) water level at or below about el 160 ft.

The hydraulic gradient throughout the Sink area is small and is in the range of the gradient across the immediate disposal site. Based on water levels in wells F and MW1 at the upper end of the Sink and the elevation of the wetlands at the lower end, and measuring about 2,000 ft.

distance between, an average gradient of 0.003 can be calculated.

4.3 Estimated Ground-Water Seepage rates

The North-South Hydrogeologic Profile (Figure 5) provides insight to the geologic controls on the ground water hydrodynamics in the site vicinity. From north to south, the bedrock surface rises and the water table dips very gently, until the two intersect just south of the disposal site. From this point southward the dip of the water table steepens and the water table continues entirely below top-of-rock.

This change in the dip of the water table can be explained by a probable difference in the hydraulic conductivity of the bedrock as compared to the overlying unconsolidated sands. Using Darcy's Equation:

$$V_d=ki \tag{1}$$

where:

V_d is ground-water discharge velocity
k is the hydraulic conductivity
i is the hydraulic gradient

it can been seen that if V_d is constant, then i must vary inversely to k. Since the water table contours (Figure 4) are neither converging nor diverging in the vicinity of the site, we can assume (based on conservation of mass) that V_d is constant throughout the range of the profile, which means that the changes in i must be caused by changes in k.

Assuming a typically high k of 5E-2 cm/sec (141.7 ft/day) for the till sands between the water table and the bedrock surface directly beneath the disposal site and using equation 1 with a constant V_d, the conductivity (k) of the upper bedrock where it serves as the transmitting media south of the site can be estimated to be about 1E-3 cm/sec (2.83 ft/day). These are reasonable values and conservatively high for these types of geologic media.

A check on the reasonableness of these assumed k values can be made based on the V_d calculated using these k values, the measured gradients, and equation 1. V_d comes out to be about 1E-4 cm/sec (0.28 ft/day). Assuming an average saturated thickness (m) of the sand beneath the disposal site of about 5 ft. (Figure 5) the amount of water (Q) flowing beneath the disposal site per unit of time per unit of profile transverse (ie., normal to) thickness, can be calculated by:

$$Q = mV_d \tag{2}$$

which gives a Q of 1.42 ft^3/day of water per unit foot of profile transverse thickness.

Since this water must originate as infiltrating precipitation, we can calculate the length of recharge section required upgradient from the disposal site to supply water at this rate. Assuming an annual rainfall of 40 inches and assuming a 60% loss due to runoff and evapotranspiration, 3.7E-3 ft^3/day per longitudinal foot of section is entering the profile as ground-water recharge. This indicates that about 400 ft. of upgradient section is needed to supply water at the required Q, which is a reasonable distance based on the location of the disposal site with respect to the local topography.

The seepage velocity (V_s) is the rate of movement of a molecule of water and is related to V_d by:

$$V_s = \frac{V_d}{n} \tag{3}$$

where n is the porosity of the media. Porosity of sandy aquifers is usually about 0.2, whereas porosity of fractured rock is usually very low. If we assume an n of 0.2 for the sandy media beneath the disposal site and an n of 0.01 for the bedrock media south of the site, then V_s beneath the disposal site is about 1.4 ft/day, and V_s through the rock is about 28 ft/day.

Once the ground water reaches the Sink area, its V_s is unknown, as it is not known if the very conductive material causing the Sink is highly fractured bedrock (with a low porosity) or unconsolidated sands and gravels (with a high porosity).

4.4 Estimated Contaminant Transport Rates

Contaminants in ground water rarely move at the V_s rate, due to attenuation caused by adsorption to fine-grained particles within the geologic media. Soil fines obviously exist throughout the media, based on the documented difficulty of developing many of the wells to a clear-water discharge (Section 3). However, they are not present in as great of an abundance as they would be in a clay or soft shale medium. It is reasonable and conservative to assume that contaminants in ground water moving through the sands and jointed bedrock near the disposal site would be attenuated by a factor of at least 2. Based on this assumption, contaminants would be carried through the jointed bedrock south of the disposal site at a rate of 14 ft/day. As the distance from the disposal site to the Sink is about 80 ft., it would take 6 days for contaminants to travel to the Sink from the edge of the disposal site.

As mentioned in Section 4.2, the V_s through the media constituting the Sink cannot be estimated with any degree of accuracy, as it is not known whether it is caused by fractured bedrock or by glacial fill material. However, even if it is bedrock the V_s is certainly less than that through the bedrock between the Sink and the disposal site. If we assume a bedrock media and a V_s through the Sink media of one half of that through the bedrock north of the Sink, then contaminants would move at about 7 ft/day. Estimating approximately 100 ft. distance from the point where contaminants would enter the Sink to the eastern site boundary, the boundary would be reached in 14 days. Adding this value to the travel time through the bedrock north of the Sink, a conservative estimate of travel time from the disposal site to the property boundary would be 20 days. Carrying this reasoning further, the 2,000 ft. to the accessible environment (the wetlands east of the gravel pit) from the disposal site would take about 286 days.

On the other hand, if the Sink is caused by glacial sands and gravels, which are typically much more porous than fractured bedrock, then travel times would by at least one order-of-magnitude more than those estimated above, or 146 days to the property boundary and 2,800 days to the accessible environment.

In summary, an estimate of travel time from the disposal site to the property boundary would be from 20 to 146 days, and an estimate of travel time from the disposal site to the accessible environment would be from 286 days to 2,800 days.

4.4 Attenuation

Potential contaminants known to exist in the landfill in bulk are primarily organic compounds such as dioxane and toluene, and are susceptible to biodegradation to CO_2. Toluene, the most abundant potential contaminant, is known to exist in 5 gallon canisters. As toluene is a principal component of petroleum based fuels, a considerable amount of data is available with regard to its behavior in ground water. Toluene is known to be especially susceptible to bioattenuation by both aerobic and anaerobic bacteria, with degradation half-lives of about 50 days. The solubility limit for toluene in water is 500 mg/l. The EPA drinking water standard (proposed, 1985) is 2.0 mg/l. Assuming a half-life of 50 days, a 500 mg/l concentration would degrade to drinking water standards in 320 days. It is therefore very likely that a maximum release of toluene from the disposal site would not reach the wetlands in a concentration above drinking water standards. In the more likely event of a release less than the solubility limit, toluene content of the ground water would likely be so low by the time it reached the wetlands that it would be below the detection limit.

5.0 SAMPLING

5.1 Sampling Protocol

Two rounds of sampling have been conducted at the disposal site by Stone & Webster personnel to-date, one on May 7 & 8, 1992 after placement of the Phase I wells A, B, C, and D; and again on October 12, 13, and 14, 1993, after installation of the Phase II wells E, F, G, and H.

Samples were taken for laboratory testing and static water depths were measured in the wells. An additional set of water depth measurements were taken on November 18, 1993. The November data were used to construct the Potentiometric Surface Map of Figure 4.

5.1.1 Ground-Water Sampling

The objective of the ground-water sampling was to obtain samples from the monitoring wells for analysis of ground water volatile organic content and radioactivity.

Prior to sampling, the wells were monitored at the wellhead and in the breathing zone for vapors and gases using an HNu volatile organic compound detector. In addition, the wellhead and immediate area approximately 4 ft. above the ground surface (waist level) was monitored for gamma radiation with a gamma detector.

After checking for vapors and gases, the depth to water was measured using a decontaminated water level indicator. The decontamination procedure for the water level indicator was as follows: Wipe the water level indicator dry with a paper towel. After the water level indicator is dry, thoroughly rinse it with deionized water and again wipe dry.

While determining the depth to water, the probe was not lowered below the water surface any further than necessary, and the depth was determined with as little physical disturbance to the water in the well as possible.

Sampling was performed using sampling kits prepared in advance and supplied by the analytical laboratory. A dedicated one-liter, transparent teflon bailer was used to purge and sample each well. The bailer was decontaminated at the factory and sealed in a protective cover. The bailer was equipped with polyethylene line.

An initial sample was obtained from the well using the bailer by gently lowering the bailer down the well until contact with the well fluid was made. The bailer was lowered approximately one-half its length and retrieved. The purpose of the initial bail was to capture any immiscible, lighter-than-water fluids that may have been floating at the ground-water surface for visual identification.

The next step in the sampling procedure was to evacuate the standing water inside the well casing. The depth from the top of the casing to the bottom of the well (total depth of the well) was measured, and the height and volume of the standing water was determined. A minimum of 1 well volume was removed, using the dedicated purging bailer.

After purging, the well was not disturbed for a period of time to allow settling of fines from the uppermost portion of the water column.

Fluid from the initial bail after purging was used to prepare samples for laboratory analysis of volatile organic compounds. The remaining sample jars were then filled for transport to the laboratory.

Field sampling techniques for radionuclides were in accordance with EPA 901.1 for Gamma Spectralanalysis and EPA 900.0 for Gross Alpha and Gross Beta. These each require 1 liter of fluid sample in a plastic container. Field sampling techniques for volatile organic compounds were in accordance with SW846 Series for Method 624. This requires two 40 ml VOA septum vials with zero head space.

Two quality control (1 duplicate sample and 1 equipment blank) were collected for laboratory analysis. A duplicate sample is a repeat sample taken from an identified well and is used to determine laboratory/sampling precision (repeatability of results). An equipment blank is a sample prepared by using the same sampling equipment as was used to sample the wells (ie, the sampling bailer) to obtain a sample of distilled water transported to the wellhead vicinity by the sampling team from an off site commercial source. The equipment blank is prepared, containerized, preserved, shipped to the laboratory and otherwise treated in the same manner as the ground-water samples, and analyzed at the laboratory with the ground-water samples. Any contaminant detected in both a ground-water sample and an equipment-blank sample in more-or-less similar concentrations would be suspected of having been introduced by the sampling/preparation/shipping/testing procedures, rather than occurring as an actual contaminant in the ground-water.

For shipment, sample containers were packed in insulated coolers containing ice and foam packing material. Shipment to the laboratory was by a commercial over-night delivery service.

5.1.2 Soil Gas Sampling

The objective of this task was to sample and measure volatile organic gases that may be present in the soil underlying the landfill cover.

One soil gas sample was obtained beneath the impervious cover of the disposal site. Another sample was collected outside the disposal site area prior to penetrating the hypalon liner and was used as an equipment blank.

Prior to collecting the soil gas sample, the breathing area was monitored for vapors and gases using an HNu volatile organic compound detector. In addition, the area approximately 4 ft. above the ground surface was monitored for gamma radiation.

The soil gas sampling location was prepared by removing approximately 6 in. of sand that covers the hypalon liner. A small incision was made to insert a plastic tube below the hypalon. The tube was sealed to the liner with duct tape. A battery operated vacuum pump with built in flowmeter extracted soil gas from beneath the liner through a glass tube. Any organic gas present would be adsorbed onto the material inside the glass tube. The organic gases can be desorbed and quantified by the laboratory. The flow rate on the pump was set at 2.2 l/min and monitored periodically. The pump was operated for 1 hour. HNu readings were taken immediately after penetrating the cover and during the sample collection. Area radiation measurements were taken during the sampling period. No levels above off site background were detected. After sampling, the hypalon liner was sealed with several layers of duct tape and covered with sand. The sample location was marked with a stack of cobbles for future reference. The gas samples were labeled, packed and shipped with the ground-water samples for overnight delivery to the laboratory for analysis.

6.0 ANALYTICAL RESULTS

6.1 Phase I Results

Laboratory analysis of the samples collected during Phase I was performed by Controls for Environmental Pollution (CEP) located in Santa Fe, New Mexico.

The test results indicated that no man-made gamma emitting isotopes and no gross alpha or beta activity were present in the ground water collected from Wells A,B,C,and D during the Phase I sampling. A very low concentration of alpha and beta activity was initially detected in Wells C and D, the two wells that were noticeably turbid when sampled. Upon instructions from Stone & Webster, the laboratory filtered the remaining sample water from Well C and Well D. Filtering the sample water significantly reduces the concentration of suspended solids and the naturally occurring radioactivity that is present in soil particles that constitute the suspended solids. Gross alpha and beta analysis performed on the filter residue and the filtered water (filtrate) show that all detectible alpha and beta activity is removed by filtration. The analysis of filtered and unfiltered ground-water samples indicate that ground water at the site contained no measurable levels of alpha or beta radioactivity and the activity detected initially can be attributed to natural radioactivity from suspended soil particle in the turbid water. Laboratory analyses for radioactivity are summarized on Table 1.

The results of the organic analysis are shown on Table 2. Trace concentrations of methylene chloride were reported in all samples including the equipment blank. Trace concentrations of chloroform were detected in Well B (DUP), WELL D and in the equipment blank. The presence of these two analytes in the equipment blank at essentially the same concentrations as reported in the wells, (refer to Section 5 for a description of the equipment blank) suggests the source of these analytes as being other than the ground water. All other analytes, including toluene, are reported as non-detected.

6.2 Phase II Results

Analysis of the samples collected during Phase II was performed by the same laboratory that analyzed the Phase I samples (CEP).

The Phase II test results indicated that no man-made gamma emitting isotopes were present in any of the samples except for an indication of a small amount (42 ± 19 pCi/l) of Cobalt 60 detected in the sample from well H. Two retestings of the well H sample revealed no detectible Cobalt 60, indicating an initial false positive. Some gross alpha and gross beta activity were present in the ground water collected from all the wells during the Phase II sampling except for well MW1 which indicated no alpha activity. Most of the results indicated activity at a very low rate (Table 3). Most of the samples were noticeably turbid when taken. Upon instructions from Stone & Webster, the laboratory filtered the remaining sample water from wells B, C, D, and MW2. Filtering the sample water significantly reduces the concentration of suspended solids and the naturally occurring radioactivity that is present in soil minerals that constitute the suspended solids. Gross alpha and beta analysis performed on the filter residue and the filtered water (filtrate) show that most detectible alpha and all beta activity is removed by filtration. The analysis of filtered and unfiltered ground-water samples indicate that ground water at the site contained no measurable levels of alpha or beta radioactivity and the activity detected initially can be attributed to natural radioactivity from suspended soil minerals in the water. Phase II laboratory analysis for radioactivity are summarized on Table 3.

The results of the Phase II organic analyses are shown on Table 4. Trace concentrations of methylene chloride were reported in the sample from well H and measurable amounts were reported in the soil gas sample from beneath the hypalon liner. The methylene chloride was attributed to analytical contamination by the laboratory (see Appendix 3). Trace concentrations of chloroform were detected in wells A, B, and D and in the soil gas sample from beneath the hypalon. Unlike the Phase I results, no chloroform was detected in the equipment blank. The detection of chloroform in the Phase I equipment blank suggests that chloroform is introduced at the laboratory, but the presence of trace amounts of chloroform in the ground water and in the vadose zone voids at the disposal site cannot be definitely ruled out. All other analytes, including toluene, are reported as non-detected.

7.0 CONCLUSIONS

Results of the hydrogeological investigations in the vicinity of the Greenbush Disposal Facility indicate that the most likely pathway to the accessible environment, for any potential contaminant originating at the disposal site, would be eastward to the wetlands east of Goulds Ridge Road and the gravel pit, a distance of about 2,000 ft. Conservatively assuming that most of the migration would be in highly permeable bedrock with a low porosity, results in an estimated travel time from the disposal site to the wetland of about 286 days.

It is very unlikely that any existing water supply wells or any surface water bodies north, west, or south of the disposal site could ever be threatened by potential contaminants originating from the disposal site, as these areas are all upgradient from the disposal site.

A release of contaminant from the disposal site is likely to reach the ground water at a slow rate, considering the following factors:

- Liquid contaminants are in small containers (5 gal. and smaller, see Appendix I). It is unlikely that many containers would fail at the same time. Therefore, releases at any given time will be small.

- Radioactive components are small in quantity, many have short half-lives, most had already decayed to low or background levels by the time they were buried, and those that had not were encased in bronze or foil.

- Potential contaminants must pass vertically downward through at least 50 feet of unsaturated soil before reaching the ground-water table. It is likely that most releases would be entirely absorbed by the pore spaces within the unsaturated zone.

- The hypalon cap over the disposal site will continue to inhibit infiltration of meteoric waters into and through the contents, which will in turn inhibit vertical migration of potential contaminants from the disposal site to the water table.

A slow release of potential contaminants, combined with a moderate volume of ground water flowing beneath the disposal site (Q of 1.42 ft^3/day per unit profile thickness) would result in contamination at low levels. As contaminant concentrations would be attenuated further during migration, it is unlikely that any contaminant would reach the accessible environment in detectable quantities.

To date, testing of ground water from the ten monitoring wells surrounding the disposal site and soil gas from beneath the hypalon cap has not detected contaminants that can be attributed to the contents of the disposal site. It is suspected that the chloroform persistently reported in some of the samples is introduced at the laboratory, but the possibility exists that chloroform may have been disposed of at the site and was not documented. As chloroform is very volatile it would be expected to dissipate into the vadose zone within short distances down gradient from the disposal site, if indeed it does exist.

8.0 RECOMMENDATIONS

Since the risk to human health and the environment posed by the Greenbush Disposal Facility is minimal, Stone & Webster does not believe that exhumation of the waste or other remedial measures are justified, in light of present-day available technologies. Instead, Stone & Webster recommends that a program of continuous caretaking and monitoring be initiated, and an action plan developed that would be followed by the University in the event that significant ground-water contamination is detected by the monitoring activities. The program should contain the following elements:

8.1 Caretaking

8.1.1 Security

Measures should continue to be taken to discourage access to the immediate facility by humans and wildlife. This will protect the integrity of the hypalon and soil cap and will minimize the risk of false test positives due to human activity. As a minimum, the existing wire fence surrounding the facility should be repaired and maintained. The University should consider replacing the wire fence with a 7 ft. high chain-link fence with a locking gate. This would enhance the appearance of the facility, would protect against larger borrowing animals, and would eliminate the need to climb over the existing fence for sampling and brush clearing activities. Warning signs should be placed and maintained on the four sides of the facility.

A locking gate should be constructed across the access road at the property boundary, and a sign placed and maintained that identifies the area as University property.

8.1.2 Maintenance

Fences and gates should be maintained and repaired as needed. Monitoring well guardpipes and caps should be periodically repainted with a rust inhibiting paint. The wells should be sounded at least once a year and sediments removed from the well bottoms when required.

8.1.3 Grounds Keeping

A buffer of trees and brush should be maintained between Goulds Ridge Road and the facility to reduce visibility and discourage public access. On a yearly basis, vegetation larger than grass and low ground cover should be cleared from the soil immediately overlying the hypalon cap. Vegetation larger than grass and small brush should be discouraged outside the fence to a distance of at least 6 feet in order to prevent root damage to the hypalon cap and soil.

8.2 Monitoring

A Monitoring Protocol should be prepared that documents the procedures for sampling, testing, test results verification, and quality control activities that will be performed to monitor the facility. A framework for the protocol is as follows:

8.2.1 Every Three Months:

Once every three months the following activities should be undertaken:

- Depth-to-water should be measured in the ten monitoring wells and in the Smith House well. The readings should be reduced to elevations and maintained in a Project file or database.

- A soil gas sample should be taken from beneath the hypalon cap, together with a background (atmospheric) sample. The gas samples should be analyzed for volatile and semi-volatile organic compounds.

- Water samples should be taken from one upgradient monitoring well and one downgradient monitoring well. The samples should be analyzed for volatile and semivolatile organic compounds, Gross Alpha, Gross Beta, and Gamma Spectralanalysis.

8.2.2 Every Nine Months:

In addition to those activities undertaken every three months, the remaining monitoring wells should be sampled and the samples tested every nine months, so that the ground water in all ten wells are assessed for volatile and semivolatile organic compounds, Gross Alpha, Gross Beta, and Gamma Spectralanalysis on a nine month basis.

8.2.3 Every Two Years:

On a biannual basis, an in-depth review should be made of all of the monitoring data collected to-date, and the basic assumptions upon which the recommendations in this Section are based should be reassessed. The Monitoring Protocol should be updated to reflect changes in the assumptions as well as changes in regulations and technology. Construction and cultural developments on properties in the vicinity of the site should be reassessed, especially in the downgradient areas east of Goulds Ridge Road.

A comprehensive report should be prepared that summarizes the monitoring and evaluation results, documenting any changes in the Monitoring Protocol and the reasons for those changes.

8.3 Action Plan

An Action Plan should be prepared that documents in advance the activities that will be taken by the University in the event that the monitoring program detects significant amounts of contaminants that are reasonably attributable to the Facility. The Action Plan should be a brief document stating the minimum concentration levels (MCLs) of contaminants that will trigger activities to protect human health and the environment. MCLs should be based on current drinking water standards in effect for the area at the time of testing. The Action Plan should identify:

- Regulatory Agencies to be notified.

- Citizen Groups to be notified (ie; the Greenbush Committee).

- Actions to be taken to reassess risk, to more closely monitor, and/or to correct the problem.

The Action Plan should be reviewed and updated every two years in light of the latest monitoring results, cultural changes in the vicinity of the site, and agency regulations.

8.4 Archiving

Field notes, laboratory test results, depth-to-water measurements, and the biannual reports, should be archived and maintained by the University for 25 years. After 25 years an assessment should be made by the University, the Community of Greenbush, and appropriate regulatory agencies, as to the need to maintain the data for a longer time period.

9.0 REFERENCES

Osberg, P.H., A.M. Hussey, II, G.M. Boone, editors, 1985. Bedrock Geologic Map of Maine, Dept. of Conservation, Maine Geological Survey, Augusta, ME., Scale 1:500,000.

Roy, D.C., 1981. Reconnaissance Bedrock Geology of the Sherman, Mattawamkeag, and Millinocket 15' Quadrangles, Maine, Open-File Report 81-46, Dept. of Conservation, Maine Geological Survey, Augusta, ME., 18 p.

Thompson, W.B. and H.W. Borns, Jr., editors, 1985. Surficial Geologic Map of Maine, Dept. of Conservation, Maine Geological Survey, Augusta, ME., Scale 1:500,000.

U.S. Geological Survey, 1988. Passadumkeag 15' Quadrangle, Maine-Penobscot Co., 7.5 Minute Series, Topographic Map, Dept. of the Interior, U.S. Geological Survey, Reston, VA., Scale 1:24,000.

Table 1. Phase I Laboratory Analyses-Radioactivity

SAMPLE No.	01B	02B	03B	04B	05B	06B
WELL	A	B	B (DUP)	C	D	A (BLANK)
PHYSICAL DESCRIPTION	CLEAR	CLEAR	CLEAR	TURBID	TURBID	CLEAR
GROSS ALPHA (pCi/l)	<2	<2	<2	14±6	13±6	<2
GROSS BETA (pCi/l)	<3	<3	<3	38±6	38±6	<3
GAMMA SPEC (pCi/l)	ND	ND	ND	ND	ND	ND
SUSPENDED SOLIDS (mg/l)	(-)	(-)	(-)	1.0060	1.2880	(-)
FILTER GROSS ALPHA ACTIVITY[1] (pCi/gm)	(-)	(-)	(-)	1.25±0.580	1.71±0.69	(-)
FILTER GROSS BETA ACTIVITY[1] (pCi/gm)	(-)	(-)	(-)	2.39±0.74	4.46±0.83	(-)
FILTRATE GROSS ALPHA ACTIVITY (pCi/l)	(-)	(-)	(-)	<2	<2	(-)
FILTRATE GROSS BETA ACTIVITY (pCi/l)	(-)	(-)	(-)	<3	<3	(-)

1. Activity on filter does not equate to original activity probably due to attempting to measure activities in the lower end of the quantification limit, decay, filter interference or a combination thereof.

(-) No analysis performed

ND No man-made nuclides detected

Table 2. Phase I Laboratory Analyses-Organics

SAMPLE No.	01B	02B	03B	04B	05B	06B
WELL	A	B	B (DUP)	C	D	A (BLANK)
PHYSICAL DESCRIPTION	CLEAR	CLEAR	CLEAR	TURBID	TURBID	CLEAR
Chloromethane	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Methylene Chloride	3.6	3.2	3.0	3.0	3.8	3.6
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	3.7	ND	3.5	3.5
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
Trichlorofloromethane	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Trichlorethene	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Tetrachlorethene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND

Chlorobenzene	ND	ND	ND	ND	ND	ND
Ethyl Benzene	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND

ND Below the quanitification limit

Table 3. Phase II Laboratory Analyses-Radioactivity

SAMPLE No.	01B	02B	03B	04B	05B	06B
WELL	A	B	C	D	E	F
PHYSICAL DESCRIPTION	CLEAR	CLEAR	CLEAR	TURBID	CLEAR	CLEAR
GROSS ALPHA	12±4	19±6	15±6	51±16	3±2	<2
GROSS BETA (pCi/l)	19±4	27±8	20±7	124±19	17±4	9±4
GAMMA SPEC (pCi/l)	ND	ND	ND	ND	ND	ND
SUSPENDED SOLIDS (mg/l)	(-)	10	20	311	(-)	(-)
FILTER GROSS ALPHA ACTIVITY[1] (pCi/gm)	(-)	45±6	31±6	107±13	(-)	(-)
FILTER GROSS BETA ACTIVITY[1] (pCi/gm)	(-)	8±3	4±3	<3	(-)	(-)
FILTRATE GROSS ALPHA ACTIVITY (pCi/l)	(-)	14±4	6±3	3±2	(-)	(-)
FILTRATE GROSS BETA ACTIVITY (pCi/l)	(-)	8±3	4±3	<3	(-)	(-)

1 Activity on filter may not equate to original activity due to attempting to measure activities in the lower end of the quantification limit, decay, filter interference or a combination thereof.

(-) No analysis performed

ND No man-made nuclides detected

Table 3 (cont'd). Phase II Laboratory Analyses-Radioactivity

SAMPLE No.	07B	08B	09B	10B	11B	12B
WELL	G	H	MW-1	MW-2	A (BLANK)	B (DUP)
PHYSICAL DESCRIPTION	CLEAR	CLEAR	CLEAR	TURBID		CLEAR
GROSS ALPHA (pCi/l)	3±2	10±4	<2	8±10	<2	15±6
GROSS BETA (pCi/l)	6±3	31±5	12±4	11±13	<2	38±8
GAMMA SPEC (pCi/l)	ND	ND*	ND	ND	ND	ND
SUSPENDED SOLIDS (mg/l)	(-)	(-)	(-)	106	(-)	(-)
FILTER GROSS ALPHA ACTIVITY[1] (pCi/gm)	(-)	(-)	(-)	33±6	(-)	(-)
FILTER GROSS BETA ACTIVITY[1] (pCi/gm)	(-)	(-)	(-)	<3	(-)	(-)
FILTRATE GROSS ALPHA ACTIVITY (pCi/l)	(-)	(-)	(-)	<2	(-)	(-)
FILTRATE GROSS BETA ACTIVITY (pCi/l)	(-)	(-)	(-)	<3	(-)	(-)

1. Activity on filter does not equate to original activity probably due to attempting to measure activities in the lower end of the quantification limit, decay, filter interference or a combination thereof.

(-) No analysis performed

ND No man-made nuclides detected

* Original detection of Cobalt 60 was not detected in two retests, laboratory reported false positive.

Table 4. Phase II Laboratory Analyses-Organics

SAMPLE No.	01B	02B	03B	04B	05B	06B
WELL	A	B	C	D	E	F
PHYSICAL DESCRIPTION	CLEAR	CLEAR	CLEAR	TURBID	TURBID	CLEAR
Chloromethane	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Chloroform	1.8	3.5	ND	3.7	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
Trichlorofloromethane	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Trichlorethene	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Tetrachlorethene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND

Chlorobenzene	ND	ND	ND	ND	ND	ND
Ethyl Benzene	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND

ND Below the quanitification limit

Table 4 (cont'd). Phase II Laboratory Analyses-Organics

SAMPLE No.	07B	08B	09B	10B	11B	12B
WELL	G	H	MW-1	MW-2	A BLANK	B (DUP)
PHYSICAL DESCRIPTION	CLEAR	CLEAR	CLEAR	TURBID	TURBID	CLEAR
Chloromethane	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	2.9	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	3.9
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
Trichlorofloromethane	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Trichlorethene	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Tetrachlorethene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND

Chlorobenzene	ND	ND	ND	ND	ND	ND
Ethyl Benzene	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND

ND Below the quanitification limit

APPENDIX 1

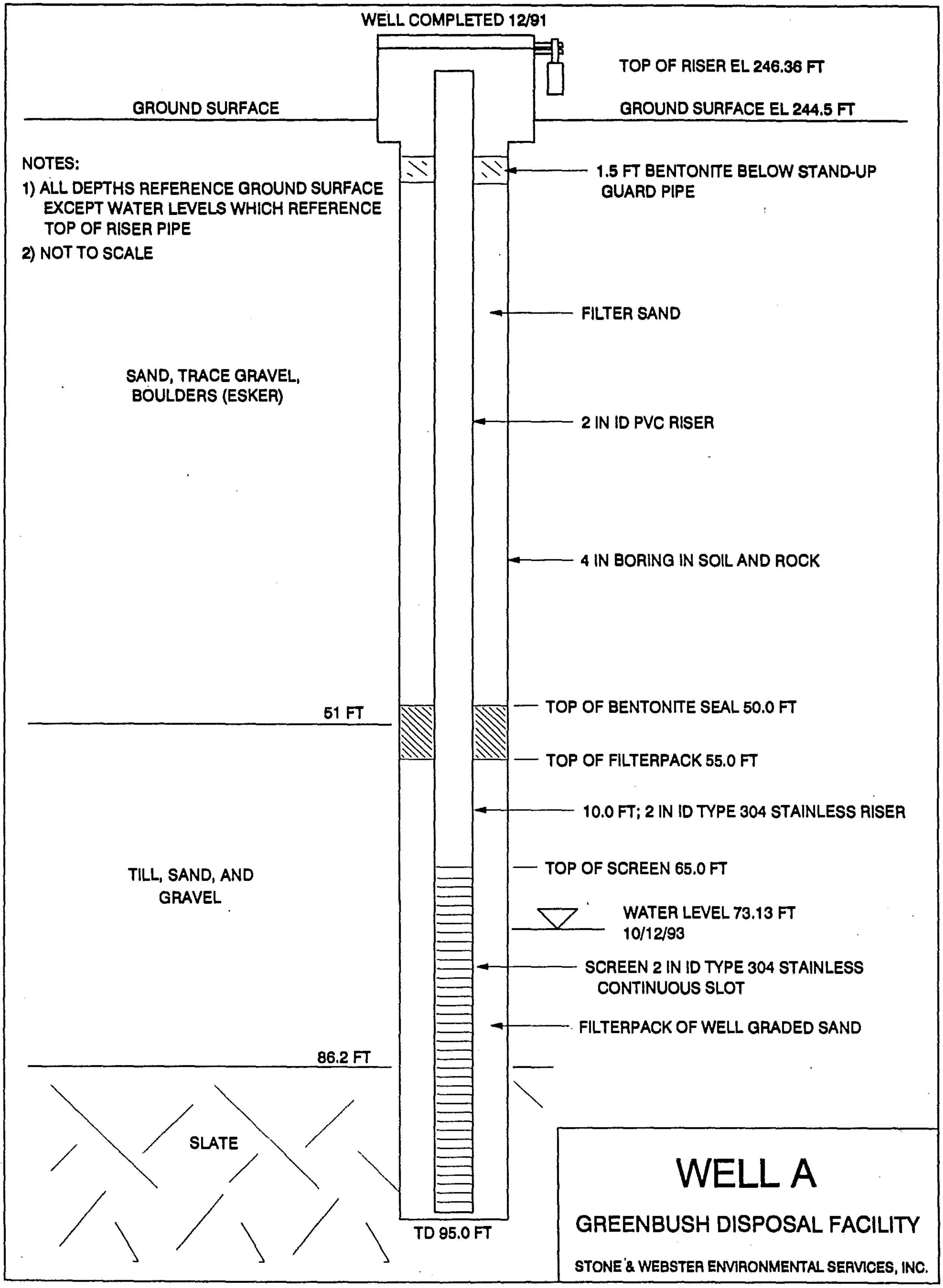
INVENTORY OF THE GREENBUSH FACILITY

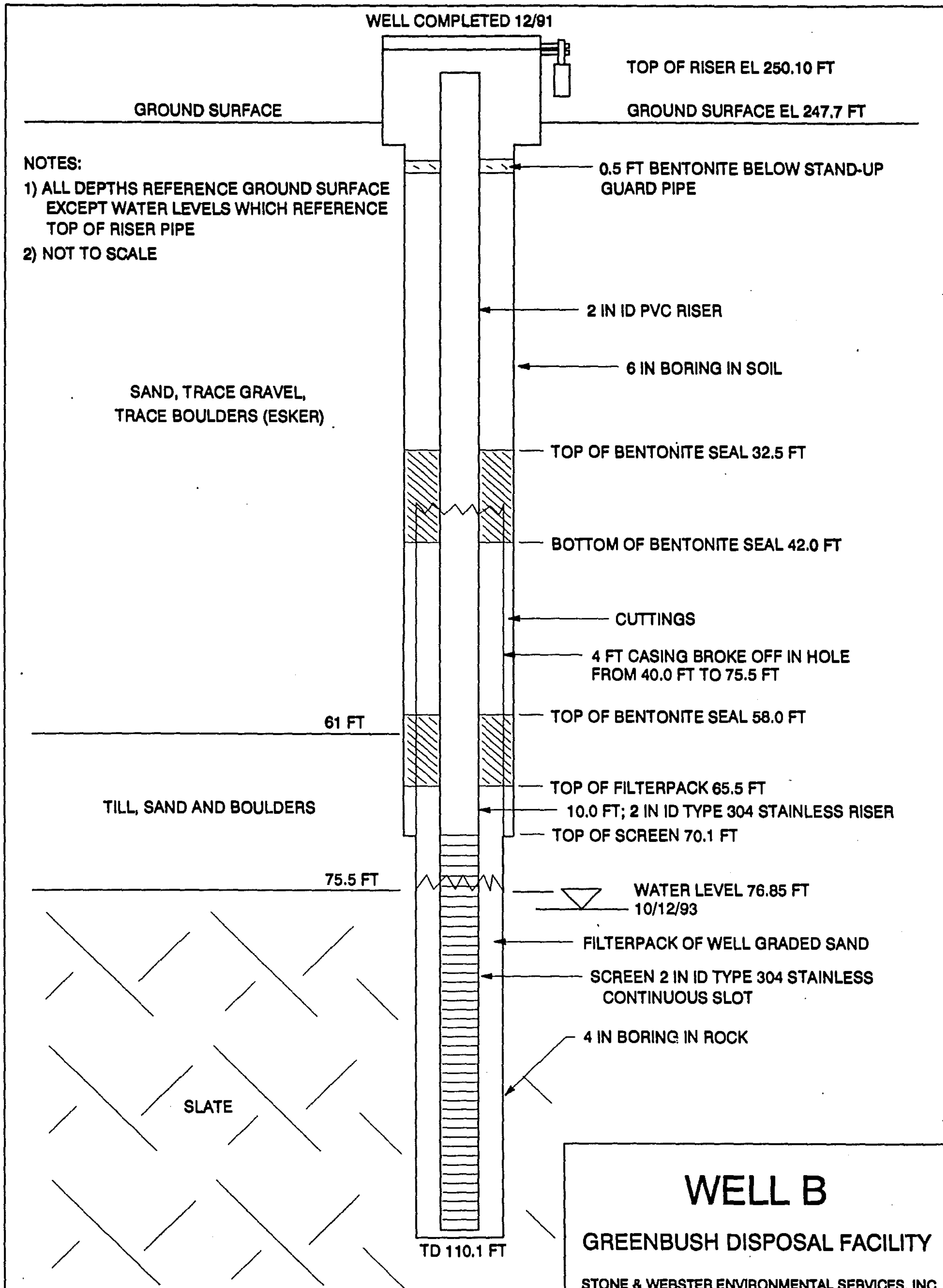
Documented Contents of the Greenbush Disposal Facility[a]

	Item		Level	Comments
1.	Scintillation Waste[b]			Long half-lives but at low levels.
	a.	Radium-Beryllium[c]	several	Sealed in bronze casks about the size of a 500gm balance weight.
	b.	Tritium	22.25 mCi	Sealed in foil.
	c.	H-3 (Sealed Source)	754.16 mCi	
	d.	Carbon 14	79.596 mCi	
	e.	Hydrogen	22 mCi	Dissolved in Toluene
	f.	Carbon	80 mCi	Dissolved on Toluene
	g.	Lead 210	0.001 mCi	
	h.	Cobalt 60	0.165 mCi	
	i.	Cesium 134	0.655 mCi	
2.	Toluene[d]		± 200 gal	Volatile organic solvent, slightly soluble in water.
3.	Triton-X-100 (Polyethylene glycol)		± 100 gal	Water soluble, low toxicity. Increases solubility of Toluene.
4.	Propylene Glycol		Small amounts	Miscible with water, nontoxic
5.	Ethylene Glycol		Small amounts	Miscible with water, antifreeze.
6.	Dioxane		< 50 gal	Solvent, soluble in water, consists of paradioxane as solvent with naphthalene, methanol, & ethylene glycol.
7.	Methanol		< 50 gal	Miscible in water.
8.	Naphthalene		Small amounts	Insoluble in water.
9.	Xylene		Small amounts	Insoluble in water

APPENDIX 2

MONITORING WELL LOGS

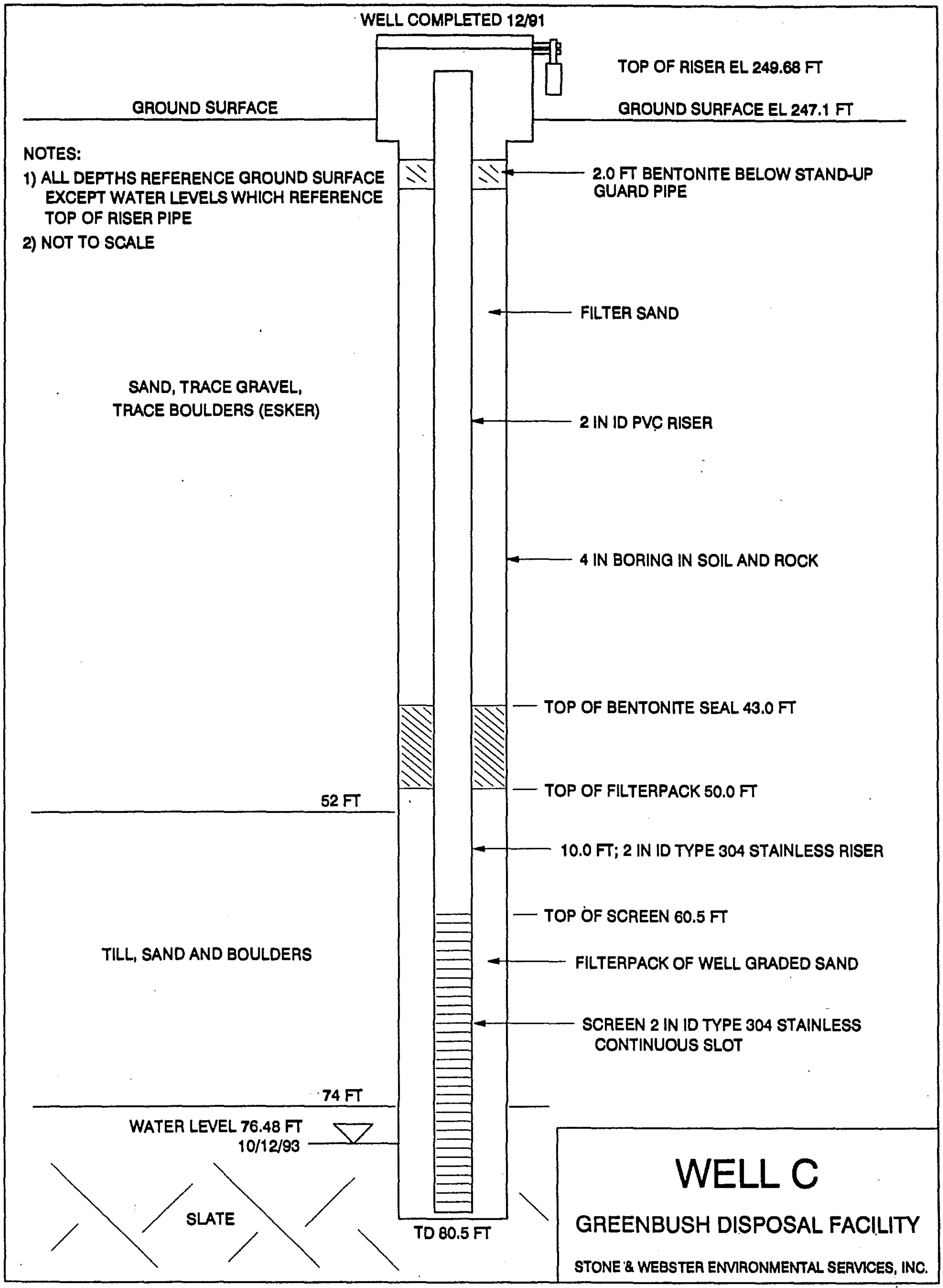

WELL COMPLETED 12/91
TOP OF RISER EL 246.36 FT
GROUND SURFACE
GROUND SURFACE EL 244.5 FT
NOTES:
1) ALL DEPTHS REFERENCE GROUND SURFACE EXCEPT WATER LEVELS WHICH REFERENCE TOP OF RISER PIPE
2) NOT TO SCALE
1.5 FT BENTONITE BELOW STAND-UP GUARD PIPE
FILTER SAND
SAND, TRACE GRAVEL, BOULDERS (ESKER)
2 IN ID PVC RISER
4 IN BORING IN SOIL AND ROCK
51 FT
TOP OF BENTONITE SEAL 50.0 FT
TOP OF FILTERPACK 55.0 FT
10.0 FT; 2 IN ID TYPE 304 STAINLESS RISER
TILL, SAND, AND GRAVEL
TOP OF SCREEN 65.0 FT
WATER LEVEL 73.13 FT 10/12/93
SCREEN 2 IN ID TYPE 304 STAINLESS CONTINUOUS SLOT
FILTERPACK OF WELL GRADED SAND
86.2 FT
SLATE
TD 95.0 FT
WELL A
GREENBUSH DISPOSAL FACILITY
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.



WELL B

GREENBUSH DISPOSAL FACILITY

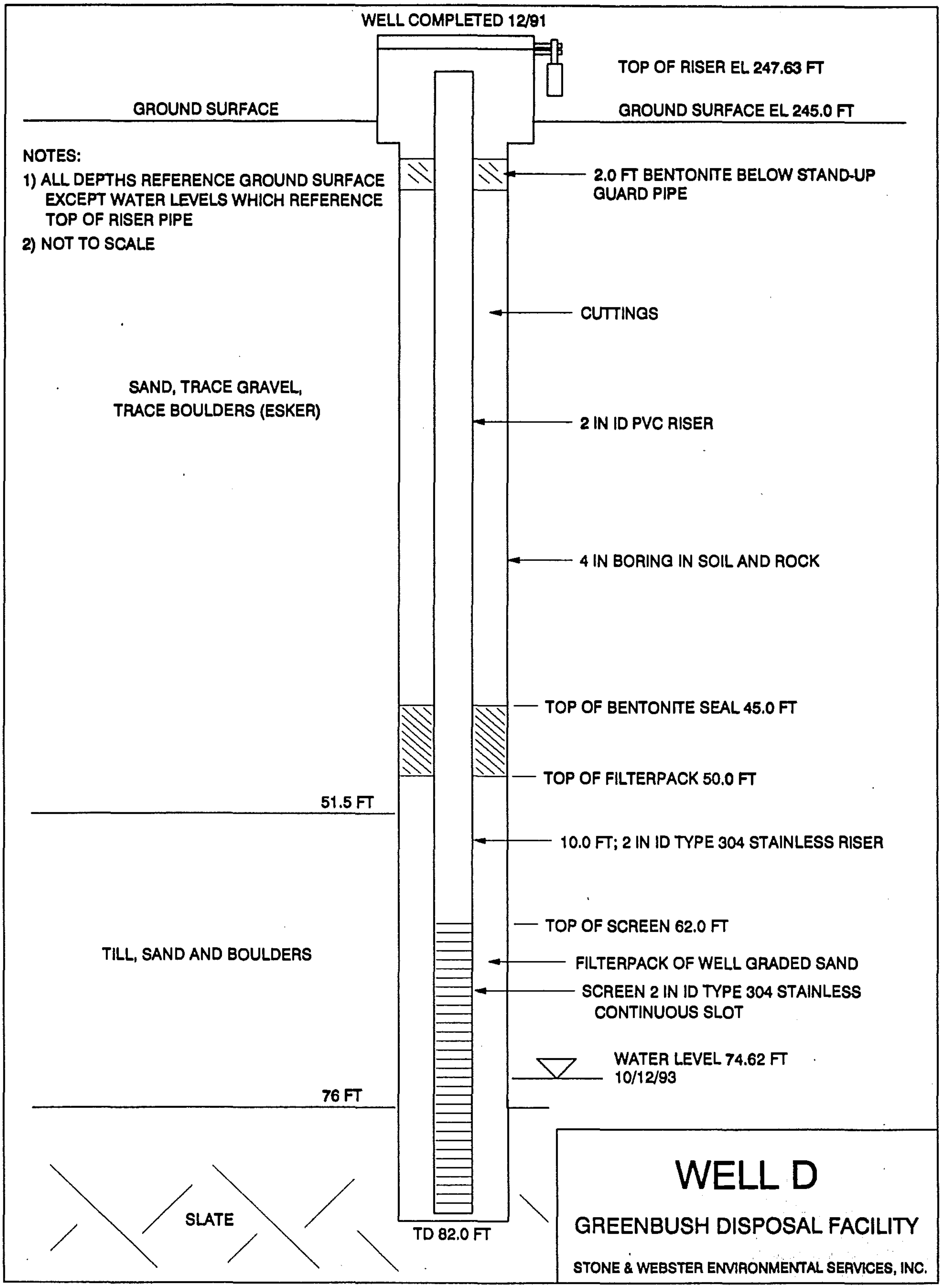
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.



WELL C

GREENBUSH DISPOSAL FACILITY

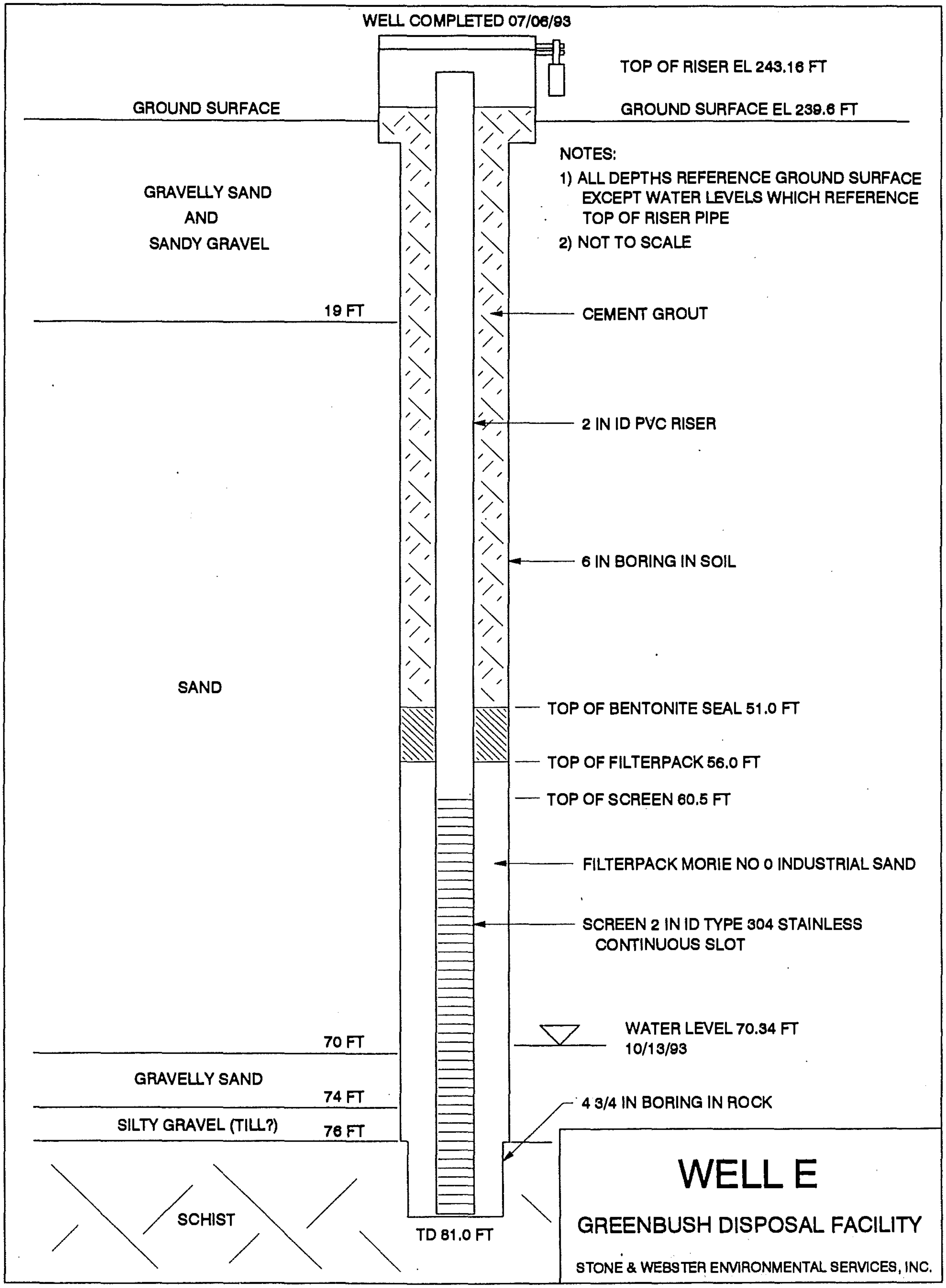
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.



WELL D

GREENBUSH DISPOSAL FACILITY

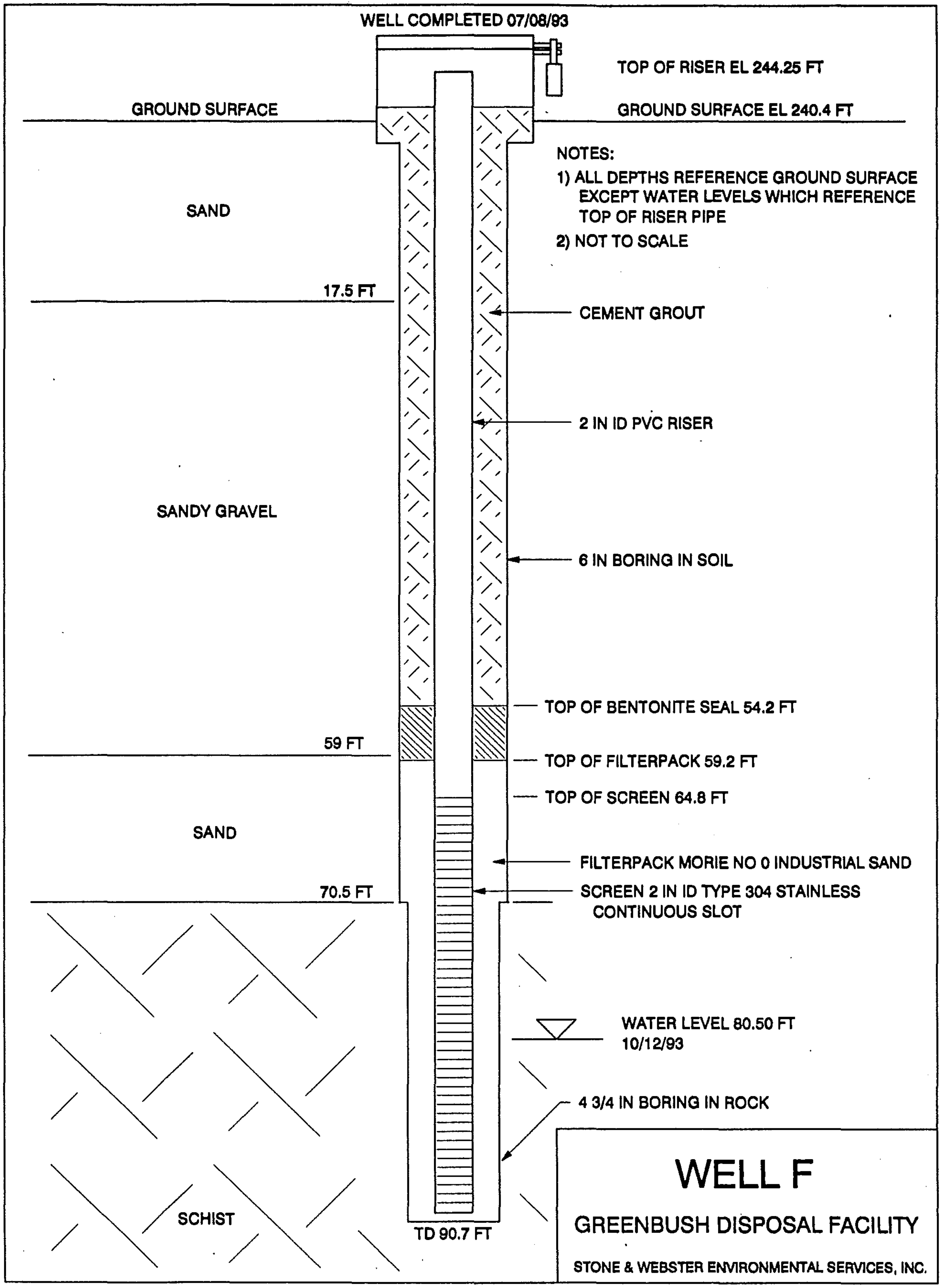
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.



WELL E

GREENBUSH DISPOSAL FACILITY

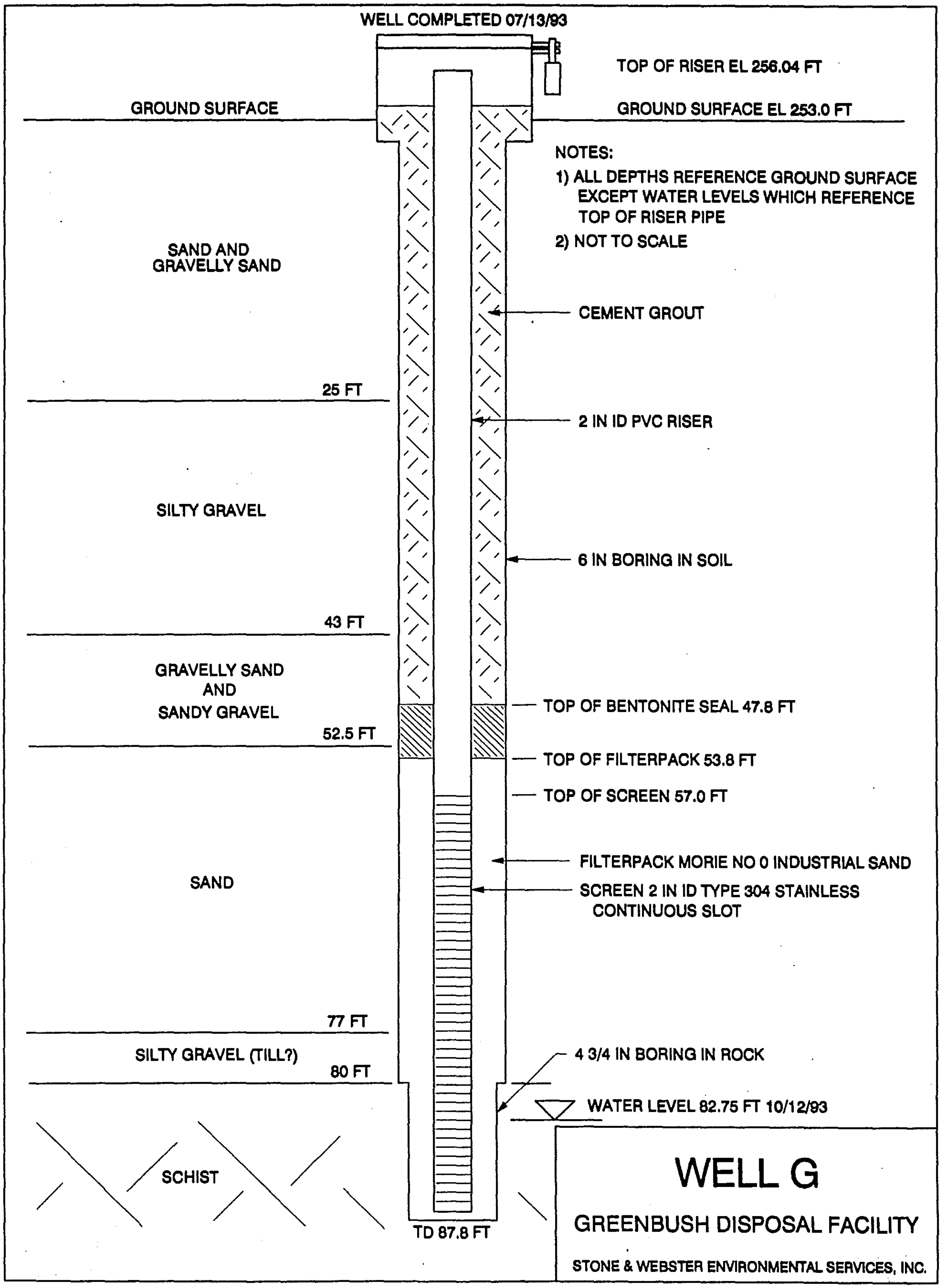
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.



WELL F

GREENBUSH DISPOSAL FACILITY

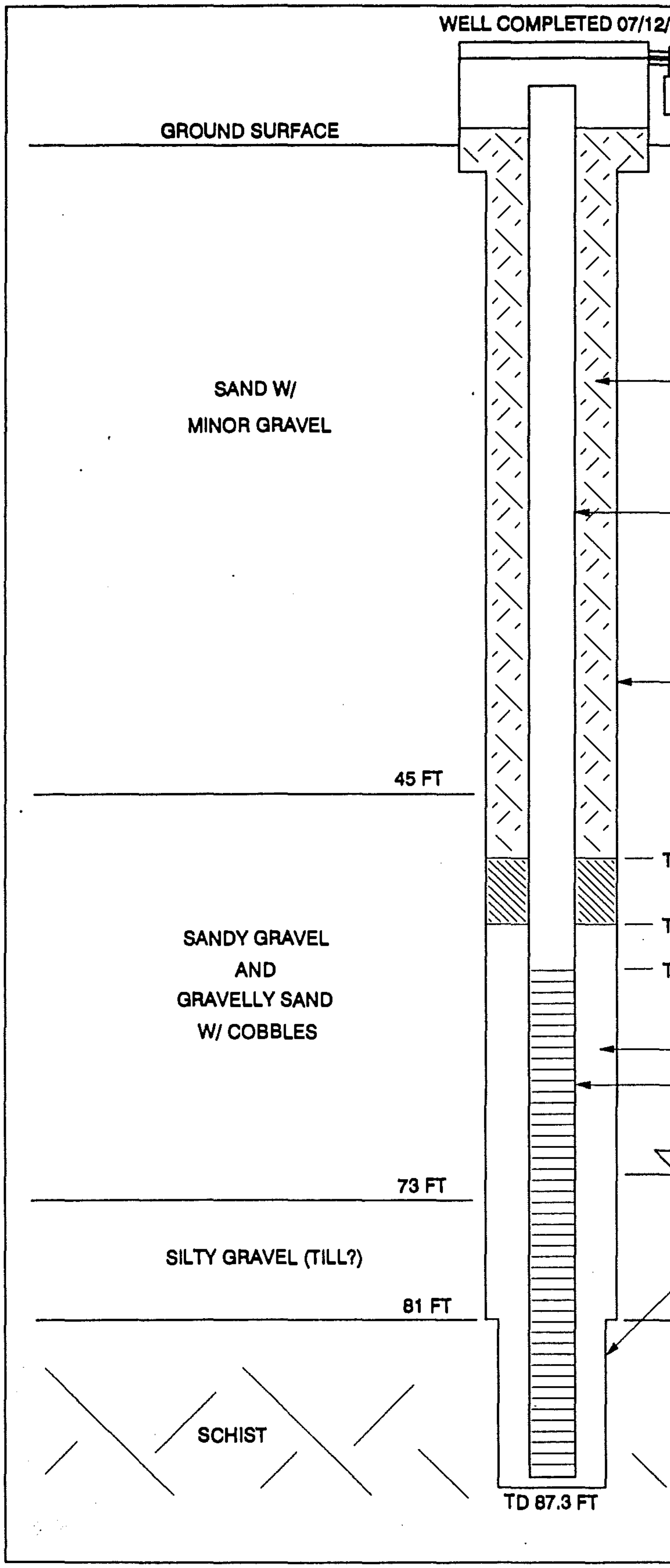
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.



WELL G

GREENBUSH DISPOSAL FACILITY

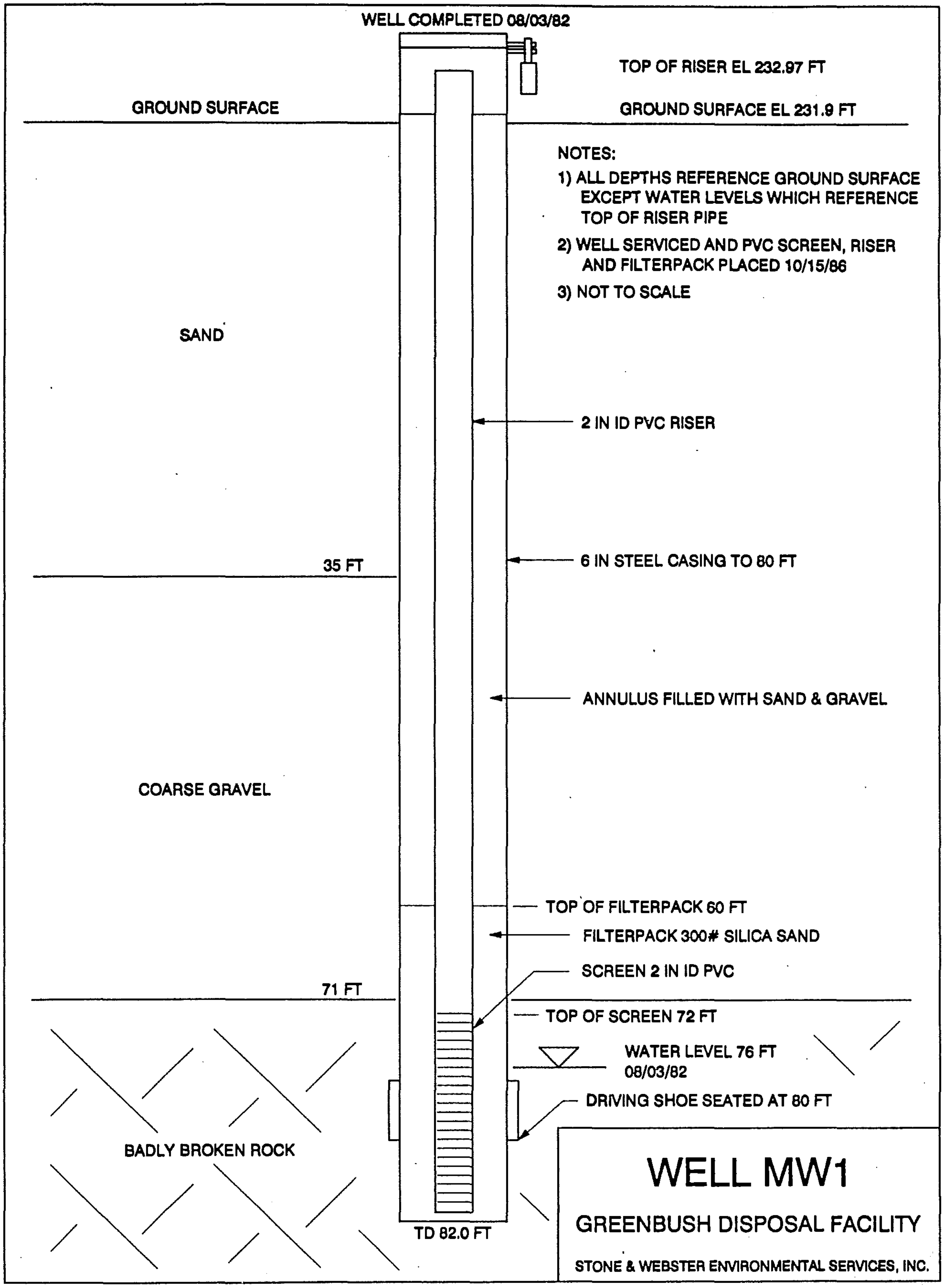
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.

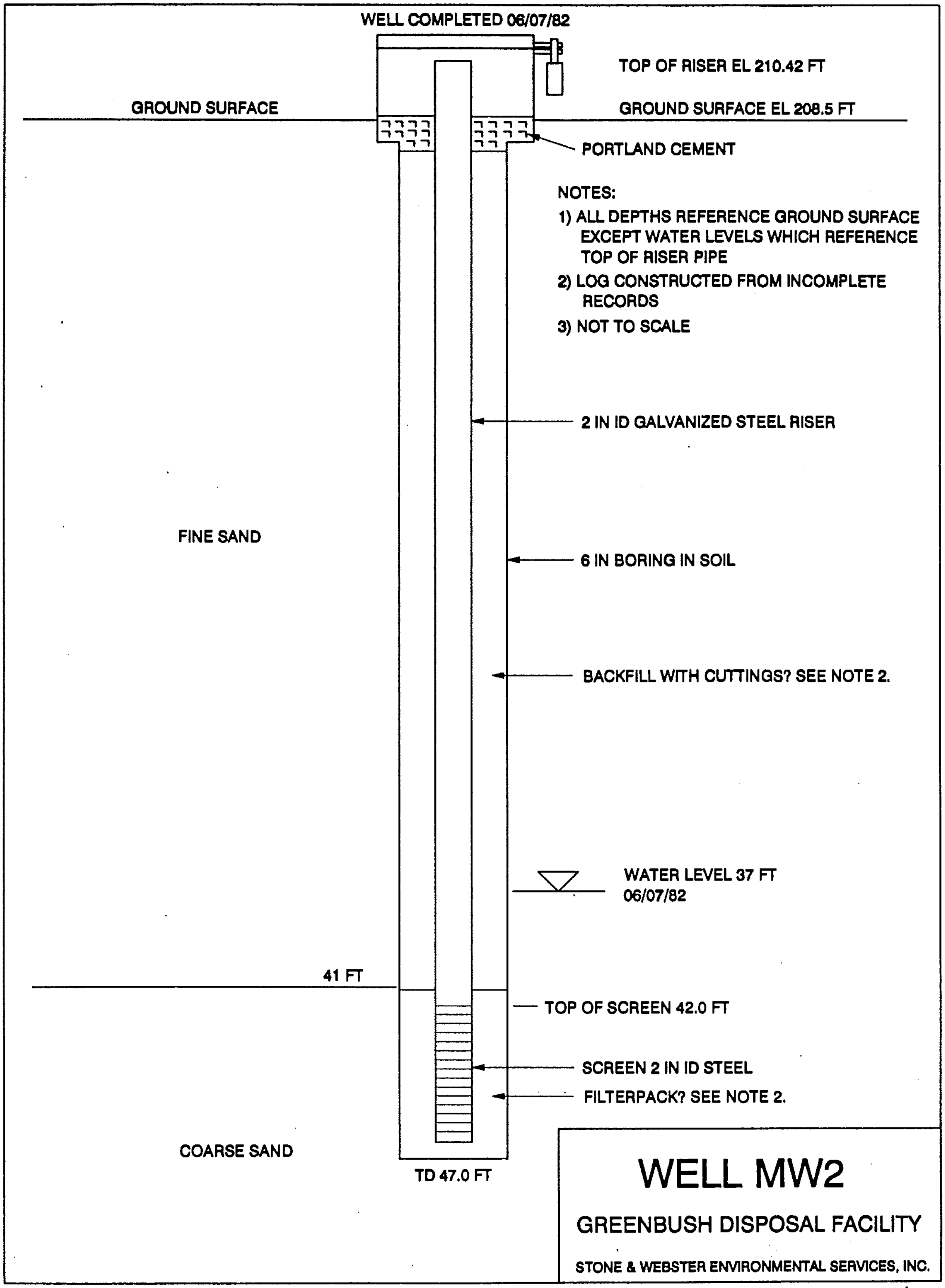


WELL H

GREENBUSH DISPOSAL FACILITY

STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.


WELL COMPLETED 08/03/82
TOP OF RISER EL 232.97 FT
GROUND SURFACE
GROUND SURFACE EL 231.9 FT
NOTES:
1) ALL DEPTHS REFERENCE GROUND SURFACE EXCEPT WATER LEVELS WHICH REFERENCE TOP OF RISER PIPE
2) WELL SERVICED AND PVC SCREEN, RISER AND FILTERPACK PLACED 10/15/86
3) NOT TO SCALE
SAND
2 IN ID PVC RISER
35 FT
6 IN STEEL CASING TO 80 FT
ANNULUS FILLED WITH SAND & GRAVEL
COARSE GRAVEL
TOP OF FILTERPACK 60 FT
FILTERPACK 300# SILICA SAND
SCREEN 2 IN ID PVC
71 FT
TOP OF SCREEN 72 FT
WATER LEVEL 76 FT
08/03/82
DRIVING SHOE SEATED AT 80 FT
BADLY BROKEN ROCK
TD 82.0 FT
WELL MW1
GREENBUSH DISPOSAL FACILITY
STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.



WELL MW2

GREENBUSH DISPOSAL FACILITY

STONE & WEBSTER ENVIRONMENTAL SERVICES, INC.

APPENDIX 3

LABORATORY DATA SHEETS

Controls for Environmental Pollution, Inc. IN STATE 505/982-9841
P.O. BOX 5351 • Santa Fe, New Mexico 87502 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Controls for Environmental
Pollution, Inc.
P. O. Box 5351
Santa Fe, NM 87502

Phone: (505) 982-9841/(800) 545-2188

Stone & Webster
245 Summer St.
Boston, MA 02107

Attn: Richard Skyrness
Invoice Number:

Order #: 92-05-211
Date: 06/15/92 10:55
Work ID: Water (NR)
Date Received: 05/11/92
Date Completed: 06/12/92
Client Code: STONE_WEB

ND - No man-made nuclides detected.

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	A Well A	04	C Well C
02	B Well B	05	D Well D
03	B-DUP Well B	06	Equip/Blank Well A

Remainder of sample(s) for routine analysis will be disposed of three weeks from final report date. Sample(s) for bacteria analysis only, will be disposed of immediately after analysis. This is not applicable if other arrangements have been made.

Approved By

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502 IN STATE 505/982-9841 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample: 01A A Well A Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gamma Spectral Analysis	ND		pCi/liter		
Gross Alpha	<2		pCi/liter	05/20/92	CD
Gross Beta	<3		pCi/liter	05/20/92	CD

Sample: 02A B Well B Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gamma Spectral Analysis	ND		pCi/liter		
Gross Alpha	<2		pCi/liter	05/20/92	CD
Gross Beta	<3		pCi/liter	05/20/92	CD

Sample: 03A B-DUP Well B Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gamma Spectral Analysis	ND		pCi/liter		
Gross Alpha	<2		pCi/liter	05/20/92	CD
Gross Beta	<3		pCi/liter	05/20/92	CD

Sample: 04A C Well C Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gamma Spectral Analysis	ND		pCi/liter		
Gross Alpha	14+/-6		pCi/liter	05/20/92	CD
Gross Beta	38+/-8		pCi/liter	05/20/92	CD

Sample: 05A D Well D Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gamma Spectral Analysis	ND		pCi/liter		
Gross Alpha	13+/-7		pCi/liter	05/20/92	CD
Gross Beta	38+/-8		pCi/liter	05/20/92	CD

Controls for Environmental Pollution, Inc. IN STATE 505/982-9841
P.O. BOX 5351 • Santa Fe, New Mexico 87502 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample: 06A Equip/Blank Well A Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gamma Spectral Analysis	ND		pCi/liter		
Gross Alpha	<2		pCi/liter	05/20/92	CD
Gross Beta	<3		pCi/liter	05/20/92	CD

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502 IN STATE 505/982-9841 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Order # 92-06-502
07/01/92 16:09

Controls for Environmental

TEST RESULTS BY SAMPLE

Sample: 01A C Well C Collected: 05/08/92 Category: FILTER

Test Description	Result	D.L.	Units	Analyzed	By
Suspended Solids	1.0060*		grams		

Sample: 02A D Well D Collected: 05/08/92 Category: FILTER

Test Description	Result	D.L.	Units	Analyzed	By
Suspended Solids	1.2880*		grams		

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: C Well C
Test Description: Gross Alpha/Beta
Collected: 05/08/92 11:45
Lab No: 01A
Method:
Category: FILTER
Test Code: AB_S

Type of Analysis	RESULT
Gross Alpha	1.25+/-0.58
Gross Beta	2.39+/-0.74

All results reported in:

UNITS pCi/gram

Sample Description: D Well D
Test Description: Gross Alpha/Beta
Collected: 05/08/92 12:14
Lab No: 02A
Method:
Category: FILTER
Test Code: AB_S

Type of Analysis	RESULT
Gross Alpha	1.71+/-0.69
Gross Beta	4.46+/-0.83

All results reported in:

UNITS pCi/gram

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Controls for Environmental
Pollution, Inc.
P.O. Box 5351
Santa Fe, NM 87502

Phone: (505) 982-9841/(800) 545-2188

Stone & Webster
245 Summer St.
Boston, MA 02107

Attn: Richard Skyrness
Invoice Number:

Order #: 92-06-501
Date: 07/01/92 10:49
Work ID: Water (NR)
Date Received: 06/23/92
Date Completed: 07/01/92
Client Code: STONE_WEB

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	C Well C	02	D Well D

Remainder of sample(s) for routine analysis will be disposed of three weeks from final report date. Sample(s) for bacteria analysis only, will be disposed of immediately after analysis. This is not applicable if other arrangements have been made.

Approved By

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample: 01A C Well C   Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha (dissolved)	<2		pCi/liter	06/25/92	LH
Gross Beta (dissolved)	<3		pCi/liter	06/25/92	LH

Sample: 02A D Well D   Collected: 05/08/92 Category: WATER

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha (dissolved)	<2		pCi/liter	06/25/92	LH
Gross Beta (dissolved)	<3		pCi/liter	06/25/92	LH

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: A Well A
Test Description: EPA - method 624
Collected: 05/08/92 10:28
Lab No: 01B
Method: .
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<10	10
Chloroethane	<10	10
Methylene Chloride	3.6	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	3.5	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroathane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502 IN STATE 505/982-9841 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Sample Description: A Well A Lab No: 01B
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 05/08/92 10:28 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS ug/liter

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 ● Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 ● FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: B Well B
Test Description: EPA - method 624
Collected: 05/08/92 11:14
Lab No: 02B
Method:
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<10	10
Chloroethane	<10	10
Methylene Chloride	3.2	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502   IN STATE 505/982-9841   OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: B Well B   Lab No: 02B
Test Description: EPA - method 624   Method: Test Code: 624_1
Collected: 05/08/92 11:14   Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS ug/liter

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Order # 92-05-211
06/15/92 10:55

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: B-DUP Well B
Test Description: EPA - method 624
Collected: 05/08/92 11:14

Lab No: 03B
Method:
Category: WATER

Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<10	10
Chloroethane	<10	10
Methylene Chloride	3.0	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	3.7	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502 IN STATE 505/982-9841 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: B-DUP Well B   Lab No: 03B
Test Description: EPA - method 624   Method: Test Code: 624_1
Collected: 05/08/92 11:14   Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS ug/liter

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: C Well C
Lab No: 04B
Test Description: EPA - method 624
Method:
Test Code: 624_1
Collected: 05/08/92 11:45
Category: WATER

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<10	10
Chloroethane	<10	10
Methylene Chloride	✓3.0	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Sample Description: C Well C   Lab No: 04B
Test Description: EPA - method 624   Method: Test Code: 624_1
Collected: 05/08/92 11:45   Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS ug/liter

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: D Well D
Lab No: 05B
Test Description: EPA - method 624
Method:
Test Code: 624_1
Collected: 05/08/92 12:14
Category: WATER

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<10	10
Chloroethane	<10	10
Methylene Chloride	3.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	3.5	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2 Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502 IN STATE 505/982-9841 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: D Well D Lab No: 05B
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 05/08/92 12:14 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS ug/liter

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: Equip/Blank Well A
Lab No: 06B
Test Description: EPA - method 624
Method:
Test Code: 624_1
Collected: 05/08/92 10:04
Category: WATER

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<10	10
Chloroethane	<10	10
Methylene Chloride	✓ 3.1	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502 OUT OF STATE 800/545-2188 • FAX - 505-982-9289
IN STATE 505/982-9841

Sample Description: Equip/Blank Well A Lab No: 06B
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 05/08/92 10:04 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS ug/liter

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Controls for Environmental
Pollution, Inc.
P.O. Box 5351
Santa Fe, NM 87502

Phone: (505) 982-9841/(800) 545-2188

Stone & Webster
245 Summer St.
Boston, MA 02107

Attn: Richard Skyrness
Invoice Number:

Order #: 92-05-212
Date: 07/15/92 11:25
Work ID: Soil Gas Vapor (NR)
Date Received: 05/11/92
Date Completed: 07/14/92
Client Code: STONE_WEB

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	BLANK Inside Fence	02	SAMPLE 1 Inside Fence

Remainder of sample(s) for routine analysis will be disposed of three weeks from final report date. Sample(s) for bacteria analysis only, will be disposed of immediately after analysis. This is not applicable if other arrangements have been made.

Approved By

Controls for Environmental Pollution, Inc.
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Order # 92-05-212
07/15/92 11:25

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: BLANK Inside Fence   Lab No: 01A
Test Description: EPA - method 8240   Method: Test Code: 8240_5
Collected: 05/08/92 09:40   Category: SOIL_GAS_VAP

PARAMETER	RESULT	LIMIT
Chloromethane	<0.075	0.075
Bromomethane	<0.075	0.075
Vinyl Chloride	<0.015	0.015
Chloroethane	<0.075	0.075
Methylene Chloride	<0.021	0.021
Acetone	<0.075	0.075
Carbon Disulfide	<0.04	0.04
1,1-Dichloroethene	<0.021	0.021
1,1-Dichloroethane	<0.04	0.04
trans-1,2-Dichloroethene	<0.012	0.012
Chloroform	<0.012	0.012
1,2-Dichloroethane	<0.021	0.021
2-Butanone	<0.075	0.075
1,1,1-Trichloroethane	<0.029	0.029
Carbon Tetrachloride	<0.021	0.021
Vinyl Acetate	<0.075	0.075
Bromodichloromethane	<0.017	0.017
1,1,2,2-Tetrachloroethane	<0.051	0.051
1,2-Dichloropropane	<0.045	0.045
trans-1,3-Dichloropropene	<0.038	0.038
Trichloroethene	<0.014	0.014
Dibromochloromethane	<0.023	0.023
1,1,2-Trichloroethane	<0.038	0.038
Benzene	<0.033	0.033
cis-1,3-Dichloropropene	<0.038	0.038
2-Chloroethyl Vinyl Ether	<0.075	0.075
Bromoform	<0.035	0.035
2-Hexanone	<0.075	0.075

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Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: BLANK Inside Fence
Test Description: EPA - method 8240
Collected: 05/08/92 09:40
Lab No: 01A
Method:
Category: SOIL_GAS_VAP
Test Code: 8240_5

4-Methyl-2-Pentanone	<0.075	0.075
Tetrachloroethene	<0.031	0.031
Toluene	<0.045	0.045
Chlorobenzene	<0.045	0.045
Ethyl Benzene	<0.05	0.05
Styrene	<0.038	0.038
Total Xylenes	<0.038	0.038

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS mg/m3

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: SAMPLE 1 Inside Fence
Lab No: 02A
Test Description: EPA - method 8240
Method:
Test Code: 8240_5
Collected: 05/08/92 10:47
Category: SOIL_GAS_VAP

PARAMETER	RESULT	LIMIT
Chloromethane	<0.075	0.075
Bromomethane	<0.075	0.075
Vinyl Chloride	<0.015	0.015
Chloroethane	<0.075	0.075
Methylene Chloride	<0.021	0.021
Acetone	<0.075	0.075
Carbon Disulfide	0.04	0.04
1,1-Dichloroethene	<0.021	0.021
1,1-Dichloroethane	<0.04	0.04
trans-1,2-Dichloroethene	<0.012	0.012
Chloroform	<0.012	0.012
1,2-Dichloroethane	<0.021	0.021
2-Butanone	<0.075	0.075
1,1,1-Trichloroethane	<0.029	0.029
Carbon Tetrachloride	<0.021	0.021
Vinyl Acetate	<0.075	0.075
Bromodichloromethane	<0.017	0.017
1,1,2,2-Tetrachloroethane	<0.051	0.051
1,2-Dichloropropane	<0.045	0.045
trans-1,3-Dichloropropene	<0.038	0.038
Trichloroethene	<0.014	0.014
Dibromochloromethane	<0.023	0.023
1,1,2-Trichloroethane	<0.038	0.038
Benzene	<0.033	0.033
cis-1,3-Dichloropropene	<0.038	0.038
2-Chloroethyl Vinyl Ether	<0.075	0.075
Bromoform	<0.035	0.035
2-Hexanone	<0.075	0.075
4-Methyl-2-Pentanone	<0.075	0.075
Tetrachloroethene	<0.031	0.031

Controls for Environmental Pollution, Inc.
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TEST RESULTS BY SAMPLE

Sample Description: SAMPLE 1 Inside Fence Lab No: 02A
Test Description: EPA - method 8240 Method: Test Code: 8240_5
Collected: 05/08/92 10:47 Category: SOIL_GAS_VAP

Toluene	<0.045	0.045
Chlorobenzene	<0.045	0.045
Ethyl Benzene	<0.05	0.05
Styrene	<0.038	0.038
Total Xylenes	<0.038	10.0

Notes and Definitions for this Report:

DATE RUN 05/22/92
ANALYST DVM
UNITS mg/m3

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
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Controls for Environmental
Pollution, Inc.
P.O. Box 5351
Santa Fe, NM 87502

Phone: (505) 982-9841/(800) 545-2188

Stone & Webster
245 Summer St.
Boston, MA 02107

Attn: Richard Skyrness
Invoice Number:

Order #: 93-10-251
Date: 11/08/93 16:19
Work ID: Water (NR)
Date Received: 10/15/93
Date Completed: 10/26/93
Client Code: STONE_WEB

* High statitics due to large amount of solids.
**This sample was reanalyzed on the same detector as well as a different detector and no man-made nuclides were detected on either detector.

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	A	07	G
02	B	08	H
03	C	09	MW-1
04	D	10	MW-2
05	E	11	BLANK
06	F	12	DUPLICATE

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Remainder of sample(s) for routine analysis will be disposed of three weeks from final report date. Sample(s) for bacteria analysis only, will be disposed of immediately after analysis. This is not applicable if other arrangements have been made.

Certified By

Order # 93-10-251
11/08/93 16:19

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample: 01B A   Collected: 10/14/93 09:09

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	12+/-4	2	pCi/liter	10/18/93	DC
Gross Beta	19+/-4	3	pCi/liter	10/18/93	DC

Sample: 02B B   Collected: 10/14/93 09:25

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	19+/-6	2	pCi/liter	10/18/93	DC
Gross Beta	27+/-8	3	pCi/liter	10/18/93	DC

Sample: 03B C   Collected: 10/14/93 09:37

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	15+/-6	2	pCi/liter	10/18/93	DC
Gross Beta	20+/-7	3	pCi/liter	10/18/93	DC

Sample: 04B D   Collected: 10/14/93 09:45

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	51+/-16	2	pCi/liter	10/18/93	DC
Gross Beta	124+/-19	3	pCi/liter	10/18/93	DC

Sample: 05B E   Collected: 10/14/93 10:02

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	3+/-2*	2	pCi/liter	10/18/93	DC
Gross Beta	17+/-4	3	pCi/liter	10/18/93	DC

Sample: 06B F   Collected: 10/14/93 10:14

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	<2	2	pCi/liter	10/18/93	DC
Gross Beta	9+/-4	3	pCi/liter	10/18/93	DC

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Sample: 07B G   Collected: 10/14/93 10:25

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	3+/-2*	2	pCi/liter	10/18/93	DC
Gross Beta	6+/-3	3	pCi/liter	10/18/93	DC

Sample: 08B H   Collected: 10/14/93 10:36

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	10+/-4	2	pCi/liter	10/18/93	DC
Gross Beta	31+/-5	3	pCi/liter	10/18/93	DC

Sample: 09B MW-1   Collected: 10/14/93 10:58

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	<2	2	pCi/liter	10/18/93	DC
Gross Beta	12+/-4	3	pCi/liter	10/18/93	DC

Sample: 10B MW-2   Collected: 10/14/93 11:14

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	8+/-10	2	pCi/liter	10/18/93	DC
Gross Beta	11+/-13	3	pCi/liter	10/18/93	DC

Sample: 11B BLANK   Collected: 10/14/93 09:09

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	<2	2	pCi/liter	10/18/93	DC
Gross Beta	<3	3	pCi/liter	10/18/93	DC

Sample: 12B DUPLICATE   Collected: 10/14/93 09:25

Test Description	Result	D.L.	Units	Analyzed	By
Gross Alpha	15+/-6	2	pCi/liter	10/18/93	DC
Gross Beta	38+/-8	3	pCi/liter	10/18/93	DC

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: A
Test Description: EPA - method 624
Collected: 10/14/93 09:09
Lab No: 01A
Method:
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	1.8	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
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TEST RESULTS BY SAMPLE

Sample Description: A — Lab No: 01A
Test Description: EPA - method 624 — Method: — Test Code: 624_1
Collected: 10/14/93 09:09 — Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/20/93
ANALYST MG
UNITS ug/liter

Sample Description: A — Lab No: 01B
Test Description: Gamma Spectral Analysis — Method: — Test Code: GAMMS1
Collected: 10/14/93 09:09 — Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made nuclides detected.		

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
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TEST RESULTS BY SAMPLE

Sample Description: B
Test Description: EPA - method 624
Collected: 10/14/93 09:25

Lab No: 02A
Method:
Category: WATER

Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	3.5	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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Sample Description: B Lab No: 02A
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 10/14/93 09:25 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/20/93
ANALYST MG
UNITS ug/liter

Sample Description: B Lab No: 02B
Test Description: Gamma Spectral Analysis Method: Test Code: GAMMS1
Collected: 10/14/93 09:25 Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made nuclides detected.		

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502 IN STATE 505/982-9841 OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: C
Test Description: EPA - method 624
Collected: 10/14/93 09:37
Lab No: 03A
Method:
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 ● Santa Fe, New Mexico 87502 IN STATE 505/982-9841 OUT OF STATE 800/545-2188 ● FAX - 505-982-9289

Sample Description: C
Test Description: EPA - method 624
Collected: 10/14/93 09:37
Lab No: 03A
Method:
Category: WATER
Test Code: 624_1

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/20/93
ANALYST MG
UNITS ug/liter

Sample Description: C
Test Description: Gamma Spectral Analysis
Collected: 10/14/93 09:37
Lab No: 03B
Method:
Category: WATER
Test Code: GAMMS1

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made nuclides detected.		

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample Description: D
Test Description: EPA - method 624
Collected: 10/14/93 09:45
Lab No: 04A
Method:
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	3.2	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Sample Description: D — Lab No: 04A
Test Description: EPA - method 624 — Method: — Test Code: 624_1
Collected: 10/14/93 09:45 — Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/20/93
ANALYST MG
UNITS ug/liter

Sample Description: D — Lab No: 04B
Test Description: Gamma Spectral Analysis — Method: — Test Code: GAMMS1
Collected: 10/14/93 09:45 — Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made nuclides detected.		

Controls for Environmental Pollution, Inc.

P.O. BOX 5351 ● Santa Fe, New Mexico 87502 — IN STATE 505/982-9841 — OUT OF STATE 800/545-2188 ● FAX - 505-982-9289

Order # 93-10-251
11/08/93 16:19

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: E — Lab No: 05A
Test Description: EPA - method 624 — Method: — Test Code: 624_1
Collected: 10/14/93 10:02 — Category: WATER

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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TEST RESULTS BY SAMPLE

Sample Description: E Lab No: 05A
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 10/14/93 10:02 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/20/93
ANALYST MG
UNITS ug/liter

Sample Description: E Lab No: 05B
Test Description: Gamma Spectral Analysis Method: Test Code: GAMMS1
Collected: 10/14/93 10:02 Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made nuclides detected.		

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
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Order # 93-10-251
11/08/93 16:19

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: F
Test Description: EPA - method 624
Collected: 10/14/93 10:14
Lab No: 06A
Method:
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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Sample Description: F — Lab No: 06A
Test Description: EPA - method 624 — Method: — Test Code: 624_1
Collected: 10/14/93 10:14 — Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/20/93
ANALYST MG
UNITS ug/liter

Sample Description: F — Lab No: 06B
Test Description: Gamma Spectral Analysis — Method: — Test Code: GAMMS1
Collected: 10/14/93 10:14 — Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made		
nuclides detected.		

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Sample Description: G
Test Description: EPA - method 624
Collected: 10/14/93 10:25
Lab No: 07A
Method:
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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Sample Description: G — Lab No: 07A
Test Description: EPA - method 624 — Method: — Test Code: 624_1
Collected: 10/14/93 10:25 — Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/21/93
ANALYST MG
UNITS ug/liter

Sample Description: G — Lab No: 07B
Test Description: Gamma Spectral Analysis — Method: — Test Code: GAMMS1
Collected: 10/14/93 10:25 — Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made nuclides detected.		

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
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TEST RESULTS BY SAMPLE

Sample Description: H
Test Description: EPA - method 624
Collected: 10/14/93 10:36
Lab No: 08A
Method:
Category: WATER
Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	2.9	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

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Sample Description: H Lab No: 08A
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 10/14/93 10:36 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/21/93
ANALYST MG
UNITS ug/liter

Sample Description: H Lab No: 08B
Test Description: Gamma Spectral Analysis Method: Test Code: GAMMS1
Collected: 10/14/93 10:36 Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
**ND - No man-made		
nuclides detected		

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Order # 93-10-251
11/08/93 16:19

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: MW-1
Test Description: EPA - method 624
Collected: 10/14/93 10:58

Lab No: 09A
Method:
Category: WATER

Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
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TEST RESULTS BY SAMPLE

Sample Description: MW-1 Lab No: 09A
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 10/14/93 10:58 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/21/93
ANALYST MG
UNITS ug/liter

Sample Description: MW-1 Lab No: 09B
Test Description: Gamma Spectral Analysis Method: Test Code: GAMMS1
Collected: 10/14/93 10:58 Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made		
nuclides detected.		

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
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Order # 93-10-251
11/08/93 16:19

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: MW-2
Test Description: EPA - method 624
Collected: 10/14/93 11:14

Lab No: 10A
Method:
Category: WATER

Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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Sample Description: MW-2 Lab No: 10A
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 10/14/93 11:14 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/21/93
ANALYST MG
UNITS ug/liter

Sample Description: MW-2 Lab No: 10B
Test Description: Gamma Spectral Analysis Method: Test Code: GAMMS1
Collected: 10/14/93 11:14 Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made nuclides detected.		

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502   IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Sample Description: BLANK   Lab No: 11A
Test Description: EPA - method 624   Method: Test Code: 624_1
Collected: 10/14/93 09:09   Category: WATER

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	<1.6	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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TEST RESULTS BY SAMPLE

Sample Description: BLANK Lab No: 11A
Test Description: EPA - method 624 Method: Test Code: 624_1
Collected: 10/14/93 09:09 Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/21/93
ANALYST MG
UNITS ug/liter

Sample Description: BLANK Lab No: 11B
Test Description: Gamma Spectral Analysis Method: Test Code: GAMMS1
Collected: 10/14/93 09:09 Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made		
nuclides detected.		

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

Order # 93-10-251
11/08/93 16:19

Controls for Environmental
TEST RESULTS BY SAMPLE

Sample Description: DUPLICATE
Test Description: EPA - method 624
Collected: 10/14/93 09:25

Lab No: 12A
Method:
Category: WATER

Test Code: 624_1

PARAMETER	RESULT	LIMIT
Chloromethane	<10	10
Bromomethane	<10	10
Vinyl Chloride	<2.0	2.0
Chloroethane	<10	10
Methylene Chloride	<2.8	2.8
1,1-Dichloroethene	<2.8	2.8
1,1-Dichloroethane	<4.7	4.7
trans-1,2-Dichloroethene	<1.6	1.6
Chloroform	3.9	1.6
1,2-Dichloroethane	<2.8	2.8
Trichlorofluoromethane	<5.0	5.0
1,1,1-Trichloroethane	<3.8	3.8
Carbon Tetrachloride	<2.8	2.8
Bromodichloromethane	<2.2	2.2
1,1,2,2-Tetrachloroethane	<6.9	6.9
1,2-Dichloropropane	<6.0	6.0
trans-1,3-Dichloropropene	<5.0	5.0
Trichloroethene	<1.9	1.9
Dibromochloromethane	<3.1	3.1
1,1,2-Trichloroethane	<5.0	5.0
Benzene	<4.4	4.4
cis-1,3-Dichloropropene	<5.0	5.0
2-Chloroethyl Vinyl Ether	<5.0	5.0
Bromoform	<4.7	4.7
Tetrachloroethene	<4.1	4.1
Toluene	<6.0	6.0
Chlorobenzene	<6.0	6.0
Ethyl Benzene	<7.2	7.2
1,3-Dichlorobenzene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0

Controls for Environmental Pollution, Inc.
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Sample Description: DUPLICATE   Lab No: 12A
Test Description: EPA - method 624   Method: Test Code: 624_1
Collected: 10/14/93 09:25   Category: WATER

1,4-Dichlorobenzene	<5.0	5.0

Notes and Definitions for this Report:

DATE RUN 10/21/93
ANALYST MG
UNITS ug/liter

Sample Description: DUPLICATE   Lab No: 12B
Test Description: Gamma Spectral Analysis   Method: Test Code: GAMMS1
Collected: 10/14/93 09:25   Category: WATER

Gamma Spectral Analysis

NUCLIDE	RESULT	UNITS
ND-No man-made		
nuclides detected		

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
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Controls for Environmental
Pollution, Inc.
P.O. Box 5351
Santa Fe, NM 87502

Phone: (505) 982-9841/(800) 545-2188

Stone & Webster
245 Summer St.
Boston, MA 02107

Attn: Richard Skyrness
Invoice Number:

Order #: 93-10-252
Date: 11/02/93 14:54
Work ID: Soil Gas Sorbent (NR)
Date Received: 10/15/93
Date Completed: 10/27/93
Client Code: STONE_WEB

* Chloroform is the only compound detected in this screen by GC/MS. Methylene Chloride was in the samples and also in water background. Methylene Chloride contamination likely occured in the lab.

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	Soil Gas Sorbant	02	Soil Gas Sorbant Blank

Remainder of sample(s) for routine analysis will be disposed of three weeks from final report date. Sample(s) for bacteria analysis only, will be disposed of immediately after analysis. This is not applicable if other arrangements have been made.

Certified By

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188 • FAX - 505-982-9289

TEST RESULTS BY SAMPLE

Sample: 01A Soil Gas Sorbant Collected: 10/14/93 Category: SOIL_GAS_SOR

Test Description	Result	Limit	Units	Analyzed	By
Chloroform	0.51*	0.08	mg/m3	10/25/93	DVM

Sample: 02A Soil Gas Sorbant Blank Collected: 10/13/93 Category: SOIL_GAS_SOR

Test Description	Result	Limit	Units	Analyzed	By
Chloroform	<0.08*	0.08	mg/m3	10/25/93	DVM

Controls for Environmental Pollution, Inc.
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Controls for Environmental
Pollution, Inc.
P.O. Box 5351
Santa Fe, NM 87502

Phone: (505) 982-9841/(800) 545-2188

Stone & Webster
245 Summer St.
Boston, MA 02107

Attn: Richard Skyrness
Invoice Number:

Order #: 93-10-532
Date: 11/04/93 16:43
Work ID: Water (NR)
Date Received: 10/29/93
Date Completed: 11/04/93
Client Code: STONE_WEB

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	B	03	D
02	C	04	MW2

Remainder of sample(s) for routine analysis will be disposed of three weeks from final report date. Sample(s) for bacteria analysis only, will be disposed of immediately after analysis. This is not applicable if other arrangements have been made.

Certified By

Controls for Environmental Pollution, Inc.
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IN STATE 505/982-9841
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TEST RESULTS BY SAMPLE

Sample: 01A B — Collected: 10/14/93 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Gross Alpha (dissolved)	14+/-4	2	pCi/liter	11/01/93	DC
Gross Alpha (suspended)	45+/-6	2	pCi/liter	11/01/93	DC
Gross Beta (dissolved)	8+/-3	3	pCi/liter	11/01/93	DC
Gross Beta (suspended)	8+/-3	3	pCi/liter	11/01/93	DC
Total Suspended Solids	10	4	mg/liter	11/03/93	MM

Sample: 02A C — Collected: 10/14/93 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Gross Alpha (dissolved)	6+/-3	2	pCi/liter	11/01/93	DC
Gross Alpha (suspended)	31+/-6	2	pCi/liter	11/01/93	DC
Gross Beta (dissolved)	4+/-3	3	pCi/liter	11/01/93	DC
Gross Beta (suspended)	4+/-3	3	pCi/liter	11/01/93	DC
Total Suspended Solids	20	4	mg/liter	11/03/93	MM

Sample: 03A D — Collected: 10/14/93 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Gross Alpha (dissolved)	3+/-2	2	pCi/liter	11/01/93	DC
Gross Alpha (suspended)	107+/-13	2	pCi/liter	11/01/93	DC
Gross Beta (dissolved)	<3	3	pCi/liter	11/01/93	DC
Gross Beta (suspended)	<3	3	pCi/liter	11/01/93	DC
Total Suspended Solids	311	4	mg/liter	11/03/93	MM

Sample: 04A MW2 — Collected: 10/14/93 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Gross Alpha (dissolved)	<2	2	pCi/liter	11/01/93	DC
Gross Alpha (suspended)	33+/-6	2	pCi/liter	11/01/93	DC
Gross Beta (dissolved)	<3	3	pCi/liter	11/01/93	DC
Gross Beta (suspended)	<3	3	pCi/liter	11/01/93	DC
Total Suspended Solids	106	4	mg/liter	11/03/93	MM

APPENDIX 4

SITE INVESTIGATION SAFETY PLAN

STONE & WEBSTER
PRELIMINARY SITE INVESTIGATION
SAFETY PLAN

PLAN REVIEW AND APPROVAL Richard Gillespie & [signatures] 6/28/93

On-site Supervisor Dick Skryness, Larry Picking Date: ~~8/3/92~~ 6/28/93

Corp. Health & Safety James Skrabak [signature] Date: ~~8/3/92~~

1.0 SITE DESCRIPTION JOB NO. 18988.01

1.1 Location Greenbush, Maine
(Attach Map or Diagram)

1.2 Surrounding Population Rural approximately 20 people within a 1 mile radius. Next to a tree nursery.

1.3 Topography and Accessibility Rural, wooded.

1.4 Site History A 40 X 40 ft. controlled landfill with a 65 X 65 ft. fence around the perimeter. The site contains laboratory waste including chemical compounds and low-level radioactive waste. The site operated for approximately 18 years from 1960-1978.

1.5 Planned Duration of Site Activity ~~1 day.~~ 2 weeks

1.6 Anticipated Weather Conditions During Activity ~~Cool to cold~~ warm to hot, ~~mostly dry,~~ humid possible showers or ~~flurries.~~ thunder storms

1.7 Will this Job Involve "Confined Space" Work (ie. indoor drilling)?
Yes ____ No X

If Yes, explain: ____

1.8 Are Utility Notifications Needed for Subsurface Work? Yes ____ No X

If yes, specify clearance dates, clearance I.D. #, and other relevant information. ____

[initials] 6/28/93

2.0 **ENTRY OBJECTIVES**- Describe planned activities covered by the plan and their objectives.

~~Groundwater sampling for water quality.~~ Installation of 4 ground water monitoring wells located approximately 100 ft from the disposal facility and about the same distance from the inner ring of monitoring wells installed, sampled and evaluated about 1 year ago. - No contaminants found

3.0 **ON-SITE ORGANIZATION**- Identify persons involved in the project and their job functions.

Team Leader ~~Dick Skryness,~~ Larry Picking, Richard Gillespie

Site Safety Officer Same

Team Members RICHARD Gillespie

4.0 **HAZARD ANALYSIS**- For each task or operation describe the potential hazards.

4.1 List Source and Location of Potential Contamination: Landfill containing low-level radioactive waste and laboratory chemical constituents. Waste is buried at a depth of approximately 10 ft. in an esker deposit.

4.2 List Characteristics of Representative Contaminants:

Representative Chemicals	**Medium**	**Exposure Limits**
H-3	Unsealed	Exposure limit for all
C-14	Unsealed	the radioactive isotopes
Pb-210	Unsealed	combined is 0.5mR/h.
Co-60	Unsealed	
Cs-134	Unsealed	
H-3	Plated	PEL or TLV whichever is
Ra-Be	Sealed in bronze	lower:
Toluene	Pl. Btl./Steel Drum	100ppm-TWA 150ppm-STEL
Polyethylene glycol	Pl. Btl./Steel Drum	N/A
Dioxane	Pl. Btl./Steel Drum	25ppm-TWA
Methanol	Pl. Btl./Steel Drum	200ppm-TWA 250ppm-STEL
Naphthalene	Pl. Btl./Steel Drum	10ppm-TWA 150ppm-STEL
Xylene	Pl. Btl./Steel Drum	100ppm-TWA 150ppm-STEL
Propylene glycol	Pl. Btl./Steel Drum	N/A
Ethylene glycol	Pl. Btl./Steel Drum	50ppm-C

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4.3 Identify Unique Chemical Characteristics (ie. odor, warning properties):

Toluene - aromatic odor like benzene.

Polyethylene glycol - hard, water soluble, waxlike solid.

Dioxane - colorless liquid with a mild etherlike odor.

Methanol - colorless liquid with a characteristic pungent odor.

Naphthalene - colorless to brown solid with an odor of mothballs.

Xylene - colorless liquid with aromatic odor.

Propylene glycol - colorless, almost odorless, slightly viscous liquid with a slightly acrid taste.

4.4 Additional Site-Specific Hazard Information: Previous drilling program to install monitoring wells did not detect any volatile organic compounds or radioactivity above background levels.

4.5 List Potential Physical Hazards: overhead equipment hazard while drill rig mast is up. Hard hat required.

5.0 AIR MONITORING- Describe frequency and types of air monitoring to be done and the equipment and calibration procedures to be used.

A HNu and radiation survey meter will be present onsite. Measurements will be at regular depth intervals during drilling ~~taken when a well is initially opened and when samples are collected from the well~~. Background levels will be measured prior to the commencement of work activities each day. If any measurement exceeds action levels, work activity will stop and personnel will move off the site. HNu measurements will be taken in the breathing zone and at the wellhead. Radiation measurements will be made at waist level and at the wellhead. Action levels will be: HNu-5ppm in the breathing zone, radiation survey meter-2 X background. Background levels will be deemed as being exceeded if a sustained reading above action levels lasts for

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longer than two minutes. All readings will be recorded in the field notebook including background levels.

6.0 PERSONAL PROTECTIVE EQUIPMENT- Describe the levels of protection to be used and under what conditions they will be upgraded or work stopped.

Work will be performed at level D protection including ~~surgical inner gloves and~~ protective outer gloves.

7.0 SITE CONTROLS

7.1 Work Zones Will be established, if necessary, by the site safety officer onsite.
(Attach Map or Diagram)

7.2 Site Communications Will be verbal.

7.3 Work Practices Standard safety precautions will be taken regarding drilling ~~groundwater sampling procedures~~ (refer to section 5.0), and skin contact with the well fluid will be avoided.

8.0 TRAINING- Describe the training requirements of the project and how the personnel named to the project meet those requirements.

All personnel will receive an onsite briefing. The site safety officer will have been trained on the use and maintenance of monitoring equipment.

9.0 DECONTAMINATION- Describe what materials will need to be decontaminated, how they will be decontaminated and how other materials will be classified and disposed.

Personal clothing and footware will be brushed off every day before leaving the job site.

ASS 6/-

10.0 EMERGENCY RESPONSE

10.1 First Aid- Identify location and individual responsible for first aid kit.

~~Site safety officer will be responsible for providing.~~ Driller will provide. kit will be located on drill rig.

10.2 Telephone Numbers

Local Fire Department 1-800-432-7911

Police Department 1-800-432-7911

Ambulance Service (207)-827-5551

10.3 Nearest Hospital

Name Eastern Medical Center

Address 489 State Street

Bangor, Maine

Directions (Attach Map)

11.0 **OTHER** The nearest telephone is located in the Greenbush Town Hall, or at the Olamon Supermarket in Olamon, Maine.

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12.0 ACKNOWLEDGEMENTS

The following team members have read and understood this health and safety plan.

Name	Signature	Date
Larry Picking	Larry Picking	June 28, 1993
RICHARD P. GILLESPIE	Richard P. Gillespie	6/28/93

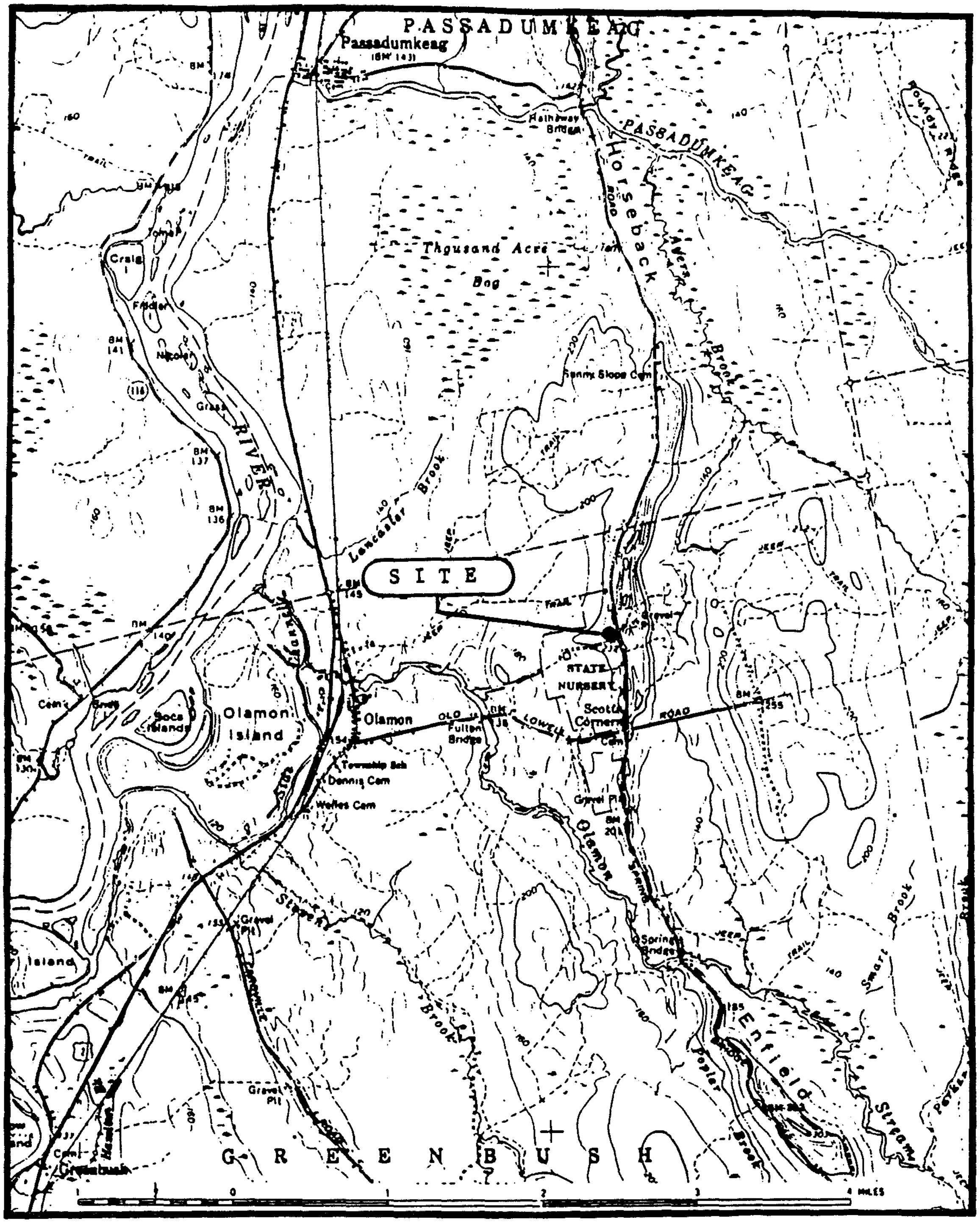

FIGURE 1. SITE ON PASSADUMKEAG 15 MIN. TOPO.

FIGURES

(IN POCKET)

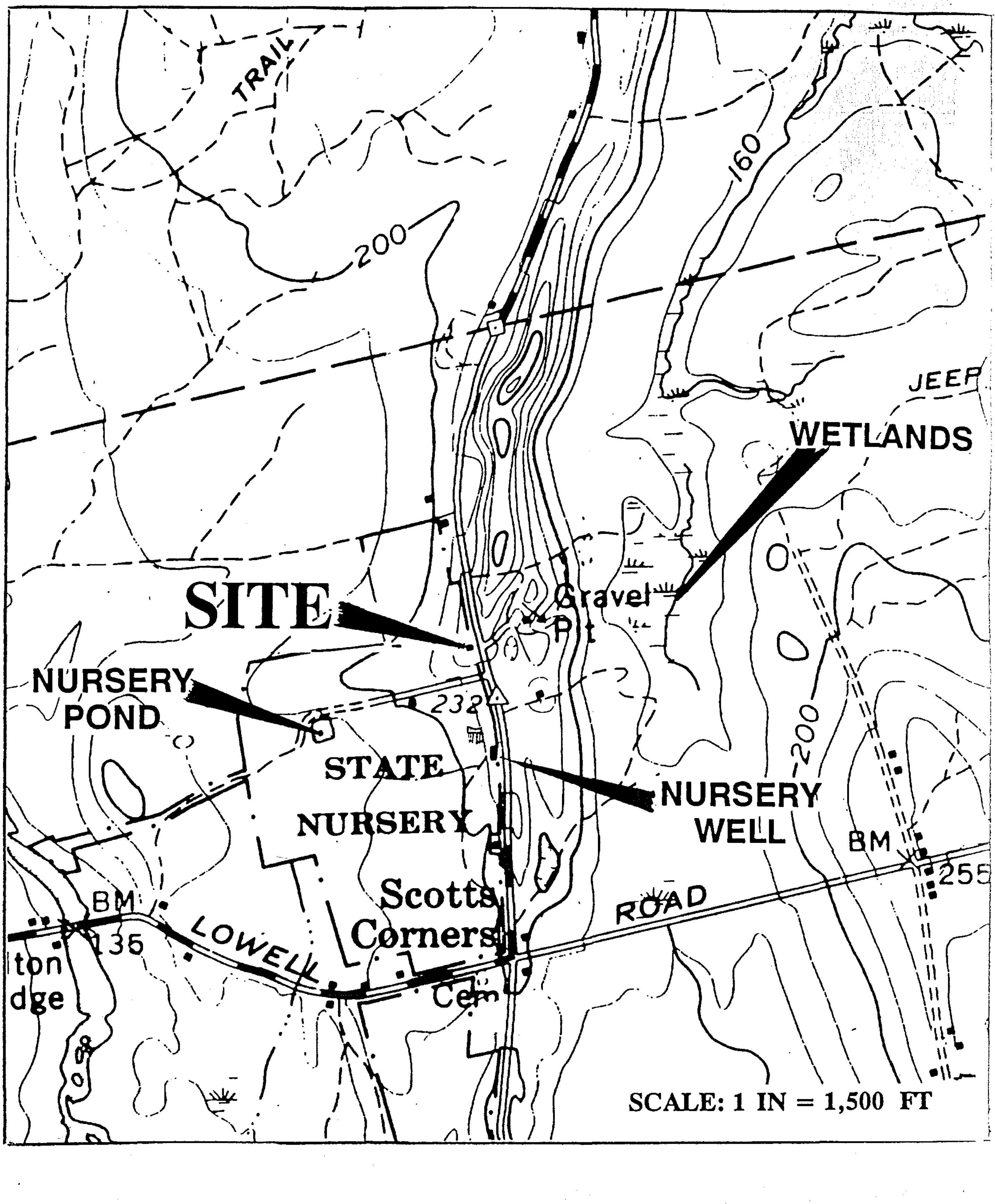

Figure 1: Site Location and Topography