PROJECT WORK PLAN

FOR

REMEDIAL INVESTIGATION
MIDWAY LANDFILL
Kent, Washington
B&V Project 11889.401
October 14, 1985

State of Washington
Department of Ecology
Office of
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1.0 EXECUTIVE SUMMARY

This project work plan for the implementation of remedial investigation field activities at Midway Landfill was prepared under contract C-85075 with the State of Washington, Department of Ecology. Authorization for the production of this work plan has been made under Midway Landfill work assignment MDLF-2, as amended.

The strategy utilized to develop this work plan is consistent with the Midway Landfill Forward Planning Document (Black & Veatch, March 1985). Data obtained during this phase of the overall remedial investigation field activities will be evaluated in detail, and may result in a second phase of RI field activities. The second phase may include the installation of additional monitoring wells or gas probes to provide a more comprehensive data base for purposes of developing remedial actions.

This work plan establishes a scope of services to be performed with an estimated budget of $907,000 and a completion schedule of approximately 32 work weeks after receipt of the work assignment authorization from WDOE. This project consists of the field investigation phase of the remedial action investigation to be conducted at the Midway site. Prior to initiation of this work effort, an initial series of gas probes are being installed adjacent to the landfill site to monitor for off-site gas migration. Work completed under this work plan will complement that initial field activity.

1.1 INTRODUCTION

This work plan has been developed for the siting, installation, and monitoring of a minimum of fourteen groundwater monitoring wells, twenty clustered gas probes, and three leachate wells on and adjacent to the Midway landfill site. Additional work to be done includes surface water sampling, soil investigation, a ground survey, and remote sensing of subsurface stratigraphy to further define migration pathways. This work plan contains the project description, scope of work, schedule, team assignments, and description

of outputs from each task.

1.2 OBJECTIVE

The objective of this work effort is to define the nature and extent of contaminant presence at Midway Landfill, including water, air, and soil contamination, as well as the migration of landfill gas in the landfill vicinity. Activities that will be included in this work effort are listed below.

- Development of site plan
- Development of design drawings for wells and gas probes
- Development of subcontractor specifications and contract documents
- Implementation of health and safety, quality control/quality assurance plan, and sampling plan during the field activities
- Monitoring well drilling and installation
- Leachate well drilling and installation
- Gas probe drilling and installation
- Geophysical survey
- Ground survey to record locations of wells, probes, and sampling sites
- Implementation of ambient air/climatological monitoring
- Soil, groundwater, surface water, and gas sampling
- Waste characterization
- Data analysis and report preparation

- Project management

- Community relations plan implementation

1.3 BACKGROUND

Detailed background information relating to the Midway Landfill project has been presented in the Midway Landfill Forward Planning document (Black & Veatch, 3/85). Recent developments concerning the detection of significant levels of combustible gas off site in the vicinity of the landfill have contributed to increased monitoring efforts, including the planned initial installation of approximately 75 off-site gas probes to further define the extent and concentration of the landfill gas plume. The City of Seattle Solid Waste Utility is proceeding with the installation of an on-site gas collection system.

2.0 SCOPE OF WORK

The purpose of this major field activity phase of the remedial investigation for Midway Landfill is to obtain sufficient data to identify the magnitude and extent of contaminant and gas migration for subsequent assessment of remedial action alternatives during the feasibility study. The collection and review of all data will be done in a professional, legally defensible manner. The investigation will consist of activities to be conducted in three major areas: hydrologic investigations, air quality investigations, and an investigation to identify receptors. The estimated date of start-up for the activities described in this remedial investigation (RI) work plan is November, 1985.

Each of the tasks associated with this work effort is described in greater detail in the following sections.

2.1 TASK 1 DEVELOPMENT OF SITE PLAN

The purpose of this task will be the development of a basic site plan for all subsequent field activities. Up-to-date site maps of the landfill are available at a scale of 1"=100' with detailed topography from the City of Seattle, Solid Waste Utility. A base map of the landfill and surrounding area to be investigated during the RI field activities is currently being prepared from recently obtained WDOT aerial photography. The procurement of rights-of-way for drilling of off-site gas probes and monitoring wells will be the responsibility of WDOE. Key activities involved in finalizing the site plan prior to the initiation of field drilling and sampling activities are expected to include:

1) Development of preliminary site plan showing proposed drilling locations

2) Review of preliminary site plan by involved agencies (WDOE, WDOT, City

of Kent, City of Seattle, King County, home/business owners) to identify and resolve potential problems relating to right-of-way or other sensitive issues

3) Development of the site location plan from comments received during previous steps

4) Staking of actual drilling sites for gas probes, leachate wells, and groundwater monitoring wells

5) Preparation for implementation of health and safety, quality/assurance quality control (QA/QC) and sampling plans, including procurement of safety clothing and equipment, monitoring equipment, laboratory coordination, and any necessary training/retraining of field personnel.

Site planning will be coordinated such that on-site monitoring well and gas probe installation can be initiated as quickly as possible after approval of the site location plan. In addition, climatological and air quality monitoring instruments will be installed on-site as early as possible. Access to off-site monitoring well and gas probe locations may take longer to complete due to physical barriers or legal considerations. The determination of the locations of these activity sites will be an on-going process under direction of WDOE and contractor representatives.

The locations of the near-surface soil sampling will be at the direction of the geotechnical site manager in conjunction with the drilling effortand geophysical survey. General locations will be described in the site plan.

2.2 TASK 2 DEVELOPMENT OF SUBCONTRACTOR DRAWINGS AND SPECIFICATIONS

The purpose of this task is to develop plans, drawings, and specifications for the drilling program, ground survey activities, and specialty air quality instrumentation installation, startup, and consultation.. The format used will be suitable for each type of subcontract, and will meet all contract procurement requirements of EPA, the State of Washington, and the Black & Veatch prime contract with WDOE. B&V will develop all contract documents and will assist WDOE in completing procurement requirements. Contents of the documents will include:

1) Typical drawings for monitoring well, leachate well, and gas probe installation with appropriate design notes and specification references

2) Specifications for all drilling activities including mobilization, drilling procedures, geologic sampling procedures, casing installation and grouting details, and completion details

3) Specifications for ground survey activities including tolerances for horizontal and vertical surveys, computational and field note methods, instrument tolerances, and map plotting requirements

4) Specifications for air quality monitoring instrumentation installation and startup, including instrument specifications, operating environment, power requirements, support equipment requirements, and maintenance requirements

5) General contract clauses, including health and safety, quality assurance/quality control, insurance, and administrative requirements

6) Bid forms for submission of subcontractor quotes

WDOE will review the draft contract documents for compliance with all technical and procurement requirements. After WDOE approval is obtained, final contract documents will be used to retain one or more drilling contractor(s)

and negotiate final contractr cost in accordance with federal and state procurement regulations.

2.3 TASK 3 FIELD ACTIVITIES

RI field activities will include those tasks which involve a one-time or uniquely identified task. The field activities described in this section typically will not include intensive monitoring programs (described in Section 2.4). Field activities that will take place at Midway Landfill are described below.

Organization of field activities will be the responsibility of a geotechnical site manager and a surface activities site manager. The project engineer will provide overall technical land schedule guidance to site managers. Health and safety (H&S) and quality assurance (QA/QC) functions will be the responsibility of a single H&S and QA/QC officer who will work independently of other personnel and will insure that all field activities are in accordance with the site Health and Safety Plan and the Quality Assurance Plan. The site managers and H&S/QA officer will be assisted by staff engineers and scientists from the manpower resources of Black & Veatch and B&V subcontractors.

Scheduling of field activities will be a critical project management task during work plan implelmentation. Scheduling of activities will be the responsibility of the project engineer and will be conducted in accordance with the overall project schedule and guidance from WDOK managers.

2.3.1. TASK 3.1 GROUNDWATER MONITORING WELL INSTALLATION

It is anticipated that a total of fourteen new monitoring wells will be installed at nine locations within and adjacent to the landfill. In order to determine if significant differences exist in the water quality between the upper water table and the water beneath the confining layer, four of the wells will be dual completion wells. The location of the wells has been tentatively identified in the Midway Landfill Sampling Plan. Sufficient geologic samples will be obtained during drilling to characterize the subsurface stratigraphy. A full-time geotechnical engineer will provide field supervision of the drilling activities and will review and certify the drillers' record. The

geotechnical engineer will be responsible for determining the final depth of well completion, based upon the geological characteristics and relative degree of saturation of the formations. Additionally, the geotechnical engineer will be responsible for the proper installation, grouting, and completion of the casings, screens, gravel packs, and other fill materials. The use of a magnetometer or metal detector will assist in avoiding drilling through buried utility lines or metallic objects (drums, containers) that may present a safety threat. Upon completion of installation of well casings, the wells will be developed. Development will occur after the water level has reached and remained at equilibrium for at least three days. At that time, the well will be purged, evacuating at least 5 well volumes. The process will be repeated prior to sampling. Dedicated bladder-type pumps will be installed at each wellhead, with locking caps.

In addition to the geotechnical engineer, there will be assigned a field supervisor responsible for the implementation of the Health and Safety and QA/QC Plans. This person will be designated as the QA/QC officer, and will be responsible for the proper calibration, maintenance, and operation of all field instrumentation, as well as the proper handling of all media environmental samples. In the event that unsafe conditions arise that cannot be mitigated using measures outlined in the Health and Safety Plan, the QA/QC officer will have authority to halt or interrupt drilling activities.

2.3.2 TASK 3.2 LEACHATE WELL INSTALLATION

This task will focus on the drilling and installation of three leachate monitoring wells that will be installed within the landfill material. This task has been designated as a work effort separate from the installation of the groundwater monitoring wells because of potentially greater safety risks. The presence of high levels of landfill gas, potentially under significant pressures, necessitates the provision of additional safety measures such as supplied air and SCBA equipment. A magnetometer or metal detector will be used to avoid drilling into buried containers such as drums. During this task, geologic samples will be obtained as in the drilling of the boreholes for the groundwater monitoring wells. A geotechnical engineer will provide supervision of the leachate well drilling and installation. A QA/QC officer will assume

the responsibility for QA/QC functions, and will also act as the Health and Safety officer for the drilling and well installation. The QA/QC officer will have complete authority to shut down or interrupt drilling operations should unsafe conditions arise that cannot be mitigated with those measures outlined in the Health and Safety plan.

2.3.3. TASK 3.3 GAS PROBE INSTALLATION

During this task, twenty gas probe clusters will be installed in and adjacent to the landfill area. These probe locations will be selected to complement the data obtained from the initial installation of approximately 75 gas probes which are being implemented under a separate work plan. Locations will be finalized by the geotechnical site manager in consultation with landfill gas experts assigned to the B&V project team and WDOE project managers. The securing of rights-of-way for off-site probe installation will be the responsibility of WDOE.

Probes will be installed near groundwater monitoring well locations, and will consist of two or three clustered probes per location to assess the extent of gas migration with depth and stratigraphy. During drilling and installation of the gas probes, the geotechnical site manager will provide drilling supervision and will be responsible for geotechnical sample collection, drilling procedures, installation procedures, and gas probe completion. The geotechnical site manager will be assisted by a landfill gas expert who will be responsible for selecting final probe depths and other decisions related to optimization of the subsequent gas probe monitoring program. A full-time H&S/QA officer will be provided for on-site activities, and will also assume responsibility for implementing the provisions of the Health and Safety plan. For off-site probe installation, the H&S/QA officer will be provided on a part-time basis, with the site manager assuming those duties when the H&S/QA officer is involved with on-site responsibilities.

2.3.4. TASK 3.4 GEOPHYSICAL SURVEYS

This task will be devoted to conducting a geophysical survey in the Midway Landfill area. Methods anticipated to be utilized include a magnetometer

survey, resistivity survey using two dipole separation schemes, and a seismic refraction survey. Strategy for the geophysical survey is to provide the greatest amount of data which can be obtained with a moderate level of technical complexity and minimum cost. Because the depth to groundwater is in excess of 100 feet, the geophysical survey methods are not expected to provide extensive data concerning grounwater movement; however, the methods are expected to provide extremely useful data in further defining complex landfill stratigraphy and gas migration pathways. The geophysical survey will be conducted within the same time frame as the drilling operations, in order to obtain concurrent ground truth data. The team selected to perform the geophysical survey will assume the responsibility for implementing safety measures in accordance with the site Health and Safety Plan, and will comply with all QA/QC requirements to assure data validity. The geotechnical site manager will be responsible for coordinating schedule and technical issues involved in conducting geophysical survey activities.

2.3.5. TASK 3.5 GROUND SURVEY

During this task, the locations and elevations of all groundwater monitoring wells, leachate wells, gas probes, and sampling sites will be surveyed. Additionally, this work effort will encompass the surveying of the gas probes (approximately 75) installed under the "Project Work Plan for Gas Probe Installation, Midway Landfill Remedial Investigation, Kent, Washington (B&V,September 1985). The surveying of all sample locations is necessary to accurately document their location in accordance with CERCLA guidelines, and to provide information to be used in the designing of remedial action alternatives during a subsequent feasibility study. It is expected that one subcontract survey crew will be used to complete the field portion of this task. Survey computations and plotting of locations and elevations on base maps will be based on field survey notes.

2.3.6. TASK 3.6 SOIL INVESTIGATION

In this task, soil samples will be obtained from approximately fifteen locations in the landfill to provide information on the structure, description,

and permeability of the in-situ soils, and to characterize the soils from the Terminal 5 area that were placed at the landfill. The samples will be obtained using a hand-held screw type auger. Locations of the sampling will be finalized by the geotechnical site manager. A two-person team will collect the samples; one person will obtain the sample; the other team member will perform H&S/QA functions, and will carry portable instrumentation to indicate the need for appropriate levels of protection on-site. Locations for soil sampling will be coordinated with geophysical survey results.

In-sity permeability tests will be performed at selected soil sampling sites after soil samples are collected. These tests will be conducted using either constant or falling head permeability protocol by the soil sampling crew. Purpose of these tests is to determine surface infiltration rates for the existing landfill cover which will provide one segment of the total hydrologic data base for the landfill.

2.3.7 TASK 3.7 SURFACE WATER INVESTIGATION

During this task, storm water sampling instrumentation will be installed at the locations determined during site planning activities. Two automated storm-triggered stormwater samplers will be installed, along with flow recorders. A detailed storm sewer review will be conducted for the vicinity surrounding the landfill to accurately determine storm sewer drainage patterns. Staff gages will be installed at the north and middle ponds on the landfill site. The locations of surface seeps in the study area surrounding the landfill will be documented and mapped for subsequent sampling and water level measurements.

2.3.8. TASK 3.8 CLIMATOLOGICAL/AIR QUALITY STATION INSTALLATION

Two on-site climatological/air quality stations and satellite off-site stations will be installed during this task. Installation will be completed as quickly as possible after field activities are initiated. The information gathered from the stations will assist in planning day-to-day field activities, by providing information concerning wind speed and direction, relative

humidity, barometric pressure, temperature, rainfall, and evaporation rates. These stations will also be used to obtain daily on-site air quality data during the field activity period. The stations will be installed at locations to be determined by the B&V surface activities site manager, with advice from B&V and subcontractor meteorological and air quality experts. A specialty subcontractor will be retained to assist in identification of station locations. The subcontractor will install, test, and start up the instrumentation, provide consultation, and collect air quality samples during the RI field activities and monitoring periods. Satellite off-site locations will be chosen to record wind speed and direction, and temperature. Data obtained from climatological and air quality instruments will be used in assessing both on-site and off-site air quality impacts. Satellite air quality stations utilized for detection of a surrogate air quality toxics parameter, such as hydrogen sulfide, will be installed during the RI monitoring phase of work at selected on-site and off-site locations to better define the movements of landfill gas components in ambient air.

2.3.9 TASK 3.9 RECEPTOR INVESTIGATION

The identification of potential receptors will be completed during this task. Receptors are defined as those human and other life forms on and adjacent to the landfill which may be detrimentally affected by environmental problems created by the presence of the landfill including gas migration, groundwater or surface water contamination, soil contamination, or air quality contamination. Included in this work effort will be a detailed water well survey to determine if there are any operational wells that are at risk from groundwater contamination; the location of seeps adjacent to surrounding businesses and homes; and a census to determine daily migration habits of the local population. A review of available vegetation and wildlife inventories will be made by biological scientists, and contacts will be made with State and Federal natural resource agencies to determine if any threatened or endangered species inhabit the study area. Results obtained from the combustible gas monitoring efforts currently underway will be used to profile the size and distribution of the population at risk from landfill gas presence. Potential risks to receptors will be reviewed synoptically by preparing geographic

distribution maps of problem issues and overlaying these on the study area base map.

2.3.10. TASK 3.10 WASTE CHARACTERIZATION

In order to develop information that will be used to assist in determining the types of contamination that are present within the landfill, selective chemical analysis will be performed on subsurface material samples. Samples will be selected during drilling of leachate wells and gas probes located within the landfill material. The geotechnical site manager will direct the collection of individual or composite samples from representative subsurface fill intervals. The samples will be analyzed for parameters as described in Section 6 of this work plan. The information obtained from this task is expected to be used in the development of predictions regarding leachate composition and generation rates.

2.4. TASK 4 MONITORING ACTIVITIES

An intensive monitoring effort will be undertaken in conjunction with the geotechnical drilling and equipment installation task and other field activities conducted at the Midway Landfill site. The monitoring program will be conducted on a schedule which is intended to provide time correlated data for multi-media environments, with an objective of providing basic RI-related information on the hydrologic cycle, climatic and air quality cycle, groundwater hydrology, leachate movement, and gas migration dynamics related to the Midway Landfill site.

During this work effort, monitoring of newly installed groundwater monitoring and leachate wells, gas probes, and air quality will be conducted. Additionally, existing wells and probes will be sampled, as well as surface water quality. The monitoring efforts are further described below.

2.4.1 TASK 4.1 GROUNDWATER AND LEACHATE WELL MONITORING

The goundwater monitoring wells and the leachate wells will be sampled a minimum of four times during the RI monitoring period. Water level measurements will be made weekly using an electronic well level indicator. Each of the newly installed wells will be sampled, as will the existing on-site groundwater and leachate monitoring wells. It is anticipated that at least two off-site, privately owned wells will also be sampled during this work effort. Two of the sampling events are scheduled to occur in association with wet weather events, and two during dry weather conditions. An appropriate antecedent condition will be selected for each sampling event. A two-member team will be used to obtain the samples, with one team member devoted to sample handling (preparation of sample containers as appropriate, filling of containers, completion of chain of custody forms, packing and shipping); the other team member will be responsible for purging of the wells and the actual sample procurement, and in-situ parameter measurement as outlined in the sampling plan. The site H&S/QA officer will oversee this activity to insure that all provisions of the Health and Safety and Quality Assurance Plans are

followed.

2.4.2 TASK 4.2 GAS PROBE MONITORING

This task will focus on sampling twenty new gas probe clusters installed under this work plan, approximately 77 probes being installed under a separate Midway Landfill work plan, and the probes which have been installed in and near the landfill in 1985 by the City of Seattle, Solid Waste Utility. Time correlated monitoring will begin immediately after completion of probe installation with a complete scan of all probes, and will continue weekly for the duration of the initial monitoring period. Monitoring will include combustible gas concentration, O_2 level, CO_2 level, H_2S level, and volatile organics semi-quantitative chromatographic analysis. The equivalent of five complete rounds of gas probe sampling will be completed during this task. One two-man crew, trained previously, will complete this task, with supervision provided by the site manager and H&S/QA officer.

2.4.3 TASK 4.3 AMBIENT AIR MONITORING

Automated collection of climatological and ambient air quality data will be initiated as early as possible during the RI field activities period and will be closely coordinated with other ongoing RI field activities. Additional sampling efforts during the intensive monitoring period will be based upon an extension of the monitoring work performed on-site by the University of Washington (University of Washington, July, 1985). Special attention will be given to verifying critical climatic conditions suggested in the university researcher's report. Data will be obtained in a manner to facilitate input into the air quality mathematical model developed for the site. An on-site automatic weather station will be installed to collect meteorological data as early as possible during the field activities period and will continue to operate throughout the intensive monitoring period. Parameters to be measured will include wind speed and direction, temperature, humidity, barometric pressure, precipitation, and evaporation. Sampling pumps using charcoal collector tubes will be installed at an upwind and a downwind site. The pumps will be collecting time weighted samples under microprocessor control throughout the time that drilling activities are taking place on site, and will

continue to operate during the intensive monitoring period. In addition, on-site real time organic vapor analysis will be conducted using a portable continuous-calibration gas chromatograph linked to the automated air sampling system.

In addition to automated ambient air sampling and analysis during the implementation of field activity and monitoring tasks, an organic vapor analyzer (OVA) will be used to scan existing operational on-site flares, newly constructed gas extraction wells, and sites expected to experience "worst case" conditions as predicted by the Midway Landfill air quality mathematical model. Samples will be collected in a manner which will provide valid data for model calibration and verification. Duplicate carbon tube samples will be collected at selected sites, both on and adjacent to the landfill, for laboratory confirmation of organic vapor analyzer data.

During the intensive monitoring period, satellite fixed air quality stations will be implemented to monitor a surrogate air toxics parameter such as hydrogen sulfide. These satellite stations will be moved about as appropriate to collect data which is representative of "worst case" climatological conditions in the vicinity of the landfill. This data collection effort will be coordinated with organic vapor analyzer mobile ambient air and gas flare sampling to obtain a geographically correlated data set for calibration or verification of the air quality model for selected air toxics.

2.4.4 TASK 4.4 SURFACE WATER MONITORING

Intensive monitoring of surface water will be conducted at sites where stormwater sampling and flow monitoring devices have been installed, and at other surface water sites which may be correlated with the landfill site either through leachate seepage or potential infiltration surfaces. At least two storm events will be monitored using storm actuated flow and sampling devices installed temporarily at Interstate 5 highway culverts which are connected to pipes that discharge into the landfill. Water quality parameters will be analyzed as described in the sampling plan.

Water levels at ponds and seeps identified during the field investigation

activities will be measured on a daily basis during the intensive monitoring period. Samples will be obtained as appropriate based on water levels and antecedent conditions and analyzed for the presence of selected indicator pollutants. Hydrologic data associated with surface water run-on will be obtained from on-site climatological instruments as described in Task 4.3. Monitoring well samples and water levels obtained for wet weather conditions will be coordinated with stormwater sampling events to gain insight into overall landfill area water balance.

2.5 TASK 5 DATA ANALYSIS AND REPORT PREPARATION

The purpose of this task is to analyze and interpret the multi-media data base obtained during the remedial investigation field activities and monitoring program, develop conclusions and recommendations regarding receptor impacts from off-site migration of landfill contaminants, and prepare technical and project reports which summarize the completed work efforts and estimate additional levels of effort necessary to define the nature and extent of particular problem issues. Conclusions and recommendations for further remedial investigation activities will be detailed including plans for further monitoring of installed groundwater/leachate wells, gas probes, ambient air, and surface water.

2.5.1 TASK 5.1 DATA ANALYSIS AND INTERPRETATION

The purpose of this task will be to analyze and interpret the data obtained from the field activities. The development of a data management system (described in TASK 6) will allow for the efficient, accurate analysis of generated data. The data analysis will include statistical analysis of each data type in accordance with the procedures outlined in the Midway Landfill Quality Assurance Plan. Statistical correlations of selected data groups will be performed (e.g., correlations between strata permeabilities and gas concentrations) to assist in developing assessments of current conditions and predictions of future conditions. During this task, data action level criteria will be developed which will represent RI/FS decision points for assessing the need for additional data, defining extent and magnitude of contamination, and/or implementing remedial actions.

The output from this task will consist of data summaries, data plots, data statistical correlations, and other items which describe numerically and mathematically the field activities and the monitoring activities completed in accordance with this work plan. Data analysis results will be used to describe as accurately as possible the current conditions within and near the landfill. Locations of all newly placed wells and probes and sampling sites will be recorded on base maps.

It is anticipated that data analysis efforts will include historical long term climatological data assessment, primarily wind direction and velocity and precipitation, and additional ambient air model development and refinement to better define "worst case" atmospheric conditions. Also, it is likely that groundwater and leachate hydraulics will be simulated by some type of simple mathematical model. However, it is not anticipated that detailed or complex modeling of groundwater will be undertaken during this phase of the remedial investigation.

2.5.2 TASK 5.2 PROJECT REPORTS AND PLANS

2.5.3 TASK 5.2.1 GEOTECHNICAL/GEOLOGIC REPORT

This report will describe the geotechnical and geological information generated during the installation of the monitoring wells and gas probes. Incorporated into this report will be the results obtained from the geophysical survey, and the results of the soil sampling effort. Standard stratigraphic logs and lithographic descriptions will be included in the report.

2.5.4 TASK 5.2.2 GAS PROBE MONITORING REPORT

A report will be prepaed summarizing the results obtained during the monitoring of the gas probes. A summary of the gas concentrations and analytical results will be presented. An assessment of the effectiveness of the proposed gas collection system will be made, if sufficient data is available. Spatial and temporal gas relationships will be described, and isopleths of gas concentrations will be prepared on basemaps. Statistical regression correlations of data will be completed to establish simple models of migration mechanisms, as appropriate. Additional at-risk areas will be identified, if appropriate.

The development of a long-term gas monitoring program will be included as part of this report. This plan will identify additional monitoring efforts (if needed) and will scope the time frame and frequency of sampling. Quality assurance/quality control measures will be included, in order to assure that

all subsequent data gathering efforts and results are legally defensible.

2.5.4 TASK 5.2.3 GROUNDWATER MONITORING REPORT

A report will be prepared that summarizes the information obtained during the field activities and monitoring efforts and describes the qualitative condition of the groundwater in the landfill vicinity. The need for additional groundwater monitoring wells will be assessed, and recommendations will be made concerning the location of additional wells. The results of the waste characterization program will be included. An interim groundwater monitoring plan will be presented based upon the information obtained from the four sampling efforts. This plan will address the parameters and monitoring frequency for additional and existing wells.

2.5.5 TASK 5.2.4 AMBIENT AIR MONITORING REPORT

The results of the ambient air/climatological monitoring will be compiled and presented in report format. Results will be compared to regulatory limits for those compounds for which ambient air limits exist. Recommendations for additional monitoring, if needed, will be made. Ambient air quality impacts on potential receptors will be assessed with regard to worst case climatological conditions.

2.5.6 TASK 5.2.5 GROUND SURVEY REPORT

In this report the locations of the wells, probes, and sampling points will be described and plotted on a base map. Field books and calculations will be submitted. The depth and volume of the on-site pond will be determined and included in the report.

2.5.7 TASK 5.2.6 SURFACE WATER REPORT

The data obtained during the surface water investigation will be compiled in a report format. The amount of rainfall and run-on will be summarized, and comparison of the values obtained will be made with previously calculated amounts. The necessity of re-routing surface drainage away from the landfill

will be assessed. An overall huydrologic balance will be described based on data obtained to date and closure options for surface water as described in the Midway Landfill Environmental Impact Statement (Parametrix, August, 1985). Data for ponds and seeps will be summarized with respect to surface and groundwater interactions.

2.5.8 TASK 5.2.7 RECEPTOR IDENTIFICATION AND IMPACT REPORT

The receptor populations identified during the course of the field activities will be described. The populations will be described according to paths of contaminant exposure they may be exposed to whether air, water, or soil. Included in the assessment will be infrastructure (residences, businesses, transportation patterns, utility layouts, etc.), wildlife and aquatic resources, and vegetation. The primary method utilized to define potential exposure limits will be geographic overlays of receptor populations and pollutant pathways on study area base maps. These plots will provide sufficient detail to establish geographic limits for additional RI field or monitoring activities.

2.5.9 TASK 5.2.8 PROJECT SUMMARY REPORT

An overall summary report will be prepared to present a comprehensive and synoptic review of all RI activities to date. The primary objectives of this report will be (1) synoptic review of all field data,(2) identification of further field data collection needs (3) updated status of off-site surface or subsurface pollutant migration problems including identified receptor populations, and (4) conclusions and recommendations for further remedial action efforts. The report will be organized into major issues discussions using the established data base and individual project technical reports to summarize status of the following issues: gas migration, leachate migration, offsite groundwater contamination. off-site air quality degradation, overall water balance and drainage, and off-site receptor impacts. The project summary report will include an executive summary section suitable for public distribution and fact sheet development.

2.6 TASK 6 PROJECT MANAGEMENT

Project management will be an ongoing task throughout the proposed work effort. Management activities are expected to include management of staff assignments and budgets, staff or public meetings, preparation of monthly status reports, subcontractor supervision, contract management activities, and data management . Management of the remedial investigation schedule for field activities and monitoring will be a major project management task in this work plan due to the large number of interrelated simultaneous tasks. Staff assignments and organization and subcontract management will also be significant management efforts during work plan implementation.

Data management will be an important project management function for the Midway Landfill remedial investigation effort. A large and diverse data base will be created by field and monitoring activities. Historical and existing data collection efforts have also resulted in a large amount of data which needs to be placed in a manageable format. The following items will be addressed during the implementation of the data management task:

- WDOE data management format requirements
- Data types and quantity (historical and projected)
- Types and volumes of associated data (climatic, geological, water quality, ambient air, gas probe, potable water)
- QA/QC plan requirements
- Computer data base and mathematical model format requirements
- Data security requirements (confidentiality)

The data management system will result in the creation of files that are complete, properly categorized, quality assured, and will include all data attributes (including statistical measures such as mean, median, mode, standard

deviation). The data management system files will be accessible to qualified personnel for use in development of contamination assessment (extent and magnitude), the preparation of summary reports, and identification of additional data needs.

2.7 TASK 7 COMMUNITY RELATIONS

Activities identified in the Midway Landfill Community Relations Plan will be implemented during this task. Specific efforts will include preparation of fact sheets for public distribution, a pre-activity public meeting, post-activity public meeting, and condensed summaries of the results obtained during the field investigation.

3.0 PROJECT SCHEDULE

Figure 3.1 describes the proposed remedial investigation schedule. Work plan implementation is expected to begin during November, 1985 and will extend for approximately 32 calendar weeks. Schedule matters will be detailed further during site planning activities to be conducted during the first six weeks of work plan activity.

4.0 PROJECT TEAM ASSIGNMENTS

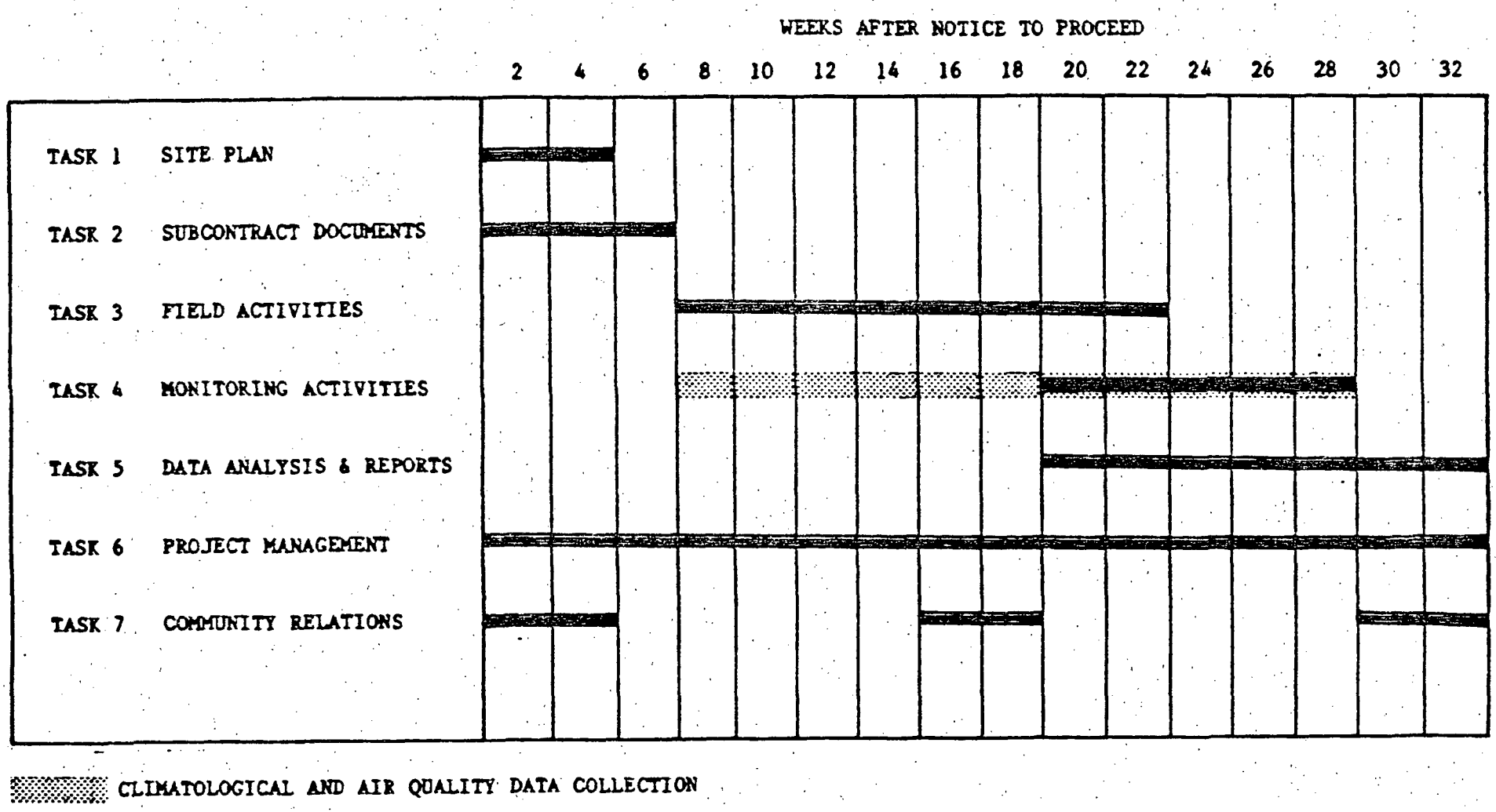
Key personnel assigned to this project are identified below. Position responsibilities are described in an organizational format for remedial investigation work plan field activities in Figure 4-1 of this section. Project organization for field and monitoring activities will be detailed during the site planning task implementation.

Black & Veatch

Program Manager	Paul B. MacRoberts	913-339-2000
Program Engineer	Mark G. Snyder	206-754-0515
Project Engineer	Wm. Gary Smith	504-926-3743
Health & Safety/Quality Assurance Officer	(To Be Named)	
RI Geotechnical Site Manager	(To Be Named)	
RI Surface Activities Site Manager	(To Be Named)	

Hart-Crowser & Associates

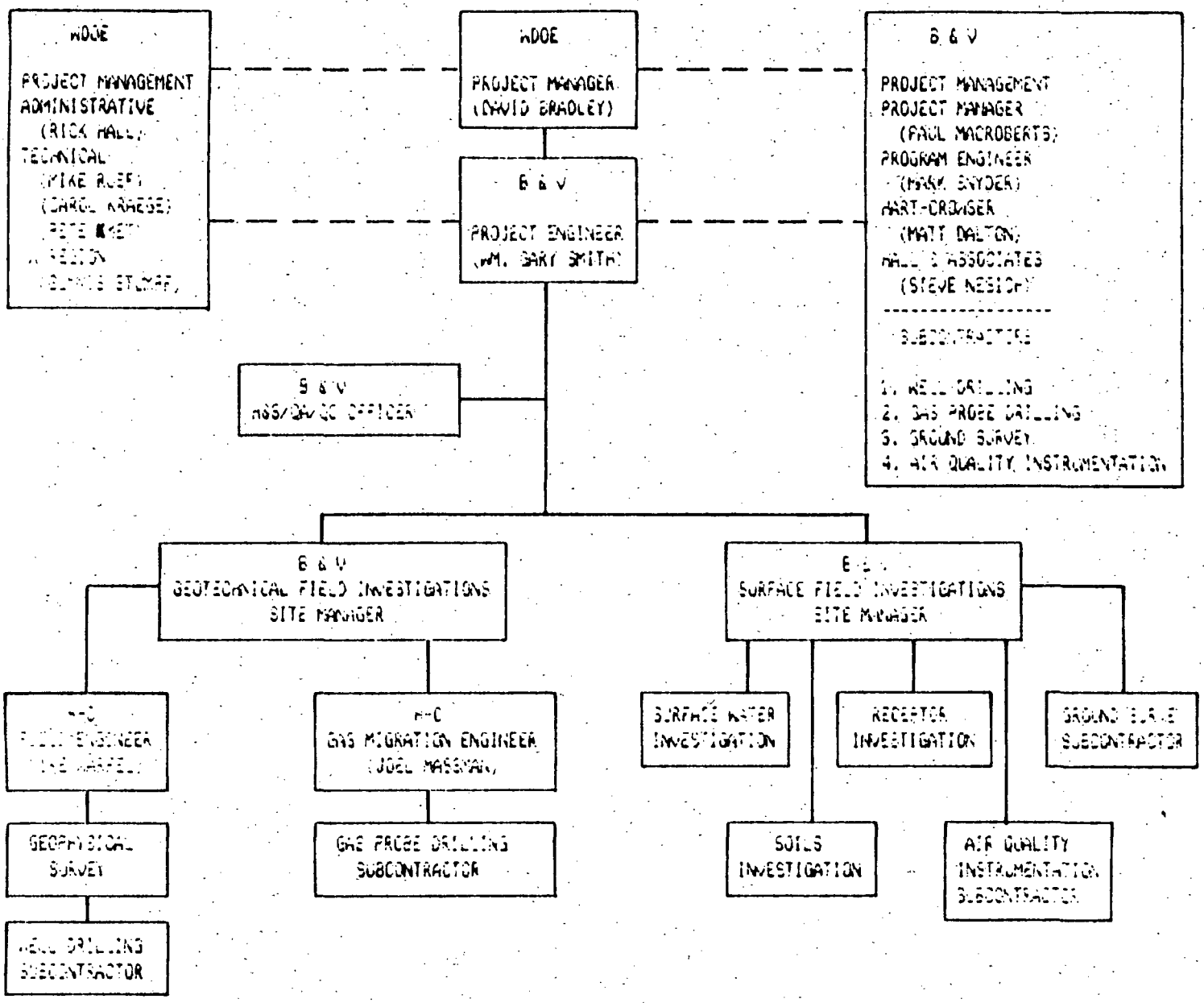
Project Manager	Matt Dalton	206-324-9530



SCHEDULE FOR REMEDIAL INVESTIGATION
MIDWAY LANDFILL

FIGURE 3.1

FIGURE 4.1
MIDWAY LANDFILL RI WORK PLAN
PROPOSED FIELD ACTIVITIES ORGANIZATION



NOTE: PERSONNEL TENTATIVELY ASSIGNED TO POSITIONS SUBJECT TO CHANGE.

Project Hydrogeologist	Mike Warfel	206-324-9530
Project Gas Migration Engineer	Joel Massman	206-324-9530

Hall & Associates

Community Relations Coordinator	Steve Nesich	206-441-4255

5.0 MBE/WBE PLAN

The following table summarizes the firms and respective participation levels that have been estimatd within this project work plan.

Minority Business Enterprises (MBE)	Participation	Work Assignment
Subcontract - Subsurface Exploration		Monitoring/Leachate Well Drilling
Subcontract - Subsurface Exploration		Gas Probe Installation
Subcontract - Ground Survey		Horizontal/Vertical Surveys in Study Area

Women's Business Enterprises (WBE)	Participation	Work Assignment
Hall & Associates		Community Relations

Note: "Participation" is presented as a percentage of estimated project costs

for the work assignment as compared with the total estimated work assignment budget, both exclusive of other direct costs.

6.0 PROJECT BUDGET

Estimated costs for this work plan and appropriate detail support are provided in the tables within this section.

6.1 PROJECT BUDGET SUMMARY

Project budget summary is presented in Table 6.1-1. Tables 6.1-2 and 6.1-3 present summary cost information for Black & Veatch primary subcontractors, Hart Crowser & Associates, Inc. and Hall and Associates. Both Hart-Crowser and Hall & Associates will be governed by the cost plus fixed fee type contract. The following additional subcontracts are expected to be implemented during the remedial investigation work plan effort:

Table 6.1-4 Groundwater and Leachate Monitoring Well Drilling and Installation

Table 6.1-5 Gas Probe Clusters Drilling and Installation

Table 6.1-6 Horizontal and Vertical Ground Surveys of the Study Area

Table 6.1-7 Air Quality Instrumentation Installation and Operation

The additional drilling and survey subcontracts are expected to be of the lump sum with unit price adjustment type, and the air quality instrumentation subcontract is expected to be a professional type contract of the cost plus fixed fee type. The above tables represent a preliminary estimate of the anticipated cost for each effort based on the specified level of effort.

6.2 DIRECT LABOR HOURS

A summary of the total direct labor hours by task and labor category is presented in Table 6.2-1. Tables 6.2-2 through 6.2-4 present direct labor hours for each firm by task and labor category.

6.3 OTHER DIRECT COSTS

A summary of preliminary estimates of other direct costs for each of the primary firms is presented in Tables 6.3-1 and 6.3-2. These tables include an extended listing of equipment and supplies which will be required for the anticipated major level of effort for field investigations and field monitoring.

A summary of preliminary estimates of direct costs for laboratory analysis of field collected samples is included in Table 6.3-3. At this time, it is anticipated that contract laboratories will be utilized to perform this effort, so the budget for these items is not included in the overall project budget summary. Tables 6.3-4 through 6.3-10 are individual summaries of expected quantities and costs for each major category of field sample to be collected during the remedial investiagtion work plan implementation.

TABLE 6.1-1

PROJECT BUDGET SUMMARY
(BLACK & VEATCH)

Labor Category	Manhours(1)	Rate(2)	Total	
Program Manager	98	$35.64	$3,492.72	
Program Engineer	384	23.76	9,123.84	
Prof. 4	228	25.85	5,893.80	
Prof. 3	1,888	21.20	40,025.60	
Prof. 2	1,260	17.74	22,352.40	
Prof. 1	885	13.97	12,363.45	
Tech. 2	981	13.87	13,606.47	
Tech. 1	190	7.97	1,514.30	
Clerical	320	8.14	2,604.80	
Direct Labor	6,234		$110,977	
Overhead (102.985% X DL)			114,290	
Fee			27,744	
SUBTOTAL				$253,011
Subcontracts:				
Hall & Associates			$8,804	
Hart - Crowser			185,556	
SUBTOTAL				$194,361

Additional Subcontract Cost Estimates:		
Groundwater/Leachate Well Drilling/Installation	$98,600	
Gas Probe Drilling/Installation	81,500	
Ground Survey, Horizontal & Vertical Control	29,800	
Air Quality Instrumentation, Installation & Consolidation	40,500	
		250,400
Other Direct Costs (Table 6.3-1)		209,805
TOTAL ESTIMATED PROJECT COSTS		$907,577

Notes: (1) See Table 6.2-2
(2) Firm's Average

TABLE 6.1-2

PROJECT BUDGET SUMMARY
(HALL & ASSOCIATES)

Labor Category	Manhours(1)	Rate(2)	Total	
Prof. 4	0	$24.00	$0.00	
Prof. 3	104	16.50	1,716.00	
Prof. 2	0	15.85	0.00	
Prof. 1	0	15.00	0.00	
Tech. 2	0		0.00	
Tech. 1	80	11.00	880.00	
Clerical	80	9.00	720.00	
Direct Labor	264		$3,316	
Overhead (142% X DL)			4,709	
Fee			497	
SUBTOTAL				$8,522
Other Direct Costs (Miscellaneous)				282
ESTIMATED PROJECT COSTS FOR FIRM				$8,804

Notes: (1) See Table 6.2-3
(2) Firm's Average

TABLE 6.1-3

PROJECT BUDGET SUMMARY
(HART - CROWSER)

Labor Category	Manhours(1)	Rate(2)	Total	
Prof. 4	148	$32.00	$4,736.00	
Prof. 3	836	22.00	18,392.00	
Prof. 2	712	15.50	11,036.00	
Prof. 1	1257	10.50	13,198.50	
Tech. 2	176	10.00	1,760.00	
Tech. 1	0	8.00	0.00	
Clerical	152	8.00	1,216.00	
Direct Labor	3,281		$50,339	
Overhead (196.4% X DL)			98,865	
Fee			12,585	
SUBTOTAL				$161,789
Other Direct Costs (Table 6.3-2)				23,768
ESTIMATED PROJECT COSTS FOR FIRM				$185,556

Notes: (1) See Table 6.2-4
(2) Firm's Average

TABLE 6.1-4

COST ESTIMATES - GROUNDWATER WELLS
+ LEACHATE WELLS

A. CABLE-TOOL HOLES

MOB/DEMOB:	400.
DRILLING 940 FT x $23/FT.	21,620.
S.S. SAMPLES - EVERY 5' 740 FT/5 = 148 SAMPLES x $20/SAMPLE	2960.
DRILLING LABOR - INSTALLATION 6 WELLS x 12 HRS/WELL x $100/HR	7200.
DRILLING LABOR - DEVELOPMENT 6 WELLS x 4 HRS/WELL x $100/HR	2400.
CLEAN-UP 6 WELLS x 2 HRS/WELL x $100/HR	1200.

B. HOLLOW STEM HOLES OUTSIDE LANDFILL

MOB/DEMOB	400.
DRILLING 70 FT W/SAMPLING x $12/FT 180 FT W/O SAMPLING x $8/FT.	840 1440
DRILLING LABOR - INSTALLATION 3 WELLS x 6 HRS/WELL x $100/HR	1800.
DRILLING LABOR - DEVELOPMENT 3 WELLS x 3 HRS/WELL x $100/HR	900.
CLEAN-UP 3 WELLS x 3 HRS/WELL x $100/HR	900.

C. HOLLOW STEM HOLES INSIDE LANDFILL - LEACHATE

DRILLING 70 FT W/SAMPLING x $18/FT. 150 FT W/O SAMPLING x $12/FT.	$1260.
DRILLING LABOR - INSTALLATION 3 WELLS x 8 HRS/WELL x $100/HR	2400.
DRILLING LABOR - DEVELOPMENT 3 WELLS x 4 HRS/WELL x $100/HR	1200.
CLEAN-UP 3 WELLS x 4 HRS/WELL x $100/HR	1200

D. MATERIALS - LEACHATE AND GROUNDWATER WELLS

PVC BLANKS (SCH. 40, THREADED, 2") 1235' x $2.50/FT	3088.
PVC SCREEN (SCH 40, 0.02" SLOTS) 165' x $3.50/FT	578
BENTONITE (2' SEAL/WELL) 12 WELLS x $100/WELL	1200
SAND 225' x 50 lbs/FT x $10/100 lbs	1125
CEMENT-SLURRY 1235' CEMENT: 1/4 BAG/FT x 1235' = 310 BAGS x $7/BAG BENTONITE: 2 lbs/FT x 1235' = 25 BAGS x $12/BAG	2470.
MONUMENTS 12 x $75	900.
STEAM-CLEANER RENTAL 3 WEEKS x $200/WK	600.
SUBTOTAL	58,100.
7.8% SALES TAX	4,532
	62,632
10% MBE SURCHARGE	6,263
	$68,895

DRILLER COSTS

DRILLING 590 FT x $23/FT	13,570.
S.S. SAMPLES - EVERY 5' 160/5 = 32 SAMPLES x $20/SAMPLE	640.
DRILLING LABOR - INSTALLATION 4 WELLS x 12 HRS/WELL x $100/HR	4800.
DRILLING LABOR - DEVELOPMENT 4 WELLS x 4 HRS/WELL x $100/HR	1600.
CLEAN-UP 4 WELLS x 2 HRS x $100	800.
PVC BLANK 550' x 2.50/FT	1375.
PVC SCREEN 40' x 3.50/FT	140.
BENTONITE 4 x $100/WELL	400.
SAND 60' x 50 lbs/ft x $10/100 lbs	300.
CEMENT - SLURRY 550' x $2/FT	1100.
MONUMENTS 4 x 75	300.
	$25,025.
	1,952
	26,977
7.8% sales tax	2,698
10% MBE	$29,675

Source: Hart-Crowser

TABLE 6.1-5

COST ESTIMATES - GAS PROBES

A. HOLLOW STEM HOLES INSIDE LANDFILL

MOB/DEMOB	400.
DRILLING 330 FT x $18/FT.	5940.
DRILLING LABOR - INSTALLATION 1 SINGLE CLUSTER x 3 HRS x $100/HR 5 DOUBLE CLUSTERS x 8 HRS x $100/HR	4300.
CLEAN-UP 6 CLUSTERS x 4 HR/CLUSTER x $100/HR	2400.

B. HOLLOW STEM HOLES OUTSIDE OF LANDFILL

DRILLING 1460 FT x $12/FT.	17,520.
DRILLING LABOR - INSTALLATION 6 DOUBLE CLUSTERS x 6 HRS x $100/HR 11 TRIPLE CLUSTERS x 8 HRS x $100/HR	12,400.
CLEAN-UP 17 CLUSTERS x 3 HRS/CLUSTER	5100.

C. MATERIALS

PVC BLANKS (½" ϕ, SCH. 80, THREADED) 2120 FT x $1.1/FT	2120
PVC SCREENING (½" ϕ, SCH. 80, 0.02" SLOTS) 1035 FT x $2.25/FT.	2329.
BENTONITE (2' SEAL/PROBE) 57 PROBES x $100/PROBE	5700.
SAND (AQUA 8) 1320 FT x 50 lbs/FT x $10/100 lbs	6600.
CEMENT SLURRY 790' CEMENT: ¼ BAG/FT x 790 FT x $7/BAG BENTON. 2 lbs/FT x 790 FT x $12/BAG	1592.
MONUMENTS 23 x $75	1725.
VALVES 23 x $20.	460.
SUBTOTAL:	68,590.
7.8% TAX	5,350
	73,940
10% MBE CHARGE	7,394
	$81,334

Source: Hart-Crowser

TASK 6.1-6

MIDWAY LANDFILL GROUND SURVEY

1. Mobilization	$ 1,000
4-person survey party, vehicle, equipment, supplies	
2. Labor	16,000
4-person survey party, 20 miles horizontal control 20 miles vertical control, at 2 miles/day = 20 days	
3. Clearing	800
1 day clearing at full crew rate	
4. Daily Subsistence	6,000
Full crew @ $75.00/person for 20 days	
5. Equipment & Supplies	
Survey vehicle @ $50.00/day	1,000
Survey equipment @ $50.00/day	1,000
Misc supplies (field books, flagging, stakes)	100
TOTAL ESTIMATE	$25,900

Source of Estimate: Black & Veatch

TABLE 6.1-7

AIR QUALITY INSTRUMENTATION SUBCONTRACT
MIDWAY LANDFILL
RI WORK PLAN

WORK EFFORT	PERSONNEL LEVEL HOURS P4	P3	P2	P1	TOTAL COST
Initial Project Meeting	8	8			
Mobilization	8	8	20	20	
Equipment Installation	16	40	40		
Equipment Testing	40		40		
Equipment Startup	16	16	16		
Operator Training	16	16			
Data Collection				160	
Data Interpretation	40	40			
Additional Consultation (Misc.)	40	40			
TOTAL LABOR	184	168	116	180	
(Inc. Overhead & Fee)	@65	@55	@45	@25	
	$11,960	9,240	5,220	4,500	$ 30,920
Travel 61 days x $25/day + 6,100 miles x $0.25					3,050
H & S Equipment 60 days @ $25/day					1,500
Specialty Equipment 10 days @ $500/day					5,000
TOTAL ESTIMATE					$ 40,470

SOURCE: BLACK & VEATCH

TABLE 6.2-1 DIRECT LABOR HOUR SUMMARY

Task		Level of Effort Labor Category PM	PE	P4	P3	P2	P1	T2	T1	Secr	Tota
1	Development of Site Plan										
1.1	Preliminary Site Plan	0	0	0	24	24	16	12	0	12	88
1.2	Plan Review	0	4	4	8	0	0	0	0	8	24
1.3	Final Planning	0	4	4	48	16	16	20	0	16	124
1.4	Site Staking	0	0	0	8	0	16	0	0	0	24
1.5	H&S/QA Plan Prep.	0	8	16	20	0	56	24	0	8	132
2	Subcontract Documents										
2.1	Drawings	0	0	4	30	8	10	16	0	0	68
2.2	Specifications	2	4	12	100	16	32	0	0	44	210
2.3	Bid Tabulatuons	4	4	6	18	0	8	0	0	16	56
3.1	Groundwater Well Installation										
3.1.1	Drilling	0	0	8	172	110	423	0	0	0	713
3.1.2	Installation	0	0	4	64	32	134	0	0	0	234
3.1.3	Development	0	0	4	52	12	58	0	0	0	126
3.1.4	Site Cleanup	0	0	0	0	6	30	0	0	0	36
3.2	Leachate Well Installation										
3.2.1	Drilling	0	0	4	20	48	72	0	0	0	144
3.2.2	Installation	0	0	2	10	24	36	0	0	0	72
3.2.3	Development	0	0	1	8	12	18	0	0	0	39
3.2.4	Site Cleanup	0	0	1	3	12	18	0	0	0	34
3.3	Gas Probe Installation										
3.3.1	Drilling	0	0	4	396	312	140	0	0	0	852
3.3.2	Installation	0	0	4	156	172	48	0	0	0	380
3.3.3	Site Cleanup	0	0	0	64	44	24	0	0	0	132
3.4	Geophysical Survey										
3.4.1	Resistivity Survey	0	0	2	12	20	28	0	0	0	62
3.4.2	Seismic Refraction Survey	0	0	2	8	20	28	0	0	0	58
3.5	Ground Survey										
3.5.1	Field Survey Coordination	0	0	0	8	0	0	20	0	0	28
3.5.2	Survey Calc./Plotting	0	0	8	8	40	0	0	0	8	64
3.6	Soils Investigation										
3.6.1	Soils Sampling	0	0	0	0	0	8	8	0	0	16
3.6.2	Permeability Testing	0	0	0	4	0	16	16	0	0	36
3.6.3	Soils Analysis										
3.7	Surface Water Investigation										
3.7.1	Installation	0	0	0	4	0	20	20	0	0	44
3.7.2	Storm Sewer Review	0	0	0	4	0	24	24	0	0	52

3.8											
3.8.1	Equipment Installation	0	0	20	20	0	0	0	0	0	40
3.8.2	Testing/Startup	0	0	20	20	0	0	0	0	0	40
3.9	Receptor Investigation										
3.9.1	Water Well Survey	0	0	0	4	24	0	24	0	0	52
3.9.2	Infrastructure Survey	0	0	0	4	32	0	32	0	0	68
3.9.3	Natural Resources Survey	0	0	0	4	16	0	16	0	0	36
3.9.4	Receptor Mapping	0	0	0	12	36	0	60	0	0	108
4.1	Groundwater/Leachate Mon.										
4.1.1	Sample Collection	0	0	8	304	352	0	0	0	0	664
4.1.2	Sample Analysis										
4.2	Gas Probe Monitoring										
4.2.1	In Situ Monitoring	0	0	8	16	16	265	265	0	0	570
4.2.2	Sample Analysis										
4.3	Surface Water Monitoring										
4.3.1	Sampling/Measurement	0	0	0	64	0	136	0	0	0	200
4.3.2	Sample Analysis										
4.4	Ambient Air Monitoring										
4.4.1	Meteorlogical Monitoring	0	0	56	0	0	100	175	0	0	331
4.4.2	Air Quality Monitoring	0	0	0	80	0	60	105	0	0	245
4.4.3	Laboratory Analysis										
5	Data Analysis & Report Prep.										
5.1	Data Analysis/Interpretation	0	40	80	396	336	232	160	80	0	1324
5.2	Report Preparation	8	40	88	288	216	50	160	40	292	1182
6	Project Management										
6.1	Project Adminstration	12	38	0	30	0	0	0	0	8	88
6.2	Contract Management	32	96	0	30	0	0	0	0	16	174
6.3	Cost/Schedule Management	22	38	0	90	0	0	0	0	16	166
6.4	Project Communications	12	38	0	30	0	0	0	0	8	88
6.5	Data Management	6	46	0	35	0	0	0	70	8	165
7	Community Relations										
7.1	RI Fact Sheets	0	8	2	64	16	8	0	0	12	110
7.2	RI Public Meetings	0	16	4	48	0	12	0	40	40	160
7.3	Public Response	0	0	0	40	0	0	0	40	40	120
	Totals	98	384	376	2,828	1,972	2,142	1,157	270	552	9,779

TABLE 6.2-2 DIRECT LABOR HOURS
BLACK & VEATCH

Task		Level of Effort / Labor Category									
		PM	PE	P4	P3	P2	P1	T2	T1	Secr	Tota
1	Development of Site Plan										
1.1	Preliminary Site Plan	0	0	0	16	24	8	8	0	8	64
1.2	Plan Review	0	4	0	8	0	0	0	0	8	20
1.3	Final Planning	0	4	0	32	16	0	16	0	8	76
1.4	Site Staking	0	0	0	8	0	8	0	0	0	16
1.5	H&S/QA Plan Prep.	0	8	16	16	0	40	24	0	8	112
2	Subcontract Documents										
2.1	Drawings	0	0	4	20	8	0	8	0	0	40
2.2	Specifications	2	4	12	84	16	0	0	0	40	158
2.3	Bid Tabulatuons	4	4	4	16	0	8	0	0	16	52
3.1	Groundwater Well Installation										
3.1.1	Drilling	0	0	0	64	110	57	0	0	0	231
3.1.2	Installation	0	0	0	30	32	18	0	0	0	80
3.1.3	Development	0	0	0	22	12	6	0	0	0	40
3.1.4	Site Cleanup	0	0	0	0	6	4	0	0	0	10
3.2	Leachate Well Installation										
3.2.1	Drilling	0	0	0	8	48	24	0	0	0	80
3.2.2	Installation	0	0	0	4	24	12	0	0	0	40
3.2.3	Development	0	0	0	5	12	6	0	0	0	23
3.2.4	Site Cleanup	0	0	0	0	12	6	0	0	0	18
3.3	Gas Probe Installation										
3.3.1	Drilling	0	0	0	382	264	140	0	0	0	786
3.3.2	Installation	0	0	0	142	92	48	0	0	0	282
3.3.3	Site Cleanup	0	0	0	64	44	24	0	0	0	132
3.4	Geophysical Survey										
3.4.1	Resistivity Survey	0	0	0	8	0	0	0	0	0	8
3.4.2	Seismic Refraction Survey	0	0	0	4	0	0	0	0	0	4
3.5	Ground Survey										
3.5.1	Field Survey Coordination	0	0	0	8	0	0	20	0	0	28
3.5.2	Survey Calc./Plotting	0	0	8	8	40	0	0	0	8	64
3.6	Soils Investigation										
3.6.1	Soils Sampling	0	0	0	0	0	8	8	0	0	16
3.6.2	Permeability Testing	0	0	0	4	0	16	16	0	0	36
3.6.3	Soils Analysis	0	0	0	0	0	0	0	0	0	0
3.7	Surface Water Investigation										0
3.7.1	Installation	0	0	0	4	0	20	20	0	0	44
3.7.2	Storm Sewer Review	0	0	0	4	0	24	24	0	0	52

3.8	Climatological/Air Quality Station Installation										
3.8.1	Equipment Installation	0	0	20	20	0	0	0	0	0	4
3.8.2	Testing/Startup	0	0	20	20	0	0	0	0	0	4
3.9	Receptor Investigation										
3.9.1	Water Well Survey	0	0	0	4	0	0	24	0	0	2
3.9.2	Infrastructure Survey	0	0	0	4	0	0	32	0	0	3
3.9.3	Natural Resources Survey	0	0	0	4	16	0	16	0	0	3
3.9.4	Receptor Mapping	0	0	0	4	28	0	60	0	0	9
4.1	Groundwater/Leachate Mon.										
4.1.1	Sample Collection	0	0	0	16	64	0	0	0	0	8
4.1.2	Sample Analysis	0	0	0	0	0	0	0	0	0	
4.2	Gas Probe Monitoring										
4.2.1	In Situ Monitoring	0	0	0	0	0	0	265	0	0	26
4.2.2	Sample Analysis	0	0	0	0	0	0	0	0	0	
4.3	Surface Water Monitoring										
4.3.1	Sampling/Measurement	0	0	0	24	0	136	0	0	0	16
4.3.2	Sample Analysis	0	0	0	0	0	0	0	0	0	
4.4	Ambient Air Monitoring										
4.4.1	Meteorlogical Monitoring	0	0	56	0	0	100	175	0	0	33
4.4.2	Air Quality Monitoring	0	0	0	80	0	60	105	0	0	24
4.4.3	Laboratory Analysis	0	0	0	0	0	0	0	0	0	
5	Data Analysis & Report Prep.										
5.1	Data Analysis/Interpretation	0	40	40	300	240	112	80	80	0	89
5.2	Report Preparation	8	40	48	208	136	0	80	40	160	72
6	Project Management										
6.1	Project Adminstration	12	38	0	30	0	0	0	0	8	8
6.2	Contract Management	32	96	0	30	0	0	0	0	16	17
6.3	Cost/Schedule Management	22	38	0	90	0	0	0	0	16	16
6.4	Project Communications	12	38	0	30	0	0	0	0	8	8
6.5	Data Management	6	46	0	35	0	0	0	70	8	16
7	Community Relations										
7.1	RI Fact Sheets	0	8	0	16	16	0	0	0	8	4
7.2	RI Public Meetings	0	16	0	12	0	0	0	0	0	2
7.3	Public Response	0	0	0	0	0	0	0	0	0	
	Totals	98	384	228	1,888	1,260	885	981	190	320	6,23

TABLE 6.2-3 DIRECT LABOR HOURS
HALL & ASSOCIATES

Task		Level of Effort / Labor Category							
		P4	P3	P2	P1	T2	T1	Secr	Tot.
7	Community Relations								
7.1	RI Fact Sheets	0	40	0	0	0	0	0	4
7.2	RI Public Meetings	0	24	0	0	0	40	40	10
7.3	Public Response	0	40	0	0	0	40	40	12
	Totals	0	104	0	0	0	80	80	26

TABLE 6.2-4 DIRECT LABOR HOURS
HART-CROWSER

Task		Level of Effort / Labor Category							
		P4	P3	P2	P1	T2	T1	Secr	Tot
1	Development of Site Plan								
1.1	Preliminary Site Plan	0	8	0	8	4	0	4	2
1.2	Plan Review	4	0	0	0	0	0	0	
1.3	Final Planning	4	16	0	16	4	0	8	4
1.4	Site Staking	0	0	0	8	0	0	0	
1.5	H&S/QA Plan Prep.	0	4	0	16	0	0	0	2
2	Subcontract Documents								
2.1	Drawings	0	10	0	10	8	0	0	2
2.2	Specifications	0	16	0	32	0	0	4	5
2.3	Bid Tabulatuons	2	2	0	0	0	0	0	
3.1	Groundwater Well Installation								
3.1.1	Drilling	8	108	0	366	0	0	0	48
3.1.2	Installation	4	34	0	116	0	0	0	15
3.1.3	Development	4	30	0	52	0	0	0	8
3.1.4	Site Cleanup	0	0	0	26	0	0	0	2
3.2	Leachate Well Installation								
3.2.1	Drilling	4	12	0	48	0	0	0	6
3.2.2	Installation	2	6	0	24	0	0	0	3
3.2.3	Development	1	3	0	12	0	0	0	1
3.2.4	Site Cleanup	1	3	0	12	0	0	0	1
3.3	Gas Probe Installation								
3.3.1	Drilling	4	14	48	0	0	0	0	6
3.3.2	Installation	4	14	80	0	0	0	0	9
3.3.3	Site Cleanup	0	0	0	0	0	0	0	
3.4	Geophysical Survey								
3.4.1	Resistivity Survey	2	4	20	28	0	0	0	5
3.4.2	Seismic Refraction Survey	2	4	20	28	0	0	0	5
3.5	Ground Survey								
3.5.1	Field Survey Coordination	0	0	0	0	0	0	0	
3.5.2	Survey Calc./Plotting	0	0	0	0	0	0	0	
3.6	Soils Investigation								
3.6.1	Soils Sampling	0	0	0	0	0	0	0	
3.6.2	Permeability Testing	0	0	0	0	0	0	0	
3.6.3	Soils Analysis	0	0	0	0	0	0	0	
3.7	Surface Water Investigation								
3.7.1	Installation	0	0	0	0	0	0	0	
3.7.2	Storm Sewer Review	0	0	0	0	0	0	0	

3.8	Climatological/Air Quality Station Installation								
3.8.1	Equipment Installation	0	0	0	0	0	0	0	
3.8.2	Testing/Startup	0	0	0	0	0	0	0	
3.9	Receptor Investigation								
3.9.1	Water Well Survey	0	0	24	0	0	0	0	2
3.9.2	Infrastructure Survey	0	0	32	0	0	0	0	3
3.9.3	Natural Resources Survey	0	0	0	0	0	0	0	
3.9.4	Receptor Mapping	0	8	8	0	0	0	0	1
4.1	Groundwater/Leachate Mon.								
4.1.1	Sample Collection	8	288	288	0	0	0	0	58
4.1.2	Sample Analysis	0	0	0	0	0	0	0	
4.2	Gas Probe Monitoring								
4.2.1	In Situ Monitoring	8	16	16	265	0	0	0	30
4.2.2	Sample Analysis	0	0	0	0	0	0	0	
4.3	Surface Water Monitoring								
4.3.1	Sampling/Measurement	0	40	0	0	0	0	0	4
4.3.2	Sample Analysis	0	0	0	0	0	0	0	
4.4	Ambient Air Monitoring								
4.4.1	Meteorlogical Monitoring	0	0	0	0	0	0	0	
4.4.2	Air Quality Monitoring	0	0	0	0	0	0	0	
4.4.3	Laboratory Analysis	0	0	0	0	0	0	0	
5	Data Analysis & Report Prep.								
5.1	Data Analysis/Interpretation	40	96	96	120	80	0	0	43
5.2	Report Preparation	40	80	80	50	80	0	132	46
6	Project Management								
6.1	Project Adminstration	0	0	0	0	0	0	0	
6.2	Contract Management	0	0	0	0	0	0	0	
6.3	Cost/Schedule Management	0	0	0	0	0	0	0	
6.4	Project Communications	0	0	0	0	0	0	0	
6.5	Data Management	0	0	0	0	0	0	0	
7	Community Relations								
7.1	RI Fact Sheets	2	8	0	8	0	0	4	2
7.2	RI Public Meetings	4	12	0	12	0	0	0	2
7.3	Public Response	0	0	0	0	0	0	0	
	Totals	148	836	712	1,257	176	0	152	3,28

TABLE 6.3-1 OTHER DIRECT COSTS
Black & Veatch

TRAVEL

Prog. Mgr.	MCI/SEA	1 Trips	$740 /Airfare RT	$740	
			40 /Shuttle RT	40	
		1 Days	75 /Perdiem Day	75	
			51 /Vehicle Day	51	
				----	$906
P4	MCI/SEA	2 Trips	$740 /Airfare RT	$1,480	
			40 /Shuttle RT	80	
		12 Days	75 /Perdiem Day	900	
			51 /Vehicle Day	612	
				----	3,072
P3(PE)	BR/SEA	3 Trips	$900 /Airfare RT	2,700	
			40 /Shuttle RT	120	
		20 Days	75 /Perdiem Day	1,500	
			51 /Vehicle Day	1,020	
				----	5,340
P3(SM)	MCI/SEA	7 Trips	$740 /Airfare RT	5,180	
			40 /Shuttle RT	280	
		105 Days	75 /Perdiem Day	7,875	
			51 /Vehicle Day	5,355	
				----	18,690
P2(H&S/QA)	MCI/SEA	5 Trips	$740 /Airfare RT	3,700	
			40 /Shuttle RT	200	
		80 Days	75 /Perdiem Day	6,000	
			51 /Vehicle Day	4,080	
				----	13,980
P2	MCI/SEA	2 Trips	$740 /Airfare RT	1,480	
			40 /Shuttle RT	80	
		23 Days	75 /Perdiem Day	1,725	
			51 /Vehicle Day	1,173	
				----	4,458
P2	BR/SEA	1 Trips	$900 /Airfare RT	900	
			40 /Shuttle RT	40	
		10 Days	75 /Perdiem Day	750	
			51 /Vehicle Day	510	
				----	2,200
T2	BR/SEA	4 Trips	$900 /Airfare RT	3,600	
			40 /Shuttle RT	160	
		59 Days	75 /Perdiem Day	4,425	
			51 /Vehicle Day	3,009	
				----	11,194
T1	MCI/SEA	2 Trips	$740 /Airfare RT	1,480	
			40 /Shuttle RT	80	
		35 Days	75 /Perdiem Day	2,625	
			51 /Vehicle Day	1,785	
				----	5,970

TRAVEL

Proj.Engr.	Local	90 Days	$6 /Vehicle Day	540	
P1	Local	90 Days	23 /Perdiem Day	2,070	
			21 /Vehicle Day	1,890	
				----	4,500

TELEPHONE

Baton Rouge/Sea.	32 wks	18 min/day	$0.41 /min	$1,180	
Olympia/Sea.	32 wks	12 min/day	0.23 /min	441	
Kansas City/Sea.	32 wks	12 min/day	0.41 /min	787	
				----	2,408

REPRODUCTION

Draft Reports	8 reports 200 pgs/copy	25 copies	$0.10 /pg	$4,000	
Final Reports	8 reports 200 pgs/copy	25 copies	$0.10 /pg	4,000	
Correspondence	28 pgs/wk 32 weeks	2 copies	$0.10 /pg	179	
Miscellaneous	150 pgs/wk 32 weeks	1 copies	$0.10 /pg	480	
				----	8,659

POSTAGE

(BATON ROUGE/KC,SEA,OLY)

Express Letter	32 letters	$11.00 /let	$352	
Express Package	16 packages	$24.00 /pkg	384	
First Class Mailing	64 mailings	$2.50 /mailing	160	
			----	896

(OLYMPIA/BR,SEA,KC)

Express Letter	16 letters	$11.00 /let	$176	
Express Package	8 packages	$24.00 /pkg	192	
First Class Mailing	64 mailings	$2.50 /mailing	160	
			----	528

(KANSAS CITY/BR,SEA,OLY)

Express Letter	10 letters	$11.00 /let	$110	
Express Package	6 packages	$24.00 /pkg	144	
First Class Mailing	32 mailings	$2.50 /mailing	80	
			----	334

EQUIPMENT

Computer	320 hrs-admin/cler	$4.00 /hr	$1,280	
	80 hrs-tech	$4.00 /hr	320	
Field Equipment	See attached table continuation		125,070	
			-------	126,670

TOTAL OTHER DIRECT COSTS $209,805

TABLE 6.3-1 (continued)

EQUIPMENT AND SUPPLIES: OTHER DIRECT COSTS

Groundwater, Surface Water, and Leachate Well sampling costs

Dedicated groundwater well bladder pumps:
13 wells x $1000/well.....13000.00
(includes pump, Teflon tubing, locks, caps)
3 leachate wells x $1000/well.....3000.00
Portable air assembly for wells
$ 250.00/month x 5 months.....1250.00
Compressed air supply for well sampling:
Portable air compressor @ $250.00/month x 5 mo..... 1250.00
Electronic well level sensor:
$ 175.00/month x 5 months.....875.00
Conductivity/salinity/temperature meter:
$ 200.00/month x 5 months.....1000.00
pH meter: 130.00/month x 5 months.....650.00
Staff gages: 3 @ 65.00/gage.....195.00
Stormwater samplers: 2 samplers x 4 months x
100.00/month.....800.00
Flowmeters: 2 meters x 4 months x 750.00/month 6000.00
Installation hardware, battery packs, charger.....225.00
Well bailer for off-site well sampling.....360.00
Ice, shipment (FedEx) for samples: 110.00/day x
50 days.....5500.00
Safety Equipment: assumes Level C protection available
drilling: 82 days x 25.00/d/person x 5 people.....10250.00
monitoring: 35 days x 25.00/d/p x 6 people.....5250.00
Level A option: 1500.00/person x 5 people.....7500.00
Rain gear: 10 suits @ 21.00/suit.....210.00
Slug test data logger: 3 days x 140.00/day.....420.00

Gas Probes

Gascope: 150.00/month x 5 months.....750.00
OVA: 1700.00/month x 5 months 8500.00
Pressure monitor: 200.00/month x 5 months.....1000.00
MSA 361 meter (H2S, O2, CH4 w/alarm)
2 meters x 340.00/month x 5 months.....3400.00

Other
Magnetometer: 10 days @ 20.00/day.....200.00
Labels, field books, sample shipping supplies.....225.00

TOTAL COST.....71810.00

TABLE 6.3-1 (continued)

AIR QUALITY INSTRUMENTATION COST ESTIMATE

1. Air quality scan of existing flares, new wells using OVA
   5 scans total; 1 scan per week

   OVA rental: 2 months @ $1700.00/month.....$3400.00

2. Climatological Station A
   Weathertronics Model 1161 remote data acquisition system, with tape recorder data output and reader, battery pack, charger, and mounting tower (or equivalent).....4815.00

   Data probes: Weathertronics microresponse anemometer, microresponse vane, humidity/temperature, rain/snow guage, evaporation guage, barometer (or equal).....4040.00

3. Climatological Station B
   As above, but with anemometer, vane, and temperature probes only.....6335.00

4. Two off-site weather stations:
   Stripchart recorders, anemometer, vane, and temperature measurement
   2 @ 2000.00 ea (estimated).....4000.00

5. Sentex Scentor automated portable gas chromatograph with internal calibration, heated column, computer interface/microprocessor controlled, internal printer, automatic gain, 3 battery packs, carrying case, extr battery charger, sample probes, carrier gas, calibration gases, automatic pressure shut-off valve, argon/electron capture detector
   2 @ 14775.00 ea.....29550.00

6. Sampling pump for charcoal tube organic vapor sample collection; MSA Monitaire Sampler Model S and MSA Tube holder or equivalent
   2 each @ 560.00 ea. 1120.00

TOTAL COST..... 53260.00

TABLE 6.3-2 OTHER DIRECT COSTS
Hart-Crowser

LOCAL TRAVEL					
P3	2,500 miles	0.205 /mile		$513	
P2	7,700 miles	0.205 /mile		1,579	
	77 days	25 /Perdiem Day		1,925	
P2	19,300 miles	0.205 /mile		3,957	
	193 days	25 /Perdiem Day		4,825	
				---	12,798
TELEPHONE					722
REPRODUCTION					2,598
POSTAGE					100
SAFETY EQUIPMENT					
Level c protection					
Drilling	82 days x	25 /day x	1 person	2,050	
Assistance	40 days x	25 /day x	2 person	2,000	
Monitoring	35 days x	25 /day x	4 person	3,500	
				---	7,550
TOTAL OTHER DIRECT COSTS					$23,768

TABLE 5.3-3

ESTIMATED COSTS FOR LABORATORY ANALYSIS

MIDWAY LANDFILL RI WORK PLAN

Sample Category	No. Samples	Estimated Cost
Groundwater/Leachate Wells	120	170760.00
Stormwater Monitoring	2	2998.00
Surface Water, Misc.	4	5436.00
Leachate Seeps, Misc.	20	1500.00
Near-Surface Soils	8-15	3703.00
Ambient Air (GC, tube desorption)	16-20	9000.00
Geological Samples, Landfill	29	12757.00
TOTAL ESTIMATE.....		206154.00

NOTE: Laboratory analysis may be performed by contract laboratory and is not included in overall budget summary.

TABLE 6.3-4

LABORATORY ANALYSIS FOR GROUNDWATER AND LEACHATE MONITORING WELLS

Parameter	Units		No. Samples	Unit Cost	Total Cost
Field Parameters					
*pH	pH		4	(1)	(1)
Temperature	oC		4	(1)	(1)
Conductivity	mmhos		4	(1)	(1)
Conventionals					
*Boron	mg/l		4	12.00	48.00
Calcium	mg/l		4	12.00	48.00
Magnesium	mg/l		4	12.00	48.00
Sodium	mg/l		4	12.00	48.00
Potassium	mg/l		4	12.00	48.00
Iron	mg/l		4	12.00	48.00
Manganese	mg/l		4	12.00	48.00
Carbonate	mg/l		4	12.50	50.00
Bicarbonate	mg/l		4	12.50	50.00
*Sulfate	mg/l		4	12.00	48.00
*Sulfide	mg/l		4	18.00	72.00
*Chloride	mg/l		4	11.00	44.00
Fluoride	mg/l		4	30.00	120.00
Total Dissolved Solids	mg/l		4	12.00	48.00
*Total Organic Carbon	mg/l		4	24.00	96.00
Ammonia Nitrogen	mg/l		4	10.00	40.00
Nitrate nitrogen	mg/l		4	30.00	120.00
Total Kjeldahl N.	mg/l		4	28.00	96.00
Hardness	mg/l		4	8.00	32.00
*Alkalinity	mg/l	CaCO3	4	8.00	32.00
Biochemical Oxygen Demand (BOD5)	mg/l	BOD5	4	23.00	92.00
*Chemical Oxygen Demand	mg/l		4	18.00	72.00
*Total Organic Halogen (TOX)	ug/l		4	100.00	400.00
Priority Pollutants					
Metals					
(Sb, As, Se, Ag, Th)	ug/l		4	19.00ea.	380.00
(Be, Cd, Cr, Cu, Ni, Pb, Zn)	ug/l		4	13.00ea.	364.00
Acid Extractables	ug/l		4	175.00	700.00
Base Neutrals	ug/l		4	275.00	1100.00
Pesticides	ug/l		4	300.00	1200.00
---					
*Microtox	% dim.		4	50.00	200.00

TOTAL COST..... 170760.00
(13 new wells, 12 existing, 3 leachate, and 2 off-site wells)
* Potential indicator parameter
(1) Cost included in equipment leasing table

TABLE 6.3-5

LABORATORY ANALYSIS FOR STORM WATER MONITORING

Parameter	Units		No. Samples	Unit Cost	Total Cost
pH*	pH units		12	(1)	(1)
Specific Conductance*	mmhos		12	(1)	(1)
Conventionals					
(B,Ca,Mg,Na,K,Fe,Mn, SO4)	mg/l		2	12.00ea	192.00
SO2	mg/l		2	18.00	36.00
Fluoride	mg/l		2	30.00	60.00
Total Dissolved Solids*	mg/l		12	12.00	144.00
Total Suspended Solids*	mg/l		12	12.00	144.00
Total Kjeldahl nitrogen	mg/l		2	28.00	56.00
Alkalinity	mg/l	CaCO3	2	8.00	16.00
Hardness	mg/l		2	8.00	16.00
BOD5	mg/l	BOD5	2	23.00	46.00
COD	mg/l		12	18.00	216.00
TOX	ug/l		2	100.00	200.00
Priority Pollutants					
Metals	ug/l		2	186.00	372.00
Acid Extractables	ug/l		2	175.00	350.00
Base Neutrals	ug/l		2	275.00	550.00
Pesticides	ug/l		2	300.00	600.00

TOTAL COST..... 2998.00

(based on sampling 2- 24 hour storm events, with '*' parameters to be used as indicators of runoff quality, with 4 hour frequency)

(1) cost included in equipment leasing table

TABLE 6.3-6

LABORATORY ANALYSIS FOR SURFACE WATER QUALITY

Parameter	Units	No. Samples	Unit Cost	Total Cost
Field parameters				
pH	pH units	4	(1)	(1)
Temperature	oC	4	(1)	(1)
Specific Conductance	mmhos	4	(1)	(1)
Conventionals				
(See Table 4.1 for list)		4	423.00	1692.00
Priority Pollutants				
Metals	ug/l	4	186.00	744.00
Acid Extractables	ug/l	4	175.00	700.00
Base Neutrals	ug/l	4	275.00	1100.00
Pesticides	ug/l	4	300.00	1200.00
TOTAL COST.....				5436.00

(1) cost included in equipment leasing table

TABLE 6.3-7

LABORATORY ANALYSIS FOR LANDFILL SEEPS

Parameter	Units	No. Samples	Unit Cost	Total Cos
pH	pH units	20	(1)	(1)
Specific Conductance	mmhos	20	(1)	(1)
BOD5	mg/l BOD5	20	23.00	230.00
COD	mg/l	20	18.00	180.00
TDS	mg/l	20	12.00	240.00
TSS	mg/l	20	12.00	240.00
Boron	mg/l	20	12.00	240.00
Fecal coliform*	# 100 ml	20	18.50	370.00

TOTAL COST..... 1500.00

(1) Cost included in equipment leasing table

No. of samples based upon 10 seeps sampled twice each

* Analyzed to determine septage seeps

TABLE 6.3-8

LABORATORY ANALYSIS FOR NEAR-SURFACE SOILS

Parameter	Units	No. Samples	Unit Cost	Total Cost
Lab. permeability	cm/s	8	110.00	880.00
Grain size analysis	-	15	45.00	675.00
pH (sat'd paste)	pH units	15	22.00	330.00
Conductivity (sat'd paste)	mmhos	15	22.00	330.00
Priority Pollutant Metals	ug/l	8	186.00	1488.00

TOTAL COST..... 3703.00

TABLE 6.3-9

LABORATORY ANALYSIS FOR AIR QUALITY USING CHARCOAL TUBES

Parameter	Number Samples Ambient Air (a)	Gas Probes (b)	Unit Cost	Total Cost
1,2-Dichloroethane	16	20	25.00	900.00
Benzene	16	20	25.00	900.00
Carbon tetrachloride	16	20	25.00	900.00
Isooctane	16	20	25.00	900.00
Trichloroethylene	16	20	25.00	900.00
Toluene	16	20	25.00	900.00
Ethylhexane	16	20	25.00	900.00
Xylene	16	20	25.00	900.00
Limonene	16	20	25.00	900.00
Methlyene Chloride	16	20	25.00	900.00

TOTAL COST.....9000.00

(a) based on 16 week daily sampling period; one tube per week
(b) based on collecting four tubes per each of five sampling rounds
(c) total cost includes cost of tubes and cost of analysis

TABLE 6.3-10

LABORATORY ANALYSIS FOR SUBSURFACE MATERIALS ANALYSIS

Parameter	Units	No. Samples	Unit Cost	Total Cost
Cyanide	ug/kg	29	35.00	1015.00
Boron	ug/kg	29	12.00	348.00
Priority Poll.				
Metals	ug/kg	29	186.00	5394.00
Acid extract.	ug/kg	8	175.00	1400.00
Base neutrals	ug/kg	8	275.00	2200.00
Pesticides	ug/kg	8	300.00	2400.00

TOTAL COST..... 12757.00

Based on selecting samples on 20-ft. intervals for 5 80 ft. deep gas probes, and 20 ft. intervals for 3 60 ft. deep gas probes that will be drilled within the landfill; total of 29 samples. A portable gas chromatograph will be used to analyze head space of each of the samples; based upon the results of the chromatograms, at least one sample per probe will be selected for priority pollutant organics analysis.