Remediation Construction Plan Package

Proposed Onsite Environmental Remediation

Vertac Chemical Corporation Plant Site
Jacksonville, Arkansas

Vertac Chemical Corporation
Memphis, Tennessee
Dear Mr. Karkkainen:

We are pleased to submit the final revised package for the onsite remedial action proposed for the Vertac Jacksonville Plant. The package includes the following documents:

- Remedial Action Summary
- Proposed Construction Sequence Outline
- Proposed Schedule
- Drawings Nos. 846012-E1,-E2,-E3,-E4,-E5 and -E6
- Construction Safety Plan
- Remedial Monitoring and Maintenance Plan

Cost estimate details will be provided shortly in a separate letter.

The above documents have been revised to reflect Vertac's and Hercules' comments and those of EPA as discussed subsequent to our mid-project meeting with EPA representatives on January 4, 1984.

The Remedial Action Summary provides a brief overview of the proposed actions and attached documents. The Proposed Construction Sequence Outline and Proposed Schedule have been revised to reflect the changes in the remedial measures made subsequent to the EPA review. Figure 1 now includes the "Containment Area" for the cooling pond sludges and reflects changes made in the North Burial Area clay cap extension, the Secondary Spill Containment Structures and the piping connecting the structures to the treatment plant. Figures 2 through 5 have been revised.

Project No. 846012

February 1, 1984

Mr. R. D. Karkkainen
Director, Environment & Safety
Vertac Chemical Corporation
5100 Poplar, 24th Floor
Memphis, Tennessee 38137

Transmittal
Final Revised Remediation Construction Plan Package
Proposed Onsite Environmental Remediation Vertac Chemical Corporation Plant Site
Jacksonville, Arkansas

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to reflect the above changes, and a new Figure 6 has been prepared to provide details on the proposed Containment Area.

The Construction Safety Plan has been finalized subsequent to eliminating the ambiguity in titles for safety personnel, correcting the information on toxic chemicals present at the Jacksonville Plant Site, clarifying the monitoring program and the coordination necessary with the Vertac Emergency Coordinator, and correcting other errors previously discussed with you. Minor corrections were made to the Monitoring and Maintenance Plan consistent with Vertac's comments dated January 6, 1984.

We believe the proposed remedial actions are consistent with Vertac's present understanding with EPA and look forward to obtaining formal approval to proceed with the proposed actions in the near future. Should you have any questions regarding the final details, please call me.

Very truly yours,

Alan D. Husak, P.E.
Project Manager

ADH:jrm

cc: Mr. Douglas J. Keilman, Hercules, Inc.
Proposed Onsite Environmental Remediation
# Proposed Onsite Environmental Remediation

## Vertac Chemical Corporation Plant Site
### Jacksonville, Arkansas

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1.0 SUMMARY OF PROPOSED REMEDIATION
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1.1 INTRODUCTION
This package contains the design drawings, Construction Sequence Outline and Schedule, Construction Safety Plan and Remedial Monitoring and Maintenance Plan for completing the proposed onsite remedial actions. These actions have been based on studies completed by Developers International Services Corporation, dated October and December, 1982. They have been developed by Vertac Chemical Corporation and Hercules, Incorporated in cooperation with Region VI of the Environmental Protection Agency (EPA) and the Arkansas Department of Pollution Control and Ecology (ADPCE) dated September 29, 1983 and October 13, 1983.

1.2 OBJECTIVE
The objective of the proposed actions is to provide adequate protection of the public health and the environment in accordance with Paragraph VIII of the Consent Decree. Accordingly, the proposed actions provide for:

- the containment of contaminated materials and wastes,
- the control and treatment of potentially contaminated runoff,
- the inhibition of infiltration of rainwater through the contaminated material, and thereby
- the protection of surface water and ground water resources.

1.3 PROPOSED REMEDIATION
The above objective will be met by implementing the following remedial measures in addition to those which have already been completed:
o Extending the clay caps covering the existing containment areas (the North Burial Area, the old Equalization Basin and the Reasor-Hill Landfill) to the west toward Rocky Branch Creek,

o Repairing existing caps and providing drainage with erosion controls as necessary,

o Constructing french drains along the western boundaries of the North Burial Area and Reasor-Hill Landfill,

o Possibly constructing a slurry (soil/bentonite backfilled) wall along the northern and eastern side of the North Burial Area,

o Draining the Cooling Pond and stabilizing the Cooling Pond sludges,

o Placing the Cooling Pond sludges in a clay-capped containment area located on the east side of the Cooling Pond area,

o Capping the East Ditch and asphalt paving the unpaved portion of the Central Ditch, and

o Constructing Secondary Spill Containment Structures along with connecting discharge lines to the onsite Treatment Plant.

The additional french drains and slurry wall will provide vertical cut-offs of groundwater infiltration through the North Burial Area and Reasor-Hill Landfill and provide for the collection of any leachate from these areas. The clay caps will be extended to the french drains and proposed cutoff wall and, thereby, will complete the containment of the contaminated material in these areas.

The closure of the Cooling Pond will be accomplished by draining the pond (and filtering any solids prior to discharge), stabilizing in place the bottom sludges and then capping the sludges after placement behind a
dike to protect them from rising water along Rocky Creek Branch. Riprap and hydromulching of the dike and clay cap will protect the containment area from erosion. The dike will be keyed into the underlying weathered rock along the northern side to mitigate any downdip migration of leachate from the stabilized sludges.

Secondary spill containment structures will facilitate collection of any spills and also allow for the treatment, if necessary, of the initial runoff (so called "first flush") from certain portions of the plant site. In combination with capping of the East Ditch and paving of the Central Ditch, these measures will provide for the protection of downstream surface water resources and of downdip groundwater resources.

1.4 CONSTRUCTION SEQUENCE AND SCHEDULE

As outlined in Section 2.0, the proposed construction has been organized to facilitate successful completion of the site remedial measures with minimal risk due to weather. The construction has also been organized to reduce impacts of construction activities on preceding construction.

Accordingly, the containment of the cooling pond sludges is the measure which can be hampered most by the weather and will, therefore, be initiated first. Extension of the clay caps will be completed subsequent to installation of the French drains and North Burial Area cutoff wall. Capping/paving of ditches, runoff controls and hydromulching (seeding) will be the final measures completed prior to demobilization.

1.5 QUALITY ASSURANCE PROGRAM

Throughout the construction, the contractor shall implement the quality assurance and quality control measures consistent with the contractor's Quality Assurance Program. Daily field activity logs, field testing equipment calibration records, daily field test data logs and a final certification of completion of remediation in accordance with this Remedi-
diation Plan will be submitted to Vertac in order to document final remediation. All structures will be constructed in accordance with accepted professional standards.

In particular the following tests will be completed:

- sufficient tests to characterize cap material as being suitable,
- soil moisture/density/permeability tests of compacted clay caps to confirm attainment of a permeability standard of 10^-7 cm/sec.,
- sufficient soil/bentonite backfill testing to confirm appropriate mix of materials to attain a permeability standard of 10^-7 cm/sec.

1.6 CONSTRUCTION SAFETY PROGRAM
The proposed remediation will be completed in accordance with applicable federal, state and local regulations, including those of the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). All elements of the proposed Construction Safety Plan (Section 5.0) will be implemented and documented by trained personnel in accordance with EPA Order No. 1440.2. All construction activities will be coordinated with local, state and federal officials and the Vertac Emergency Coordinator as outlined in the Vertac Emergency Response Contingency Plan. All construction personnel shall be trained in the anticipated hazards, use of the necessary protective equipment and the appropriate response actions to be taken in case of an emergency.

1.7 MONITORING AND MAINTENANCE PROGRAM
An integral part of the proposed environmental remediation of the Vertac Jacksonville Plant Site is a continuing monitoring and maintenance program. The purpose of this program is to assure that the remedial measures continue to provide adequate protection of the public health and
environment. Accordingly, a detailed monitoring and maintenance program (Section 6.0) will be implemented by Vertac to monitor the site and where necessary, to take the appropriate actions to maintain the clay caps and other structural measures taken at the site. As appropriate, this maintenance program will be reduced in scope upon approval once adequate vegetative cover and adequate erosion control measures have been documented.
2.0 OUTLINE OF PROPOSED CONSTRUCTION SEQUENCE
OUTLINE OF
PROPOSED CONSTRUCTION SEQUENCE

A. Mobilization
   - Mobilize Personnel to site.
   - Set up contractor village, including office, laboratory, and de-contamination facilities.
   - Move in equipment.

B. Pond Water Removal
   - Test pond and creek water quality prior to removal.
   - Install silt screen and construct straw bale dike.
   - Construct temporary diversion pond/dike upstream from cooling pond, and provide two 6-inch, 1000 gpm pumps (one standby and the other operated on an as-needed basis) and piping system to temporarily bypass cooling pond during construction. Rocky Branch Creek is normally flowing at approximately 400 to 500 gpm (base flow).
   - Set up two 6-inch pumps to remove 6.5 million gallons of ponded water at discharge rate of 1,000 to 1,200 gpm, flowing into a silt screen and then along a straw bale dike for suspended sediment removal.
   - Locate outlet pipe and take actions to keep it open.
   - The four 6-inch pumps noted above will be kept available on a standby basis and will be operated as needed during construction.

C. Starter Dike Construction
   - Within a 15- to 20-foot wide area where starter dike is to be located, stabilize pond sludge in place and then remove the stabilized sludge into the proposed containment area. Excavate into weathered rock.
   - Construct a 1H to 1V compacted clay dike to Crest Elevation 275. Dike will be constructed in nine to twelve inch lifts.

D. Stabilization of Cooling Pond Sludge
   - Mix sludge-in-place with dry stabilizing material (kiln dust and/or cement) using brown-bear sludge mixer.
- Relocate stabilized sludge into proposed disposal area.
- Grade the solidified mixture in place behind starter dike.

E. Capping Cooling Pond Containment Area

- Partially remove starter dike to form a 36-inch side wall of clay cap.
- Continue placing compacted clay in 9- to 12-inch thickness to form layered side wall.
- Cover the top with two 9-inch-thick, compacted clay layers.
- Moisture content/density/permeability of compacted testing for clay cap will be performed during construction to confirm quality control.
- Prepare clay surface for topsoil placement.
- Shape and form the toe ditch, install 12-inch riprap protection blanket to Elevation 275.
- Place 6-inch-thick topsoil on top of clay and dike slopes down to riprap.

F. French Drains for Cooling Pond and Reasor-Hill Landfill Area

- Excavate sump and install manhole.
- Excavate trench; lay pipe and backfill as trenching advances.
- Sump pump may be required during construction.

G. Slurry Wall for North Burial Area

- Set up mixing plant.
- Perform slurry wall trenching and backfill with soil/bentonite mix.
- Conduct backfill mixing, slurry testing to confirm quality control.
- Place 18 inch thick clay cap on top of trench in two 9-inch lifts and cover with 6-inch, topsoil layer.
H. Capping Reasor-Hill Landfill Area
- Place two 9-inch-thick compacted clay layers.
- Test clay layer for compaction and permeability.
- Place 6-inch topsoil.

I. Central and East Ditch
- Grade unpaved portion of Central Ditch to drain and clean concrete paved channel portion. Place excavated sediment along unpaved portion.
- Install asphalt pavement in unpaved section of Central Ditch.
- Construct secondary spill containment structures at end of Central and East Ditches.
- Cap existing East Ditch.
- Excavate "new" East Ditch.
- Modify existing piping system to connect to Central and East Ditches as needed.

J. Erosion Control and Seeding
- Provide drainage ditch at toe of railroad embankment.
- Install swales on newly capped areas, as needed.
- Construct swales and regrade existing capped landfill areas as necessary to provide adequate drainage (as determined in field).
- Place erosion control/cap protective material as needed.
- Apply proper mixture of seeding, nutrients/fertilizer and mulch via "hydromulching" system.

K. Demobilization/Report
- Move out equipment.
- Demobilize contractor village.
- Provide final report and "as-built" drawings.
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CONSTRUCTION SAFETY PLAN
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CONSTRUCTION SAFETY PLAN
REMEDIAL ACTIONS
VERTAC CHEMICAL CORPORATION PLANT SITE
JACKSONVILLE, ARKANSAS

1.0 INTRODUCTION

This plan describes the health and safety/emergency response program to be used by construction contractors while performing the remedial program at the Vertac Chemical Corporation plant (Vertac) site in Jacksonville, Arkansas. This project entails pumping ponded water from the cooling pond, solidifying pond sludges and capping. The clay cap over existing landfills will also be extended, the existing french drain leachate collection system extended, drainage ditches will be asphalt or clay-lined, and if necessary, a barrier cutoff wall constructed. The activities are planned to protect public health and the environment from the contained wastes. The wastes of concern at the Vertac site are pesticide waste products, associated manufacturing wastes and contaminated soils which contain hazardous levels of chlorinated dioxins and chlorinated phenols.

Vertac's policy will be to conduct all remedial activities in the manner required to protect the health and safety of project personnel and to limit the exposure of the public from unplanned releases. All work will be conducted in accordance with applicable federal, state, and local regulations, including the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), requirements of 29 CFR 1910 and 1926 and the U.S. Environmental Protection Agency (EPA) 40 CFR 260 to 267 hazardous waste requirements.

The elements of the plan include procedures for personnel protection, air quality control, and decontamination procedures. The plan also provides details of the emergency response procedures, including first aid capability, fire control, and implementation of the Vertac site-specific contingency plan.
2.0 CONSTRUCTION SAFETY MANAGEMENT

2.1 CONSTRUCTION SAFETY MANAGEMENT STRUCTURE

The Health and Safety Program will be implemented by the following staff:

- **Project Manager** - responsible for overall project management and in particular, for assuring coordination of construction and construction safety program activities.

- **Construction Safety Manager** - responsible for developing and implementing health and safety program.

- **Site Construction Manager** - responsible for on-site construction activities.

- **Site Safety Officer** - responsible for day to day enforcement of health and safety program, hazard monitoring and personnel training.

The Health and Safety Program will be managed by specialists independent from the construction management team. The Construction Safety Manager will be responsible for development, implementation and enforcement of the program. He will coordinate the program implementation with the Site Construction Manager but will report to the Project Manager. An on-site Safety Officer will be responsible for day-to-day program operations. The Site Safety Officer or the on-site Construction Manager have the independent authority to terminate any work activities and if necessary, order evacuation of the work areas on site if, in their judgment, unsafe conditions warrant. Both also have independent authority to dismiss or remove from site employees who fail to abide by the prescribed safety program.

2.2 CONSTRUCTION SAFETY MANAGER

The Construction Manager for this project will be responsible for implementation and enforcement of the Construction Safety Plan. He will have a minimum of two years of experience in emergency chemical spill res-
ponse and/or the cleanup of hazardous waste sites. He will also have a sound working knowledge of state and federal occupational safety and health regulations and formal training in occupational safety and health. He shall have the following specific responsibilities:

- Implementing and enforcing the personnel protection program and construction safety procedures described in this plan.
- Evaluating data generated during the application of the environmental monitoring program at the Vertac site.
- Specifying the required level of personnel protection equipment.
- Providing an outline of the training program.
- Coordinating with appropriate regulatory agencies regarding the continuing status of the health and safety/emergency response program.
- Specifying and coordinating with physicians regarding implementation and review of appropriate medical surveillance procedures.

The Construction Safety Manager will visit the site monthly to monitor the implementation of this plan.

2.3 INDUSTRIAL HYGIENE TECHNICIAN/SAFETY AND HEALTH SPECIALIST (SITE SAFETY OFFICER)

The Safety Officer designated to serve at the Vertac site will have working experience in the evaluation of hazardous materials. This person will have a working knowledge of state and federal occupational safety and health regulations as well as educational training in these disciplines. The Site Safety Officer shall have the following responsibilities:

- Functioning as the on-site representative of the Construction Safety Manager.
- Verifying that all on-site personnel have obtained the required medical examinations prior to and at the termination of work.
- Verifying that all on-site personnel are complying with the health protection and precautionary safety procedures specified for the given construction activity.

- Preconstruction training of all on-site personnel with regard to this safety plan and other safety requirements to be observed during construction, including:
  - Potential hazards
  - Personal hygiene principles
  - Personnel protective equipment
  - Respiratory protection equipment use and testing
  - Emergency procedures dealing with fires, spills, and contamination requiring medical attention.

- Identifying "contaminated" (dirty) and "uncontaminated" (clean) areas.

- Alerting the Vertac Emergency Coordinator (VEC) of any unforeseen or site-peculiar safety related factor, hazard, or condition as quickly as possible.

- Alerting appropriate off-site emergency response facilities in the event of accidents.

- Monitoring site activities when construction activities may involve potentially contaminated materials.
3.0 PRELIMINARY HAZARD ASSESSMENT

3.1 HEALTH RISK ASSESSMENT
The contaminants of concern at the Vertac site consist of phenoxyacetic acids, chlorinated dioxins, and chlorinated phenols. Of these, 2,3,7,8-tetrachlorodibenzo-p-dioxin (dioxin) is the contaminant of greatest concern. Dioxin is a contaminant formed during the production of 2,4,5-trichlorophenol (2,4,5-TCP) from 1,2,4,5-tetrachlorobenzene. 2,4,5-TCP is the major feedstock in the production of 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4,5-T esters. Consequently, these pesticides and associated manufacturing wastes contain trace concentrations of dioxin as a contaminant.

Dioxin is one of the most toxic substances known. It exhibits a delayed biological response in many species and is highly lethal at low doses to aquatic organisms, birds and mammals. It has been shown, according to EPA, to be acnegic, embryolethal, teratogenic, mutagenic (in a limited number of tests) and carcinogenic, and affects the immune responses in the mammals tested. Very little data exists regarding the health effects of dioxin to humans.

As a class, these wastes are not very volatile and are not very soluble in water. Dioxin is strongly sorbed to sediments and biota and is relatively immobile in soil. Consequently, the exposures of concern are:

- physical contact with contaminated fluids and soils,
- inhalation of contaminated dust, and
- ingestion of contaminated dust.

EPA has prepared a background document but has yet to promulgate a draft criteria document for exposure to dioxins. Criteria for exposure to phenol and pentachloro phenol have been recommended and may be used as guidelines for exposure to chlorinated phenols. National Academy of Sciences, Federal Drug Administration and industrial studies must serve
as the basis for developing for exposure for dioxins and chlorinated phenols.

These classes of chemicals in liquid suspension or solution are readily absorbed dermally and gastrointestinally. They are not readily absorbed through the skin when exposed to contaminated dust. The liver and adipose tissue are the target tissues in mammals. Evidence indicates the compounds of concern are not significantly metabolized. About half of the contaminants adsorbed are readily excreted. Continual doses of dioxin as low as 0.1 parts per thousand in the diet of rats and mice resulted in eventual death, usually associated with hepatitis. Higher doses of phenols and pentachlorophenol were required to cause death, usually associated with hemolysis and kidney failure. Human exposure to concentrated solutions of phenolic are compounds known to result in quick death.

Documented human exposures to phenoxyacetic acids and dioxins is limited primarily to exposures to dioxin-contaminated pesticides, pesticide manufacturing wastes and waste contaminated environments (soils). The usual effect is chloracne, some hepatitis-like symptoms and reduced neural responses. Individuals with severe chloracne exhibited clinical signs of systemic toxicity including headache, diarrhea, muscular weakness, loss of appetite and weight, impairment of vision, insomnia, hypotension, abdominal pain, personality changes and liver impairment. Reports of similar health effects associated with Agent Orange and exposure to pesticide spraying have been found by researchers to be without merit.

Epidemiologic studies of workers exposed to chlorophenols and phenoxyacetic acids indicate that these chemicals may cause cancer of the soft tissues. Extensive studies have been conducted to refute or confirm these findings; nonetheless, EPA has concluded that exposure to waste materials similar to those at the Vertac site may result in a higher incidence of cancer. Contaminated soils at the Vertac site within con-
Contaminated zones typically have 10 ppb dioxin. Accordingly, approximate precautions to limit exposure to these materials based on their carcinogenic potential have been included in the construction safety program.

3.2 EXPOSURE LIMITS
As previously noted, exposure limits have yet to be set by EPA and OSHA for many of the contaminants of concern at the Vertac site. Those OSHA standards which have been set include limits for:

- phenol (19 mg/m³)
- pentachlorophenol (0.5 mg/m³)

These standards are for exposures averaged over an eight-hour work shift (TWA). The U.S. Department of Health and Human Services, National Institute of Occupational Safety and Health (NIOSH), has recommended that the permissible exposure limit for phenol be changed to 20 mg/m³ averaged over a work shift of up to 10 hours per day, 40 hours per week with a ceiling value of 60 mg/m³ averaged over a 15-minute period. The American Conference of Governmental Industrial Hygienists, Inc. (ACGIH), has also set the following guidelines for time weighted 8 hour average exposures (TWA) short term 15 minute exposures (STEL) for phenol and pentachlorophenol:

- phenol (TWA: 19 mg/m³; STEL: 38 mg/m³)
- pentachlorophenol (TWA: 0.5 mg/m³; STEL 1.5 mg/m³)

These values are set to prevent chloracne and sorption through the skin which was considered the critical pathway.

Pentachlorophenol poses the limiting value which corresponds to a STEL of about 0.4 ppm. A limit of about 1 ppb is the anticipated exposure limit for dioxin. It should be noted that none of these compounds are very volatile but at very low concentration are characterized by strong odors. Accordingly, high efficiency filters for protection against mists and dusts and organic vapor cartridges along with appropriate der-
mal protection should provide adequate protection under normal circum-
stances in well ventilated areas (outside of tanks and sumps).

3.3 DEFINITION OF HIGH RISK WORK AREAS

On a daily basis the Site Safety Officer or designated personnel shall
clearly lay out and define work areas in the field and shall specify
equipment, operations, and personnel requirements within those areas.
The contaminated work zone at the Vertac site shall be denoted on posted
site maps. The contaminated work zone shall be clearly delineated in
the field by boundary markers and signs. Access to the zone will be
through a control point established for each phase of the work. Zones
may be redefined based on monitoring data and the risk of exposure
associated with the proposed activities.

During active waste handling, occupational exposure in work areas will
be evaluated using information from area monitoring (Chapter 4.0). The
personnel protection required in each area will be based initially upon
conditions disclosed by this assessment of known hazards at the site,
and associated health risks, and confirming initial site surveys. The
required protection in each work area will be continually assessed based
upon the findings of ongoing air monitoring. The Safety Officer will
control access to the contaminated area. He shall maintain a log of
vehicles and personnel permitted in the area and will continually moni-
tor work activities so that only authorized, properly protected person-
nel are in each designated work area.

Data from the Developers International Services Corporation Environmen-
tal Assessment Study for the Vertac site have been reviewed to define
contaminated work areas. Initially, the following areas will be consid-
ered contaminated zones for the proposed construction activities:

- Cooling Pond (Rocky Creek Channel Construction
  and Pond Closure)
The following work areas will be designated outside of the contaminated work areas:

- Central and East Ditch (ditch cleaning and capping)
- French Drains (Construction of new drains).

The Load Out/Decontamination Zone - This zone (also called the intermediate zone) occurs at the interface of dirty and clean areas and provides for the transfer of construction materials from clean to contaminated areas, the decontamination of equipment and vehicles prior to entering the clean area, the decontamination of personnel and clothing prior to entering the clean area, and for the physical segregation of the clean area and contaminated zone. Access will be controlled at the entrances of the intermediate zone.

- Clean Area - This area is the remainder of the site and is defined as being an area outside the zone of significant exposure to air, soil, or surface water contamination. The clean area shall be clearly delineated and procedures implemented to prevent active or passive contamination from the work site.

The contractor will maintain an Emergency Medical Facility and a Personnel Decontamination Unit. The facility will contain first aid equipment for use at the Vertac site. The decontamination unit will be outfitted with showers so that personnel may clean themselves prior to leaving the site. An equipment decontamination area will also be provided.
4.0 PERSONNEL PROTECTION

4.1 PROGRAM ELEMENTS

The health and safety program for the project will include the following integral elements:

- Health hazard analysis
- Personnel protective equipment

An occupational hazard analysis and health risk assessment will be finalized by the Construction Safety Manager and Site Safety Officer prior to initiation of site construction activities. As discussed in Section 3.0, a continuing assessment will be performed during the construction program and will consist of:

- Evaluation of site conditions and hazards considering:
  - Chemicals known or thought to be present at the site based upon previous studies by others
  - Physical inspections of site conditions and work activities.
  - Daily results of personnel, area, and perimeter monitoring

- Assessment of potential health effects of each hazard considering:
  - Toxicity of components
  - Exposure pathways
  - Work procedures
  - Monitoring methods and effectiveness
  - Response effectiveness.

- Determination of protective measures to counteract potential adverse health effects.

- Determination of safety procedures to prevent spills, fires and personnel injury.
Potential exposure to chemicals at the Vertac site will be evaluated and, at the working locations where health hazards exist, there will be periodic evaluation of working conditions to determine the level of employee exposure to the toxic agents. Average and maximum exposure limits, which cannot be exceeded, will be established for potential exposure to the hazardous substances within the working area of the project and based on the soon to be published revised EPA criteria documents for chlorinated phenols, dioxin and difuran compounds. The frequency and extent of employee monitoring will be related to the type of activity, results of previous sampling, or symptoms exhibited by the workers. Specific action levels have been set to indicate based upon monitoring data when a more stringent level of protection is warranted or when other activities are necessary to reduce exposure.

4.2 MEDICAL SURVEILLANCE

Medical screening provides a method of identifying those employees whose medical history indicates potentially increased health risk when exposed to the toxic chemicals present within the working environment, increased health risk when working under the stress caused by heat due to protective clothing, and increased pulmonary stress due to respiratory protection. The medical screening directly and indirectly measures the functional activity of organs affected by potential chemical exposure during the work. Medical screening will include physiological tests that are limited to examinations of parameters having a clinical relevance to the potential chemical exposure.

All employees will be required to have had a medical examination by a physician and to be in good health prior to starting work. The initial surveillance will be done prior to commencing work with an exit examination after completing work on site. Either an annual complete physical for regular employees or a post-construction exit examination for temporary employees will be required. Each employee subject to occupational exposure is to have the following medical screening performed in accordance with OSHA Standard 20 CFR 1910.134:
Baseline Examination:
- Medical history
- General physical
- EKG
- SMA 26
- CBC
- Urinalysis
- Serum cholinesterase
- Methemoglobin
- Urine heavy metals
- Chest x-ray (not more frequently than one every four years unless indicated otherwise by symptoms or findings of the examinations).

Exit and Interim Examinations
- SMA 26
- CBC
- Urinalysis
- Serum cholinesterase
- Urine heavy metals
- Methemoglobin.

The contractor will maintain for 30 years permanent medical records for all construction employees. These records will be continually updated as necessary. Medical records will be reviewed prior to scheduling preproject physicals to eliminate unnecessary and redundant testing. All medical records, however, will be submitted to the physician prior to each project for his review for employment fitness evaluation.

The medical surveillance will include a judgment by the examiner of the ability of the employee to use negative or positive pressure respirators. Prospective employees determined to have medical conditions which
could directly or indirectly be aggravated by exposure to those chemical substances within the work environment will be counseled relative to their condition but will not be employed on the project.

Employees working in areas where exposure to substances may cause potential ill health effects will use the following physiological screening schedule:

- Prior to their work activity
- As required during the project based upon evidence of symptoms related to chemical exposure within their work
- At termination of their site activities.

Any employee who develops a lost-time illness or sustains a lost-time injury should be reexamined by a physician. The physician must certify that the employee is fit to return to work before his employment on site can continue. A written copy of this certification will be maintained at the site and included in the employee's permanent medical records.

All part-time employees and all nonproject personnel other than authorized regulatory and Vertac personnel visiting the site will be restricted unless evidence or signed statement is presented that a medical examination covering the noted tests has been conducted with satisfactory results.

The Construction Safety Manager and Site Safety Officer will establish an agreement for emergency medical care services at a convenient medical facility near the Vertac site prior to construction. An emergency route will be established and posted in the appropriate locations as discussed in Chapter 8.0.
4.3 PERSONNEL PROTECTIVE EQUIPMENT

Equipment for personnel protection shall be referenced to the U.S. EPA levels of protection as specified in the Interim Standard Operating Safety Guide (U.S. EPA, September 1982, draft). As previously noted, it is the responsibility of the Construction Safety Manager to indicate the specific level of protection required within each area of the site. Protective equipment will be compatible with and provide protection from classes of compounds of concern at the site which include but not limited to:

- Chlorinated phenols
- Dioxin and difurans
- Chlorinated hydrocarbons
- Toxic gases.

The levels of protection as defined by EPA are described below.

4.3.1 Levels A and B

Level A protective equipment will be worn when the highest available level of respiratory, skin, and eye contact protection is needed. The following equipment is used for Level A protection:

- Positive Pressure Self-Contained Breathing Apparatus (SCBA) (Mine Safety and Health Administration [MSHA]/NIOSH approved) operated in the positive pressure mode.
- Total encapsulating suit (boots and gloves attached).
- Gloves - Inner (tight fitting and chemical resistant).
- Boots - Chemical protective, steel toe, and shank. Depending on suit boot construction; worn over suit boot.
- Gloves - Outer, chemical resistant. Depending on suit construction worn over suit gloves.
- Underwear - Cotton, long-john type (optional).
- Hard hat - (under suit, optional).
Disposable protective suit (worn under or over encapsulating suit, optional).

Coveralls (under suit, optional).

Two-way radio communications.

Level B protection will be utilized when the highest level of respiratory protection is needed, but exposure to the small unprotected areas of the body (i.e., neck and back of head) is unlikely, or where concentrations are known to be within acceptable exposure standards, based upon the results of air monitoring. The following equipment will be used for Level B protection:

Positive Pressure SCBA (MSHA/NIOSH approved), operated in the positive pressure mode.

Hooded, chemical-resistant suit.

Gloves - Outer (chemical protective and duct taped to coveralls).

Gloves - Inner (tight fitting and chemical resistant).

Boots - Outer (chemical protective, heavy rubber disposable, and duct taped to coveralls).

Boots - Inner (chemical protective, steel toe and shank).

Two-way radio communications.

Hard hat (optional).

Face shield (optional).

It is not presently anticipated that Level A protection will be utilized at this site.

4.3.3 Level C

Level C will be initially required level of protection. This level is
consistent with the previously established types and concentrations of respirable material. Continual air monitoring of the site and individual work areas is required when level C protection is used in order to detect any changes in exposure which may necessitate a higher level of protection.

Level C is generally permitted within contaminated work areas only when organic vapor readings are less than 50 parts per million (ppm) and phenol levels are less than 5 ppm.

The following equipment will be used for Level C protection:

- Full-face, air-purifying respirator with canister for organic vapors and acid gases which includes a particulate filter (MSHA/NIOSH approved). (Other types of canisters may be used depending on chemicals encountered.)
- Chemical-resistant clothing.
- Overalls and long-sleeved jacket or coveralls (disposable); hooded two-piece chemical splash suit (when applicable).
- Gloves - Outer (chemical protective and duct taped to coveralls).
- Gloves - Inner (tight fitting, disposable, and chemical-resistant type).
- Cloth coveralls - (inside chemical-protective clothing optional).
- Escape mask in areas of greater risk.
- Hard hat (face shield optional).
- Boots (chemical protective, heavy rubber throwaways duct taped to coveralls).
- Boots - Inner (chemical resistant, steel toe, and shank).
- Two-way radio communications between different work locations when distant from management area.
Half face respirators may be worn if potential exposure levels allow. Level C protection is the minimum permissible level of protection within the contaminated zone that may be provided at the Vertac site.

4.3.4 Level D

Level D protection requires the basic work uniform and should be worn only when operations are positively identified as presenting no toxic hazards to personnel. Level D protection will be used only under the following conditions:

- Operations in the support (clean) and transition areas.
- In contaminated areas when no indications above background are observed on the organic vapor analyzer (OVA).
- In areas where dioxin or phenols are known to be not present above background levels.

After monitoring and a hazard assessment have been completed, the Site Safety Officer may permit the use of Level D protection in lieu of Level C protection previously assumed contaminated areas. The basic criteria will be that monitoring results are not above normal background and work activities will not result in potential exposure to higher levels.

Equipment used for Level D protection include:

- Tyvek or treated cotton coveralls - Fire resistant.
- Boots/shoes - Safety or chemical protective, steel toe and shank.
- Boots - Outer (chemical protective, heavy rubber throwaway).
- Escape mask.
- Safety glasses or safety goggles.
4.3.4 Protective Equipment Use Protocol

Each employee will be issued a full-face, air-purifying respirator as required by Level C. Respirator cartridges will be approved for a maximum use concentration 10 times the concentration of the permissible exposure limits of the organic vapors present. Dust filters will also be used with the cartridges. Upgraded respirators and self-contained breathing apparatus (SCBA) will be used if employee exposure warrants. The minimum standard of a half-face, air-purifying respirator with organic vapor/acid gas cartridges will at no time be violated within the designated site dirty area unless approved by the Site Safety Officer.

As discussed in Section 5.0, each employee will be instructed in the following:

- The nature of respiratory hazards in the workplace and an appraisal of what may happen if the respirator is not used.
- The use and proper fitting of the respirator/equipment.
- Cleaning, disinfection, inspection, maintenance, and storage of respirators.
- Why the devices have been selected, their capabilities, and their limitations.

Routinely used respiratory equipment will be collected, inspected, cleaned, and disinfected routinely to provide proper protection. Respiratory protective devices will be inspected before and after each use. Respiratory protective devices not routinely in use at the site will be inspected weekly. The inspections of breathing devices include:
- Examination of the headstraps for:
  - Breaks, loss of elasticity, broken or malfunctioning buckles, and attachments.

- Examination of the facepiece for:
  - Excessive dirt, cracks, tears, holes, distortion, or inflexibility.

- Examination of the exhalation valve for the following after removing its cover:
  - Foreign material, cracks, tears, distortion in the valve body, improper insertion of the valve body in the facepiece, defective valve cover, abnormalities in the valve body, improper installation of the valve in the valve body.

- Examination of the air purifying elements for:
  - Incorrect cartridge or canister for the hazard, abnormalities in the holder, expired shelf life of cartridge or canister, cracks or dents in the cartridge or canister.

Extreme care will be given to the monitoring of effective cartridge life. Each employee will be given isoamyl acetate test ampules and trained in their use. This method will allow the employees to continuously monitor the effectiveness of their Respirators. Cartridges will be replaced if an employee detects breakthrough with the test ampule or by other odor breakthroughs. Cartridges will also be changed at least weekly as a matter of routine maintenance. When significant exposure occurs, cartridges will be changed daily.

Respirators will be cleaned by washing with detergent in warm water using a brush, thoroughly rinsing in clear water, and air drying in a clean place. If, in the cleaning or inspection of the respirators by the users, broken or nonfunctioning parts of the respirator are found, they are to be reported to the Health and Safety Officer. A replacement part or a new respirator will be issued.
Respirator equipment will be stored in an area where they will be protected against mechanical damage, dust, heat, extreme cold, excessive moisture, or contamination by chemical contact. The storage area for the respirators and SCBA will be readily accessible within the Vertac site and all the personnel will be aware of its location.

A prepared form will be used to document the inspection, cleaning, and maintenance of respiratory protective equipment.

4.4 MONITORING

Air quality monitoring is an integral part of the health and safety program to protect the health and safety of the work force and to monitor off-site airborne releases. The program objective is to conduct all activities in the manner required to protect the health and safety of the public and project personnel. The collected data will serve as input regarding worker protective measures, routine work procedures, and emergency events. This monitoring program will include the following components:

- Area monitoring by trained personnel to provide real-time, semiquantitative data on airborne total organic vapor and selected toxic compound concentrations in and around the breathing zone of the workers.
- Industrial hygiene monitoring of personnel working within the contaminated zone.
- Site perimeter air monitoring to assess levels of airborne contaminants at the site boundary.

The monitoring activities are designed to complement one another. The information collected will be compared to standards set for certain action levels so that appropriate responses can be made due to changing circumstances.
4.4.1 Area Monitoring

Routine area monitoring requirements can be categorized as follows:

- Continuous, real-time measurement of total organic vapor concentrations using a flame ionization detection OVA.

- Intermittent, real-time measurement of selected acutely toxic vapor concentrations.

Portable instruments will be used to provide real-time, semiquantitative data on total organic vapor concentrations in and around the breathing zone of workers active in the dirty area. OVA readings will be obtained at maximum intervals of 30 minutes when waste handling operations are taking place. The GC mode of the OVA/GC may be used to identify categories of airborne organic contaminants. The instrument may be calibrated with standard reference materials to allow identification and quantification of toluene and other select volatile compounds.

Area monitoring will also include the collection and real-time analysis of selected acutely toxic gases. A toxic gas monitor or indicator tubes will be used to analyze for toxic gases within active work areas. Readings will be taken at maximum intervals of 30 minutes when toxic gases are suspected. If OVA readings in excess of 5 ppm above background are obtained, a real-time measurement of chlorinated phenol concentration will be obtained using indicator tubes. The frequency and extent of work area monitoring will be finalized after conducting the initial on-site monitoring hazard assessment.

Action levels have been established for the Vertac site based on the maximum allowable airborne concentration of the compounds which are present at the site. The basic responses to work area monitoring results are as follows:

- Level I - Organic vapor measurements of normal background up to 50 ppm. Level C protection is...
required (Chapter 4.0). When organic vapor readings are greater than 5 ppm, indicator tubes are used to test for phenol. If the phenol concentration is in excess of 5 ppm [threshold limit value (TLV)] Level II response is initiated.

- Level II - Sustained organic vapor concentrations of 50 to 500 ppm or phenol concentrations between 5 to 10 ppm initiates a Level II response. All workers are required to use Level B protection equipment and immediate action is taken to reduce the concentration to which workers are exposed by relocating personnel, temporary suspension of an operation, or other accepted means of exposure control. The perimeter is monitored for off-site releases (Section 4.4.3).

- Level III - Sustained organic vapor concentrations in excess of 500 ppm or phenol concentrations in excess of 10 ppm initiate a Level III response. Remove personnel and treat as an emergency situation. Reduce exposure by suspending operations and covering the area with soil, sand, water, etc., to reduce contamination. The VEC is notified and perimeter measurements are taken (Section 4.4.3).

In this context, "sustained" implies a concentration that maintains its level for 15 minutes.

4.4.2 Personnel Monitoring Program

The personnel monitoring program will involve the collection of data for representative workers each day to examine their potential eight-hour time-weighted average (TWA) exposure to airborne contaminants. All sampling and analysis will be performed in accordance with accepted protocols as published in the NIOSH Manual of Analytical Methods.

The concentration of toxic materials may be determined by collecting samples in appropriate media (Tenax sorption tubes, absorbent badges, etc.) with subsequent laboratory analysis. These concentrations are then evaluated with respect to required employee potential exposure and protection throughout the project.
One method that can be used for determining average employee exposure at the site will be to take short-term and daily "breathing zone" samples at each task performed by a given employee job category. Exposure will be determined by personnel monitoring, determining time spent at the task, and determining the TWA value for each job category.

Organic vapor monitoring badges (3M Model 3500 or equivalent) will be used to collect full-shift, TWA concentrations in the work environment of employees. If OVA data indicate employees have been exposed to organic vapors, then the samples will be shipped to the analytical laboratory as soon as possible for GC analysis for toluene and other select compounds determined during the hazard assessment. Otherwise, they will be discarded.

The monitoring badges (3M Model 3500) are passive monitors. Molecular diffusion is the mechanism by which vapors are contacted with the collection medium. As such, the generated data are indicative of the contaminant levels in the air space in which workers are involved. They reflect the potential exposure through respiration and skin contact of an unprotected worker. A worker protected by an air-purifying respirator and full-body coveralls receives an exposure about one-tenth of these levels. Higher levels of protection provide greater reduction in exposure.

4.4.3 Perimeter Monitoring Program
A perimeter air quality monitoring program will be initiated to coincide with the start of any site activities. The program will provide:

- Monitoring of any excessive concentrations of fugitive dusts, vapors and gases escaping the site during construction activities.

- Initial implementation/revision of health and safety program as the work progresses.
The air sampling will coincide with start and stoppage of the shift. Du Pont P-4000 or equivalent sampling pump and suitable sorbent tubes (Tenax) and/or high volume air samplers with suitable filters will be used to collect samples. Final selection of sampling equipment will be made subsequent to the initial project site survey.

Four air sampling stations will be set up on the site perimeter to monitor and document off-site releases. Samples from one upwind station and two downwind stations will be collected each day. The Safety Officer will review the daily area monitoring results to determine if the perimeter monitors are to be analyzed. If there are no sustained OVA readings of 50 ppm or greater on a particular day, the samples will be stored for future analyses, if necessary. If sustained OVA readings greater than 50 ppm are obtained, the Safety Officer will assess testing requirements for the perimeter samples on a case-by-case basis. The general requirement will be that a downwind sample will be sent to an analytical laboratory for quantitative analysis.

Specific responses to organic vapor concentrations at the perimeter are described below.

Sustained organic vapor concentrations of 50 ppm or greater obtained during work area monitoring require another real-time organic vapor measurement downwind at the site perimeter (the nearest downwind point at the site boundary to which the general public has direct access). The following responses will be initiated depending upon the perimeter measurements:

- Organic vapor concentrations less than 5 ppm and phenol concentrations less than 1 ppm - Work will continue with frequent (every 15 minutes) perimeter monitoring if the area monitoring continues to have sustained organic vapor measurements over 50 ppm.
o Organic vapor concentrations between 5 and 30 ppm or phenol concentrations between 1 and 3 ppm - Steps will be taken to reduce emissions. The VEC is notified of the incident and the steps taken to correct it.

o Organic vapor concentrations in excess of 30 ppm or phenol concentrations greater than 3 ppm - The VEC will be notified of an off-site release. All work operations will be suspended, except operations which will reduce the off-site release. The incident will be treated as an emergency situation (Chapter 7.0).

4.5 PERSONAL HYGIENE

Personal hygienic practices will be consistent with the work of all contractor, subcontractor, service, and regulatory personnel. Signs will be posted at the site indicating various hazards and that unauthorized entry is prohibited.

Administrative areas, working areas, toilet rooms, locker rooms, eating areas, and smoking areas will be posted with information related to personal hygiene activities required of employees to enter these respective areas (i.e., wash hands, change clothing, take a shower, etc.).

Eating and food preparation or dispensing will be prohibited in any area other than those designated and properly protected. No food or beverages will be permitted in the work area. This includes items such as candy, gum, snuff, chewing tobacco, etc. Beards and long sideburns are prohibited, as are contact lenses and working when ill.

Employees who handle contaminated soil or articles must wash their hands with soap or mild detergent and water before they are permitted to enter the eating areas. To avoid potential hand-to-mouth contamination, smoking or carrying of tobacco products will be prohibited in the work area.
area. The Site Safety Officer will perform inspections and document variations. Frequent violations or repeated minor violations will result in employee dismissal or removal from the project.

The contractor will furnish equipment for all site personnel and visitors. Decontamination facilities will be maintained in clean and proper working order.

4.6 SAFETY PROCEDURES
Construction activities will be conducted in a manner consistent with accepted procedures for safe practice. All employees will be trained in these procedures and will be verified by past experience and references as being proficient in their designated construction position. Daily meetings will be held to review the day's planned activities and appropriate safety precautions. As discussed in Chapter 5.0, each employee will provided a safety manual for several construction activities. A copy of that manual is attached.
5.0 TRAINING

The Construction Safety Manager will have overall responsibility for implementing the training program. However, as the on-site representative, the Safety Officer will train employees in proper materials handling; proper methods for the use, storage, and disposal of decontamination fluids; preventive maintenance of safety equipment; requirements for and use of respirators, personal protective equipment, and required personal hygiene practices; and appropriate response to personal contamination.

The Site Safety Officer will implement a training program for all site personnel to develop safe working habits. The training program will instruct site employees on responding effectively to any emergency. Procedures for the use, repair, and the inspection of monitoring equipment will be provided. The appropriate response to fire, explosions, and the shutdown of operations will be reviewed. All project employees will be familiarized with the proper response to an unacceptable level of vapor escaping from waste movement activity. Emergency procedures, areas of the site that have restricted access, methods used for project decontamination, and general safety will be covered in the training. Records of site personnel having completed this training will be maintained on site.

In summary, the training program will include the following topics:

- Explanation of effects of toxic chemicals identified at the site
- Requirements for personnel protection (respirators, etc.)
- Proper use and fitting of respirators, including drills in emergency donning of respirators
- Prohibited actions or procedures
- Safety precautions
Emergency procedures.

Each employee will be trained regarding construction safety measures required in each work area and will be provided a safety manual for general construction (Attachment A). Each employee will be required to review and sign an agreement to comply with the requisite health and safety procedures.

Daily meetings will be held to review the day's activities and the requisite health and safety precautions.
6.0 DECONTAMINATION PROCEDURES

Decontamination facilities and equipment will be provided for construction equipment and for site personnel. These facilities and equipment will be 100 percent devoted to the project.

The Contractor will provide:

- Equipment decontamination facility
- Mud room to remove surface contamination
- Work area change room to put on and remove work clothing
- Shower room
- Laundry room
- Lunch/break area
- Clean room with lockers for street clothes
- Support area change room for miscellaneous storage of clothing, etc.

Any vehicle working in the contaminated zone will be cleaned before leaving the site using a high pressure hot water spray. Each piece of equipment will be inspected after cleaning for any soil or sludge remaining on the tires or elsewhere by the foreman and operator. Vehicles will be checked with a portable OVA prior to entering the clean area. All vehicles will be cleaned to the satisfaction of the Site Safety Officer or his designated assistant prior to leaving the site.

Personnel shall use the shower facilities before changing into their street clothes at the end of their work shift. The Contractor shall provide soap and shampoo for washing and showers, towels, wash cloths, and hair dryers. Personnel showering shall include washing of hair. Work clothes shall be left in the change facility. Except for clothing
worn only in the support area, no work clothing, including shoes or boots, will be worn off or carried out of the project area. Soiled work clothes shall be laundered by the contractor. Boots, gloves, and respirators shall be cleaned prior to entering other areas. All breathing devices shall be provided and maintained by the contractor. Wash water residues will be collected and treated as potentially contaminated.

A trailer or existing onsite building will also be available as a lunch/training room. Toilets will be available in the support area. Entrance to the lunchroom from the contaminated zone is made by going through the contamination reduction (transition) area only.
7.0 EMERGENCY RESPONSE PLAN

Emergency response procedures have been developed to cover extraordinary conditions that may occur at the Vertac site. Any emergency that could arise would be coordinated with the Vertac Emergency Coordinator in accordance with the Vertac Emergency Response Contingency Plan.

7.1 GENERAL RESPONSE CONSIDERATIONS

All accidents and other unusual events must be dealt with in a manner to minimize continued health risk of site workers. The vast majority of activities on the site will be conducted by crews working in reasonable proximity to one another. In isolated cases where less than a full crew is required to perform a task, a "buddy system" will be utilized so that an individual worker will not be involved in a physically remote activity.

In the event that an accident or other unusual event occurs, the following procedures shall be implemented:

- First aid or other appropriate initial action will be administered by those closest to the accident/event. This assistance will be coordinated by the ranking individual on site and will be conducted in a manner so that those rendering assistance are not placed in a situation of unacceptable risk. The primary concern is to avoid placing a greater number of workers in jeopardy.

- All accidents and unusual events must be reported to:
  - Construction Manager
  - Vertac Site Supervisor
  - Safety Officer
  - Vertac Emergency Coordinator
  - EPA and ADPCE project coordinators
The ranking individual on site at the time that the accident/event occurs is responsible for conducting the emergency response in an efficient, rapid, and safe manner. The ranking individual will decide if off-site assistance and/or medical treatment is required and is responsible for alerting off-site authorities and arranging for their assistance. The contractor will assume this responsibility unless directed otherwise by the VEC.

- All workers on site are responsible to conduct themselves in a mature, calm manner in the event of an accident/unusual event. All personnel must conduct themselves in a manner to avoid spreading the danger to themselves and to surrounding workers.

To respond to emergencies, one of the site personnel will be certified in first aid and cardiopulmonary resuscitation (CPR) by the American Red Cross or other approved agency. This person will be available to provide emergency medical treatment in the event of an injury.

7.2 RESPONSIBILITIES

7.2.1 Contractor Site Safety Officer

The Contractor Site Officer or his designated replacement shall have responsibility for directing response activities in the event of an emergency. He will:

- Assess the situation.
- Determine required response measures.
- Notify appropriate response teams.
- Determine and direct on-site personnel during the emergency.
- Contact and coordinate with government agencies.
He shall coordinate his response activities with those of public agencies.

Initially, the Site Safety Officer or the appropriate designated personnel shall be responsible for implementing the Emergency Response Plan for all personnel and visitors on site. The Construction Manager or his designated foreman shall, between them, know at all times what construction personnel are on the site and where they are located. A daily sign in/out log will be maintained at the site to facilitate control of construction personnel. The Construction Manager shall assist the Site Safety Officer or take the lead at his request for selected emergency responses.

7.2.2 Public Response Agencies, Notification Checklist
The following is a list of public response agencies to be contacted who may, due to the nature of the situation, assume authority for emergency response. All agencies will be notified prior to commencement of work as to the nature of activities at the Vertac site. In the event of an emergency situation, construction personnel shall lend all necessary assistance to Vertac or the agency in charge in accordance with the Vertac Emergency Response Contingency Plan.

<table>
<thead>
<tr>
<th>Immediate Emergencies</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Jacksonville Police Dept. 24 Hr. Dispatch</td>
<td>911</td>
</tr>
<tr>
<td>o Sheriff's Office (Pulaski County)</td>
<td>664-3800</td>
</tr>
<tr>
<td>o Fire Department</td>
<td>911</td>
</tr>
<tr>
<td>o Fire Chief</td>
<td>911</td>
</tr>
<tr>
<td>o Ambulance</td>
<td>911</td>
</tr>
<tr>
<td>o County Coordinator</td>
<td>372-8420</td>
</tr>
<tr>
<td><strong>Emergency Support</strong></td>
<td></td>
</tr>
<tr>
<td>o U.S. EPA (24-hour HOTLINE)</td>
<td>800-424-8802</td>
</tr>
</tbody>
</table>
The names and phone numbers of all appropriate personnel and agencies that could be involved in emergency response will be posted at several prominent locations at the site. These include the guard duty station, office, personnel decontamination trailer, and the eating area.

If a spill occurs which releases hazardous substances outside of the plant boundary lines, the federal government has the authority (under the National Oil and Hazardous Substances Contingency Plan) to initiate response activities which are directed by a federal on-scene coordinator (OSC). In the event that a release as described above occurs, contractor's response activities will be coordinated with those of the OSC's and VEC's. Federal government contacts are:

- National Response Center (800) 424-8802
- National Poison Control Center (404) 588-4400
- USEPA Region VI Spill Control (617) 223-7265
7.2.3.2 **Documentation of Incident**

Whenever a site emergency occurs, the Safety Officer will provide a report to the Project Manager and the VEC describing the following:

- The event (including date and time) that necessitated the notification and the basis for that decision
- Date, time, and names of all persons/agencies notified and their response
- Resolution of the incident (including duration) and the method/corrective action involved.

This report will be submitted within three working days of the resolution of the event and forwarded to Vertac.

Site emergencies will be verbally reported to the OSC within 24 hours of the event.

7.3 **EMERGENCY RESPONSE EQUIPMENT**

Before initiating site operations, the following emergency equipment will be provided at the site and tested to verify working order:

- Two-way radios (if distant work areas require).
- First aid station (i.e., stretcher, first aid kit, and decontamination equipment).
- Rudimentary emergency showers.
- Portable eyewash stations.
- Chemical fire extinguishers will be provided on site at each work location. All will be type ABC, 20 pounds.
- List of persons and phone numbers for emergency notification.
- SCBA's for emergency use.
Other equipment used for the routine implementation of the worker health and safety protection and monitoring programs will be made available to support any emergency response activity.

7.4 ACCIDENTS AND NONROUTINE EVENTS

The emergency procedures below are not all inclusive, nor should they be thought of as inflexible. Every accident presents a unique event that must be dealt with by trained personnel working in a calm, controlled manner. In the event of an accident/unusual event, the prime consideration is to provide the appropriate initial response to assist those in jeopardy without placing additional personnel at an unnecessary risk.

7.4.1 Worker Injury

If an employee working in a contaminated area is physically injured, Red Cross first aid procedures will be followed. Depending on the severity of the injury, emergency medical response may be sought. If the employee can be moved, he will be taken to the edge of the work area (on a stretcher, if needed) where contaminated clothing will be removed, emergency first aid administered, and transportation to a local emergency medical facility awaited.

7.4.1.1 Minor Accidents

If the injury to the worker is chemical in nature (e.g., overexposure), the following first aid procedures are generally instituted as soon as possible:

- Eye Exposure - If contaminated solid or liquid gets into the eyes, wash eyes immediately at the emergency eyewash station using large amounts of water and lifting the lower and upper lids occasionally. Obtain medical attention immediately. Contact lenses should not be worn in the dirty area.

- Skin Exposure - If contaminated solid or liquid gets on the skin, promptly wash the contaminated skin using soap or mild detergent and water. If solids or liquids penetrate through the clothing,
remove the clothing immediately and wash the skin using soap or mild detergent and water. Obtain medical attention immediately.

- Breathing - If a person breathes in large amounts of organic vapor, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.

- Swallowing - For most contaminated solid or liquid found at the site, if such material has been swallowed and the person is conscious, give the person large quantities of salt water immediately and induce vomiting. Do not make an unconscious person vomit. Obtain medical attention immediately.

A list of chemicals likely to be found on site will be maintained and posted by the Safety Officer along with the prescribed first aid treatment for exposure to each of the chemicals. The VEC shall be informed immediately of any incident.

7.4.1.2 Major Accidents

Major accidents which pose a potential immediate threat to life, limb, or health shall be handled in the following manner:

- Injured parties will be administered to by the Safety Officer or other construction employee properly trained in Red Cross first aid procedures.

- Necessary emergency response services (ambulance, fire, hospital, poison control center) shall be notified.

- Other persons potentially threatened by the accident will evacuate the area and operations in the area of the accident will cease until approval to resume is given by the VEC.
A construction representative shall inform the OSC of the accident and a written report detailing the accident, its causes, and consequences shall be submitted to the VEC.

7.4.1.3 Contamination
In the event personnel are splashed or otherwise excessively contaminated by waste, the following procedures shall be undertaken:

- The Safety Officer or other trained construction employee shall undertake to provide the required first aid/ emergency treatment.
- The necessary emergency response services (ambulance, hospital, poison control services) shall be notified.
- The contractor shall implement the site spill control procedures as appropriate, including expeditious implementation of personnel decontamination procedures.
- The VEC shall be notified of the incident and the contractor shall submit a report detailing the accident and actions taken to the VEC within 24 hours of the accident.

7.4.2 Fires
Construction personnel in each work group will be trained in safe fire suppression techniques. They shall be instructed in:

- Proper use of the fire extinguishers supplied on site
- Respiratory protective equipment that is required in the near vicinity of a fire (e.g., SCBA)
- Techniques in smothering fires using available noncombustible materials
- Emergency evacuation procedures in the event fires reach an out-of-control situation
- Notification of VEC.
All personnel will be instructed to summon the Jacksonville Fire Department for assistance should there be even a remote chance that the fire will spread rapidly.

7.4.2.1 Small Fires

In the event of a small fire at the site, the Construction Site Manager shall take the following minimum actions:

- Evacuate all unnecessary personnel from the area, if possible to an upwind location
- Attempt, by properly protected personnel, to extinguish fire using portable fire extinguishers or by smothering
- Request emergency response assistance (ambulance, fire, hospital, poison control center) as needed for any injuries or exposures to hazardous chemicals
- Notify the VEC of the incident.

7.4.2.2 Large Fires

In the event of a large or small fire which cannot be extinguished, the Safety Officer should undertake the following actions:

- Evacuate all personnel from the site, preferably to an upwind location
- Order the appropriate level of protective clothing
- Notify the fire department and other emergency response agencies
- Notify the VEC of the incident.
7.4.3 Spills

7.4.3.1 Spill Control Operations
The contractor will provide all equipment and personnel required to remove spilled material associated with the construction activities. Collected spill material will be properly containerized and stored on-site. The contractor will provide methods, means, and facilities required to prevent contamination of soil, water, atmosphere, or uncontaminated structures or equipment or material by the discharge of bulk waste from spills due to site construction operations.

The VEC will be notified immediately of any spills and actions will be undertaken by the contractor to rapidly contain the spill. All personnel endangered by the spill will be evacuated upwind unless their assistance is needed in controlling the incident. Small spills will be absorbed with sand, clean fill, or other noncombustible absorbent material. Large spills will be diked or absorbed. The VEC will be provided with a map showing the location of the spill and a written report.

7.4.3.2 Spill Control Equipment
Equipment required to clean up spills shall consist of sand, clean fill, or other noncombustible absorbent; coarse aggregate; front end loader; drums (55 gallon, U.S. Department of Transportation [DOT] 17-E or 17-H); shovels; and solvent for decontamination of tools and equipment.

Material removed shall be placed in 55-gallon drums and shall be transported to an area designated by Vertac. Drums shall be sampled, analyzed, and disposed of as directed by Vertac.

7.4.4 Contaminant Migration Control
Materials to be handled during the Vertac site remedial program may contain volatile organic compounds. Control of the volatilization of
these compounds is important with regard to both protecting the work force and limiting off-site releases. The health and safety protection and air monitoring programs are set up to monitor and respond to potentially adverse concentrations of airborne contaminants.

If a particular operation produces excessive airborne contaminants, that area will be controlled to allow the gases to be vented more slowly. Sand or noncontaminated soil will be used to control emissions. Tarpaulins and plastic sheeting will also be available on site to cover temporarily any staged materials emitting objectionable quantities of organic vapors or other gases.
8.0 DATA COLLECTION AND REPORTS

Records of all health and safety activity at the site will be maintained, including health hazard surveys, evaluation of potential hazards, and control measures taken. Records required by the state and federal government will be current. Site employees will be continually informed of exposure levels and the degree of safety measures required for protection from the hazards present.

8.1 EXPOSURE POTENTIAL

Exposure monitoring will serve as a record of assessment of the potential hazards at the project and will include the following:

- Determination of personnel activity in the working area:
  - Job routines
  - Work locations
  - Time spent in work area
  - Work rates.

- Determination of potential respiratory hazards:
  - Chemical composition
  - Type of air contamination
  - Toxicity at various concentrations (acute versus chronic)
  - Established concentration limits for breathing.

- Determination of degree of exposure with use of instruments:
  - TWA concentrations
  - Peak exposure concentration.

- Protective equipment employed to control potential hazards.

Records of all sampling, methodologies, calculations, results, reports, and recommendations will be kept as part of the project records.
8.2 LOGS AND REPORTS

The construction contractors shall maintain logs and reports covering the implementation of the Personnel Protection Program. The format will include training logs, daily logs, weekly reports, and a phase-out report:

- The training log(s) shall be completed for both initial training and refresher training.
  - Employee's name (attendance check)
  - Time in training session:
    a. Topics covered
    b. Materials used
    c. Equipment demonstration
    d. Equipment practice for each employee
    e. Prohibitions covered
    f. Other.

- Daily Logs:
  - Date
  - Area (site specific) checked
  - Employees in a particular area
  - Equipment utilized by employees
  - Protective clothing worn by employees
  - Protective devices used by each employee
  - Site Safety Officer signature and date.

- Weekly Reports:
  - Summary sheet covering the range of work being done
  - Any incidents of:
    a. Nonuse of protective devices or clothing in an area where required
    b. Violation of eating, smoking, and chewing in prohibited areas
    c. Instances of job-related injuries and illness
  - Copies of medical examinations
- Site Safety Officer signature and date

Reports shall be signed and dated with copies of daily logs attached.

- Phase-out Report - At the completion of the work, a phase-out report will be prepared and include:
  - Final physical/medical and decontamination certification
  - Procedures and techniques used to decontaminate:
    a. Equipment and vehicles
    b. Shower facility
    c. Laundry facility
    d. Portable chemical toilets, etc.

- The report shall be signed and dated by the Project Manager and the Construction Health and Safety Manager and submitted to the OSC.

Sample record forms are attached (Attachment B).
ATTACHMENT A
SAFETY MANUAL FOR GENERAL CONSTRUCTION
Safety Manual
for
GENERAL CONSTRUCTION
and
SITE PERSONNEL
AGREEMENT

10 DUFF ROAD, PITTSBURGH, PENNSYLVANIA 15235
INTRODUCTION

This pamphlet is designed to inform you of the conditions of your employment with D'Appolonia and to help you do your job efficiently and safely.

As a Construction and/or Waste Management Worker, you are part of a challenging industry; a unique team. Your fellow workers depend upon you. In order to prevent injury to yourself, or someone else, it is necessary to comply with the safety rules in this manual. Since it is not possible to include specific instructions for every safety condition or local regulations, the common sense SAFE WAY is the best way to do every job.

Please read the instructions carefully and sign the card on the back page. If you have any questions, ask your superintendent, foreman or health and safety officer before you give him the card. This pamphlet is yours to keep.

THE MANAGEMENT
GUIDELINES FOR D'APPOLONIA SAFETY PROGRAM

GOALS:

SAFE AND HEALTHFUL WORKING CONDITIONS

SAFE WORK PRACTICES BY EMPLOYEES

The personal safety and health of each employee of this company is of primary importance. The prevention of occupationally induced injuries and illnesses is of such consequence, that to the greatest degree possible, management will provide all mechanical and physical facilities required for personal safety and health in keeping with the highest standards.

The objective of the D'Appolonia safety program is to reduce the number of disabling injuries and illnesses to a minimum, not merely in keeping with, but surpassing, the best experience of other operations similar to ours. Our goal is zero accidents and injuries.

D'Appolonia Safety and Health Program Will Include:

1. An integrated program of safety and health inspections to find and eliminate unsafe working conditions.
2. Full compliance with safety and health standards for every job.
3. Training all employees in good safety and health practices.
4. Provide necessary personal protective equipment and instructions for its use and care.
5. Develop and enforce safety and health rules requiring that employees cooperate with these rules as a condition of employment.
6. Immediate and thorough investigation of each and every accident, or near accident, to ascertain and correct its cause and provide remedial action.
7. Provide mechanical and physical safeguards to the maximum extent that is possible.

The Responsibilities for Safety and Health are as Follows:

The EMPLOYER is responsible, and accepts the responsibility for leadership of the safety and health program, for its effectiveness and improvement, and for providing the safeguards required to ensure safe conditions.
SAFETY PROGRAM

CONDITIONS

SUPERVISORS are responsible for developing the proper attitudes toward safety and health in themselves and in those they supervise; and for ensuring that all operations are performed with the utmost regard for the safety and health of all personnel involved.

EMPLOYEES are responsible for genuine cooperation with all aspects of the safety and health program — including compliance with all rules and regulations and for continuously practicing safety while performing their duties.

If all of these responsibilities are not actively pursued, employee injuries are likely to occur. Accidents on the job may result in employee death or injury, property damage, production loss, and increased insurance expense, workmen's compensation, and other costs.

Training

Safe operation requires constant attention and reinforcement by proper training methods. This will be provided by well-planned regular safety and health meetings that motivate employees and supervisors to be safety conscious.

Superintendents deal personally with actual operations and employees. He should know every part of every job under his supervision. Most importantly, he should know how every job should be done properly, efficiently, and safely. With this in mind, a monthly Superintendents Safety Meeting will be held to discuss the following procedures:

1. Provide information on safe and healthful working practices to the foremen at the field level.
2. Develop or revise rules to comply with current safety and health standards.
3. Inspecting a selected area of the company each month for the purpose of detecting hazards.
4. Updating current training procedures for foremen and other employees.
5. Methods and procedures for reporting accidents or unsafe conditions.
6. Discuss first aid, and first aid training for all employees.

Individual job superintendents, and health and safety personnel shall be responsible for safety and health meetings and procedures for the project directly in their control.

The following guidelines will be in order on all D'Appolonia job sites, and shall be administered by the superintendent in charge.

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Individual job superintendents, and health and safety personnel shall be responsible for safety and health meetings and procedures for the project directly in their control.

The following guidelines will be in order on all D'Appolonia job sites, and shall be administered by the superintendent in charge.
1. Each employee shall be provided initial indoctrination and continuing safety instruction as will enable him to conduct his work in a safe manner.

2. Initial indoctrination shall include instruction in project safety practices, reporting of all accidents, availability of medical facilities, and individual responsibility for accident-free operations.

3. A minimum of one 5-minute "on the job" or "tool box" safety meeting for all workers shall be conducted each week by all field supervisors or foremen.

4. All persons required to use rescue or life-saving equipment shall be instructed and trained in the proper use of that equipment.

5. All persons required to handle or use flammable liquids shall be fully instructed in the safe handling and use of these flammable liquids.

6. All persons required to use fire-fighting equipment shall be instructed and trained in the use of this equipment.

7. Familiarization with and identification of first aid training, and first aid station locations.

8. All persons required to give or receive crane or equipment signals shall be instructed in the proper use of the signal systems.

9. All persons shall be instructed in the required response to emergency signals.

10. In areas where insects, rodents, snakes, or vermin are present, all persons shall be instructed regarding the potential hazards and first aid procedures.

In conjunction with the superintendents initial indoctrination, each individual employee will receive a copy of the D'Appolonia Safety Manual. He will also be required to sign a card stating he is in receipt of the Safety Manual, and has attended the initial job indoctrination meeting.

The following subjects should be discussed by employees during the job-site "Tool Box Weekly Meeting."
1. Accident Reporting
2. Medical Facilities
3. Emergency Procedures
4. Personal Protective Apparel, Clothing and Safety Equipment
5. Poisons and Harmful Substances
6. Fire Protection
7. Welding and Cutting Safety
8. Hand and Power Tool Safety
9. Rope Sling & Chain Safety
10. Machinery and Mechanized Equipment Safety
11. Motor Vehicle Safety
12. Pressurized Equipment and Systems Safety
13. Ramp, Runway, Platform, and Scaffold Safety
14. Excavation Safety
15. Blasting Safety
16. Personal Hygiene
17. Hazardous Wastes Present on Site and Their Toxic Effects
18. Proper Use of Protective Equipment Such as Respirators, Fitting Testing, Cartridge Selection, etc.
19. Proper Use of Monitoring Equipment Such as Organic Vapor Meters, Pumps, etc.
20. Answer Any Health and Safety Related Question

All D’Appolonia superintendents and foremen will attend first aid certification courses provided by the Pittsburgh Chapter of the American Red Cross. This will assure D’Appolonia that at least one individual trained and certified in administering advanced first aid and emergency care will be present at each job site in the future.

General Superintendent and
Health and Safety Officer
1. Report to work rested and physically fit to perform your job.

2. Wear clothing suitable for weather and your work. Torn or loose clothing, cuffs, neckwear are hazardous.

3. Wear sturdy shoes suitable for your trade, in good condition.

4. Use gloves, aprons or other suitable skin protection when handling rough materials, chemicals, hot or cold objects. Replace if worn.

5. Jewelry (rings, bracelets, neck chains, etc.) should not be worn.

6. Special safety equipment is provided for your protection. Use when required. Keep in good condition. Report loss or damage immediately.

7. Hard hats must be worn in all areas indicated (visitors included).

8. Wear proper eye protection if exposed to flying objects, dust, hot splashing metal, harmful rays, chemicals.

9. Wear proper respirator when spray painting, burning, exposed to dust or other toxic hazards. If entering manhole, tank, etc. air must be checked OK — or oxygen needed.
10 Keep materials orderly. Prevent piles from falling or shifting (tie down or support, if necessary).

11 Shavings, dust, scraps, oil or grease must not accumulate. Make good housekeeping part of the job. Remove trash piles as soon as they build up.

12 Read danger warnings on container labels. Follow any health/safety precautions. Know before you use it.

13 Remove or clinch nails in old lumber.

14 Oil, grease and water spills must be cleaned up right away. Delay can cause an accident.

15 Keep loose materials off stairs, walkways, ramps, platforms, etc.

16 Do not block aisles, traffic lanes, fire exits.

17 Have safe access to work areas — the safe way is the right way. Have enough light on stairs, aisles, and work area — to prevent falls.

18 Avoid shortcuts — use ramps, stairs, walkways, ladders, etc.
19. When entering different work areas find out what safety precautions required.

20. Be sure of your footing. Watch out for overhanging or broken planks, slippery spots, loose objects, etc.

21. Be aware of work going on around you. Keep clear of suspended loads, traffic areas, etc.

22. Use body belt and tie off if other fall protection is not available.

23. Place barricades and signs to warn of overhead danger, traffic, excavation, etc. Have warning lights, flagman or watchman if necessary.

24. Don't leave floor openings unprotected. Use strong cover or 42" high guardrail (with midrail and toeboard).

25. Properly brace or shore up excavation side wall if not sloped.

26. Place excavation spoil far enough away to avoid load strain on walls. Remove surface rocks that may fall in.

27. Do not permit vehicles too close to edge of cut.

28. When using a lift you should:

29. ...bulk load through...

30. Be cautious when big for...

31. Check first view...

32. Use or...

33. Use angle work clear...

34. Hang 3 feet easy at top brace...

35. Use safe..

36. Plan overhang than 6 be sec Minim planks...
28 Bend knees, keep back nearly straight when lifting. Leg muscles, not your back, should do the work.

29 Get help with heavy or bulky materials to avoid dropping load or getting thrown off-balance.

30 Have just one person give commands when team-lifting big loads. Before lift, check for clear path.

31 Check for clear path first. Then have clear view while carrying load.

32 Face ladder when climbing. Use both hands. Use hand line or material hoist to lift loads. Don't lift electric tools by cord.

33 Use only sturdy ladders on firm base. Where possible angle out base 1/4 of ladder working length. Keep area clear of scrap, tools, hose.

34 Have ladder reach at least 3 feet above landing for easy access. Tie off ladder at top (secure bottom and brace long ladders).

35 Use scaffold if solid footing or safe ladder access is not possible. Made of straight grained lumber, free of defects and knots. Test plank strength.

36 Platform planks should overlap supports not less than 6" nor more than 12"; be secured from shifting. Minimum width: Two 12" planks or three 10" planks.
37 Keep all tools and materials away from edge of scaffolds, platforms, shaft openings, etc.

38 Do not use tools with split, broken or loose handles.

39 Have tools with burred or mushroomed heads dressed. Keep cutting tools sharp — and carry in a container (not in your pocket).

40 Know correct use of hand and power tools before using. Use the right tool for the job.

41 Only qualified personnel should operate or service power tools, vehicles and other machinery.

42 Before starting machinery, opening valves, switches, etc., check safety of workmen. Have safety guards in place.

43 Never adjust or repair machinery while in motion. Lock out, block, bleed air as required to prevent movement.

44 Operate machinery and vehicles within rated capacity and at safe speeds.

45 Report defective power tools or machinery to management immediately.
46 Never point an air hose at anyone or use it to clean clothing — extremely dangerous!

47 Be sure you have clear area behind you before swinging sledgehammer, other tools or materials.

48 Keep check on load lines, slings, blocks, clamps or other tackle. Repair/replace defects. Hang up slings if not in use.

49 Consider all wires "live" until checked and locked out. Keep safe distance from "live" electricity.

50 Have electrical equipment properly grounded. Also — use 3 wire grounded receptacles and extension cords.

51 Do not use electrical power tools or equipment while standing in water. Keep cords out of puddles.

52 Cord splices or repairs shall be electrical/mechanical equal to that cord's quality (no substandard patching).

53 Only qualified personnel should make electrical repairs or installations. Do not use metal ladders and hats near high powered electricity.

54 Have cords, leads, hose etc. placed to avoid tripping hazards or getting damaged away from oil, heat, chemicals.
55 In or near old construction, locate gas, power and water sources before starting work. Contact utility companies.

56 *No Smoking* signs stand guard near fire dangers. Obey them — always!

57 Know location and use of fire extinguishing equipment and how to give fire alarm.

58 Flammable liquid containers shall be clearly labeled and stored in a protected, separate area.

59 Flammable liquids shall be used only in small amounts and in approved, self-closing containers.

60 Do not refuel a hot or running engine. Clean up spills before starting. Never use gasoline as a cleaner.

61 Store oily wiping rags in covered metal containers or dispose of them safely.

62 Never use an air hose for pressure to empty gasoline drums.

63 Welding, cutting work should be closely supervised. Remove or shield nearby combustibles.
64. Keep a fire watch with adequate fire extinguishers during and after "hot work" as job location requires.

65. Do not look at welding or cutting operations without wearing proper eye protection.

66. Check hose, fittings, valves for leaks (use soapy water). Cylinders shall be kept upright and secured.

67. Keep oily cloths away from oxygen (explosion danger!)

68. Always light torch with a "torch lighter" (never use a match or cigarette — and never in a keg or drum).

69. Open cylinder valves slowly to prevent damage to regulator. Close valves if work finished, moving cylinders, in storage or empty.

70. Keep salamanders or other portable heating equipment away from combustible materials.

71. Make sure engines in buildings are away from combustibles — and exhaust is properly ventilated.

72. After work, check clothing for hidden hot slag or molten metal. Do not wear oil soaked clothing.
73. Do not ride on vehicles or mobile equipment unless specifically authorized. Do not ride on hook, ball, rigging or load.

74. Always be seated when riding authorized vehicles (unless designed for standing).

75. Report any injuries immediately. Even small cuts can become seriously infected.

76. Report any unsafe conditions or equipment to supervisor to prevent a loss.

77. Keep "horseplay" and roughhousing away from the job. Practical jokes often become painful injuries.

78. Keep your mind on your job — and temper under control — always!

79. Intoxicants and nonprescribed drugs are NOT PERMITTED — cause for disciplinary action.

80. Report accidents to your supervisor. If injured, get first aid. (Small cuts can get serious if neglected).

81. Give your wholehearted support to safety activities. Preventing your accident depends mostly on YOU.

82. Do not breathe directly.

83. Always wash hands before and after handling the

84. Make sure clothes fit tightly on

85. Check res tuition carefully for c

86. Do not abuse or protective e

87. Any odor in respirator is inc

88. Check respirator fitted tightly on

89. Safety Officer, C

90. Superintendent. Safety Officer, C

designee.
IF YOU ARE WORKING IN HAZARDOUS WASTE AREA

82 Do not breathe vapor directly.

83 Always work upwind while handling the hazardous waste.

84 Make sure your respirator fits tightly on your face to avoid any leaks.

85 Check respirators carefully for cracks, missing or sticking parts.

86 Do not abuse monitoring or protective equipment. These are for your protection.

87 Any odor smelled through respirator is indicative of defective cartridge, loose fitting, or saturated cartridge. Immediately move out of the contaminated area and report the matter to Construction Superintendent, Health and Safety Officer, or his designee.

88 Do not contaminate clean area. Remove all the contaminated clothing before entering a clean area.

89 Do not drive contaminated vehicles in clean area.

90 Always wash your hands with mild detergent before eating or drinking.

91 Eating, drinking, and smoking is permitted only in designated area.

92 Do not smoke, chew tobacco or gum in field especially while working in contaminated area.

93 Use only designated washroom facilities while working in field.
ELECTRICAL GROUNDING INSPECTION . . .

. . . to prevent SHOCK in case tool insulation breaks . . . .

Required: Before day of use visually inspect cord-supplied equipment for ground problems.

If damaged (or suspect) — report it to supervisor. Do not use until repaired, tested.

Inspection reminders

CHECK IF...

X broken cord
X missing t
X miss bent 3rd pr
X cut, cracked cor
X bruised, burned
CHECK IF...

- X broken cover plate?
- X missing box?
- X damaged plug?
- X missing or bent 3rd prong?
- X wire strand loose from screw terminals?
- X poorly "patched" or tapped-in cord?
- X cut, cracked cord?
- X bruised, burned?
- X damaged covers?
- X loose bare wires?

Equipment:
- X unusual noise?
- X sparks, vibration?
- X overheating?
KEEP THESE OFF THE JOB:

- X 2-hole receptacles!
- X 2-wire cords!
- X 2-prong plug adapters!

CORD MISUSE:

- X inside or thru walls, floors, ceilings.
- X or over sharp edges.
- X or stapled to wall.
- X or exposed to any traffic damage.

See how protection stops here...

JOB CL

Your job. This class per hour. O time hour. construc and your honored.

PERIOD

You have complei terminat services. privilege: otherwise dismiss a in a sati.

PAY PE.

D'Appol by the co which yo employm provide c circumsta.

SITE SU.

Each D'A This indiv is the onl personnel unless so.
CONDITIONS OF EMPLOYMENT

JOB CLASSIFICATION

Your job classification is that of a ___________________.

This classification is paid at the D'Appolonia rate of $________ per hour worked. Overtime is paid for hours worked over 40 per week. Overtime rate is one and one-half (1 1/2) times the straight-time hourly rate. If you are hired as a union member for a construction project covered by an agreement between D'Appolonia and your union, D'Appolonia's agreement with your union will be honored throughout the term of your employment.

PERIOD OF EMPLOYMENT

You have been hired by D'Appolonia for the express purpose of completing a construction project. When work is concluded or terminated, or when D'Appolonia no longer requires your skills, services, etc., your employment will be terminated, and all rights and privileges granted to you as an employee will be terminated, unless otherwise provided for under law. D'Appolonia reserves the right to dismiss any individual who fails to perform in his assigned position in a satisfactory manner.

PAY PERIOD

D'Appolonia pays site employees on a weekly basis. You will be paid by the corporate office by check the week following the week in which your wages were earned. At the completion of your employment, your final wages will either be sent to the address you provide or distributed by the Site Superintendent, depending on the circumstances.

SITE SUPERINTENDENT

Each D'Appolonia site is managed by a Superintendent or Foreman. This individual is in charge of the site personnel and equipment. He is the only individual who has been authorized to direct D'Appolonia personnel. You are not to work for, or be directed by anyone else, unless so authorized by the site superintendent or foreman.
MEDICAL SCREENING

All employees will complete a physical examination by a physician or through a medical screening laboratory before entering a hazardous waste site. While working on a hazardous waste site, employees will wear required protective equipment associated with the specific job. Failure to do so will result in immediate dismissal. At the conclusion of the hazardous waste project, all employees will complete an exit medical screening examination. All medical screening examinations required by the nature of the specific project will be performed at the expense of the Company. The Company reserves all rights to reject applicants for employment whose medical screening reveals pre-existing conditions that may be aggravated by the type of work to be performed on the project.

SAFE WORK PRACTICE

D’Appolonia is committed to a safe work environment. It is every employee’s duty to: 1) attend weekly safety meetings; 2) use safety equipment; 3) dress in a safe manner; 4) work in a prescribed manner; 5) call any unsafe conditions to the attention of the site superintendent; and 6) if operating equipment, to do so in a safe manner and not misuse the equipment. If there are any questions regarding D’Appolonia’s safety requirements, it is the employees duty to ask the site superintendent. Ignorance is no excuse. D’Appolonia reserves the right to dismiss any employee who does not comply with any of the preceding “safe work practices.”

EQUAL OPPORTUNITY EMPLOYMENT

The Company is an equal opportunity employer and is committed to hire qualified individuals regardless of race, color, religion, national origin, sex, age, physical impairment or veteran status. All decisions relative to compensation, benefits, promotions, training, transfer, layoff, and recall shall be equitably administered in order to advance the principle of equal employment opportunity. It is the overall responsibility of every member of the company management team to insure the effective implementation of this policy. Any deviation from this policy should be brought immediately to the attention of the site superintendent.

THEFT

It is D’Appolonia’s policy to dismiss an individual who has committed theft of D’Appolonia’s property or any unlawful act; and to inform the law enforcement authorities of such theft or act.
I HEREBY AGREE TO ALL THE CONDITIONS, POLICIES, RULES, AND REGULATIONS, CONTAINED IN, BUT NOT LIMITED TO, THIS THE D'APPOLONIA SAFETY MANUAL FOR GENERAL CONSTRUCTION AND SITE PERSONNEL AGREEMENT. AND UNDERSTAND THAT ANY CHANGE REGARDING ANY OF ITS TEXT MUST BE IN WRITING AND SIGNED BY AN OFFICER OF THE CORPORATION. I UNDERSTAND THAT AN "OFFICER" OF THE CORPORATION DOES NOT INCLUDE A SUPERINTENDENT OR FOREMAN.

EMPLOYEES NAME ...........................................(PLEASE PRINT) ...........................................(SIGNED)

ADDRESS: Street & No.: .................................................................

City & State: ............................................................................

Zip Code: ..............................................................................

003452
# LIST OF ATTACHMENTS
## DATA/DOCUMENTATION FORMS

<table>
<thead>
<tr>
<th>FORM NO.</th>
<th>TITLE</th>
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</thead>
<tbody>
<tr>
<td>HS-1</td>
<td>Record of Medical Examination</td>
</tr>
<tr>
<td>HS-2</td>
<td>Log of Protective Equipment Issued</td>
</tr>
<tr>
<td>HS-3</td>
<td>Training Session Documentation Form</td>
</tr>
<tr>
<td>HS-4</td>
<td>Air Monitoring Data Report</td>
</tr>
<tr>
<td>HS-5</td>
<td>Accident Report Form</td>
</tr>
</tbody>
</table>


03107446

D'APPOLONIA
# RECORD OF MEDICAL EXAMINATION

<table>
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<tr>
<th>EMPLOYEE NAME</th>
<th>SOCIAL SECURITY NUMBER</th>
<th>MEDICAL EXAMINATION (DATE)</th>
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Routing:
- Site File (copy)
- RCB
- Central Files

03107447
**Form HS-2**

**Investigation**

**By** __________________________

**Date** __________________________

Sheet ____ of _____

## LOG OF PROTECTIVE EQUIPMENT ISSUED

<table>
<thead>
<tr>
<th>EMPLOYEE NAME</th>
<th>SOCIAL SECURITY NUMBER</th>
<th>RESPIRATOR OUT IN</th>
<th>HARD HAT OUT IN</th>
<th>GOGGLES OUT IN</th>
<th>BOOTS OUT IN</th>
<th>GLOVES OUT IN</th>
<th>RAIN GEAR OUT IN</th>
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**Routing:**

- Site File (copy) ________
- RCB ________
- Central Files ________

**03107448**

**D'APPOLONIA**
Form HS-3
Investigation
By ___________________________
Date _______________________
Sheet ___ of ___

TRAINING SESSION DOCUMENTATION RECORD

Instructor ____________________________

Topics Covered ____________________________

________________________

ATTENDEES

NAME (print) SIGNATURE

________________________

Routing:
Site File (copy) __________
RCB __________
Central Files __________

03107449
Form HS-4

Investigation

By ____________________________

Date ____________________________

Sheet ___ of ___

AIR MONITORING DATA REPORT

Meteorological Conditions:

Wind Speed ____________ mph

Wind Direction ____________

Air Temperature ____________ °F

Cloud Cover ____________ percent

Site Work Activities:

______________________________

______________________________

______________________________

Air Quality Readings:

<table>
<thead>
<tr>
<th>Type of Reading</th>
<th>Time</th>
<th>Location</th>
<th>Measurement (units)</th>
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Routing:

Site File (copy) ____________
RCB ____________
Central Files ____________

D'APPOLONIA

03107450
ACCIDENT REPORT FORM

Date and Time of Accident/Injury: ________________________________

Injured Employee:
Name ________________________________
S. S. Number ________________________________

Date Employee Returned to Work: _______  Lost Days _______

Description of Accident/Injury: _______________________________________

Response: ____________________________________________________________

Medical Assistance Sought?  Yes _______  No _______

Cause of Accident/Injury: ______________________________________________

Corrective Measure(s) to Prevent Recurrence: ______________________________

Health and Safety Officer ___________________________ Date

Project Manager ___________________________ Date

Routing:
Site File (copy) ___________
RCB _______________________
Central Files ___________

03107451
6.0 REMEDIAL MONITORING AND MAINTENANCE PLAN
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   1.1 OBJECTIVE 1
   1.2 APPROACH 2

2.0 MONITORING AND MAINTENANCE PROGRAM
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   2.2 MONITOR WELLS AND FRENCH DRAIN SUMPS CHECKLIST 3
   2.3 EAST DITCH, CENTRAL DITCH, BLOWOUT AREA, DIVERSION CHANNEL AND PLANT DRAINAGEWAYS 5
   2.4 CLAY CAPS AND LANDFILL AREAS CHECKLIST 6
   2.5 WASTE WATER TREATMENT PLANT CHECKLIST 6
   2.6 INSPECTION DOCUMENTS AND MAINTENANCE LOG 6
   2.7 EVALUATION AND REPORTING OF ANALYTICAL DATA 7

3.0 SUMMARY

ATTACHMENT A - GROUNDWATER SAMPLING AND ANALYSIS PROCEDURES

TABLES

FIGURES
Vertac Chemical Corporation (Vertac), the U.S. Environmental Protection Agency (EPA) and the Arkansas Department of Pollution Control and Ecology (ADPCE) have agreed that a series of remedial actions are to be implemented at the Vertac Plant Site in Jacksonville, Arkansas. The parties have further agreed, as confirmed in Vertac letters to ADPCE and EPA dated September 29, 1983 and October 13, 1983, that a monitoring and maintenance plan (maintenance plan) be prepared in conjunction with the development of the requisite engineering plans for the proposed actions.

1.1 OBJECTIVE
The objective of this maintenance plan is to assure that the proposed remedial actions continue to provide adequate protection of public health and the environment in accordance with Paragraph VIII of the Consent Decree. This maintenance plan calls for systematic monitoring of:

- ground water and leachate quality,
- ground water piezometric levels,
- the amounts of leachate and waste oils recovered from the french drains,
- the integrity of the clay caps covering the plant site landfills and the proposed cap extensions for the landfills and onsite cooling pond,
- the adequacy of the vegetative cover,
- the integrity of the Rocky Branch Creek diversion channel lining, and
- the protective caps of the onsite ditches and blow out areas.
These particulars are outlined in the Vertac letters to ADPCE and EPA, dated August 19, September 8, September 29, October 13 and November 3, 1983 and agreed upon during a meeting on November 30, 1983 in Dallas.

1.2 APPROACH
This maintenance plan calls for systematic monthly inspections of the site facilities and semi-annual testing of leachate collection sumps and ground water monitoring wells as described below. Copies of all inspection reports will be maintained for a period of at least three years and will be kept available at the plant for agency inspection. A comprehensive checklist will be used as a guide during the inspection and actual observations will be photographically documented. Where and when necessary, appropriate actions will be taken to maintain and/or repair the relevant site facilities and equipment to assure that the proposed remedial actions continue to protect public health and the environment. The proposed plan is effective until December, 1985 subsequent to completion of the construction activities associated with implementation of the remedial plan. At that time, the results of the monitoring and maintenance program will be reevaluated to determine the appropriate activities requisite for long term maintenance of the protective measures implicit in the remedial plan.

2.0 MONITORING AND MAINTENANCE PROGRAM

2.1 AREAS TO BE MONITORED
The following facilities will be inspected at least monthly and as may be deemed appropriate subsequent to major rainstorms (in excess of four inches in a twenty-four hour period as reported for the Jacksonville weather station for the initial six months following completion of construction activities):

- All trench drain sumps,
- Monitor Wells 10, 4, 9, 11, 13, 19, 20, 21, 22, and 15
- In January 1984, also monitor 18 and 14.
o East Ditch, Central Ditch, Blow Out Area and Rocky Branch Creek Diversion Channel,
o Plant portion of the west branch of Rocky Branch Creek,
o Cooling Pond clay cap,
o Old Equalization Basin clay cap,
o Reasor-Hill clay cap,
o North burial area (Hercules-Transveal) clay cap, and
o Waste water treatment system (as required by plant discharge permits).

2.2 MONITOR WELLS AND FRENCH DRAIN SUMPS CHECKLIST
On a monthly basis, each of the above noted monitor wells and french drain sumps will be inspected. The following items will be noted:

o signs of any damage to well, sump or associated appurtenances,
o signs of leaks, wear or deterioration to electric connections, piping, pumps and valves,
o proper functioning of leachate/oil collection pumps, and
o strip chart recordings of the pump record at each sump (i.e., of the amount of material collected).

Recommended actions will be documented immediately following the inspection with copies provided to the Plant Manager and to the Vertac Director of Environment and Safety. Necessary repairs will be affected within 30 days to the extent possible.

An extra pump and motor will be maintained on site in the event of a pump or pump meter failure.
Monitor Well Water Level Measurements
Quarterly, the water levels in each well will be measured with an electric sounder to the nearest 0.1 foot and the data recorded on a form prescribed for the purpose.

Monitor Well Water Sampling and Analysis
Semi-annually, each well will be bailed (three well volumes removed) subsequent to measuring the water level, each well and sump pad sampled and the samples analyzed for the following parameters:

- Toluene,
- 2-chlorophenol,
- 4-chlorophenol,
- 2,4-dichlorophenol,
- 2,3,6-dichlorophenol,
- 2,3,6-trichlorophenol,
- 2,4,6-trichlorophenol,
- 2,4,5-trichlorophenol,
- 2,4-D,
- 2,4,5-T,
- 2,4,6-T,
- 2,4,5-TP, and
- 2,3,7,8-TCDD (in wells 14 and 18 only)

Sampling procedures are detailed in Attachment A.

Samples will be collected on the last Monday of January and June for three years. Any of the above constituents not detected in two consecutive sampling periods for any well will be eliminated from the testing protocol for that well or sump. However, the entire list of parameters will be included in the testing protocol for the final third year sampling period to confirm their continued absence.

Upon request, collected samples will be split with EPA and/or ADPCE.
2.3 EAST DITCH, CENTRAL DITCH, BLOWOUT AREA, DIVERSION CHANNEL AND PLANT DRAINAGEWAYS

The plant ditches, drainageways, diversion channel, and other designated asphalted or clay-lined areas will be inspected monthly to assess the integrity of the protective liners and erosion protection. The following items will be noted:

- Signs of erosion or natural creation of new drainage pathways,
- Cracks or discoloration in the protective liners which would be early signs of potential failure, and
- Adequacy of vegetative cover, riprap, shell or other energy absorbers and erosion prevention measures.

Recommended maintenance or corrective actions will be documented monthly immediately following the inspection with copies provided to the Plant Manager and to the Vertac Director of Environment and Safety.

Where necessary, major repairs to the asphalt liners or erosion protection measures will be initiated within 60 days of the determination that minor repairs will not suffice. Minor repairs (such as asphalt calking of small cracks, watering and reseeding of small patches of soil, etc.) will be effected within 30 days subsequent to inspection.

The necessary materials will be maintained at the plant to complete minor repairs.

If deemed appropriate, recurring erosion cuts will be improved and allowed to function as drainage pathways; design of such drainage features will assure that no contaminated soils are exposed, and that clay covers are maintained as-built. Soil samples will be collected from such created drainageways to confirm that contaminants are not removed by storm water or process water runoff.
2.4 **CLAY CAPS AND LANDFILL AREAS CHECKLIST**

The clay cap covering each landfill area and the cooling pond will be inspected monthly. Precaution signs will be set up to curtail vehicular traffic except along designated roadways. Capped areas will be inspected on foot monthly and photographed semi-annually to document maintenance of the integrity of the vegetative cover and integrity of the clay cap. The following items will be noted on the monthly inspection checklist:

- sparsely vegetated and devegetated areas,
- signs of vegetation cover disease or deterioration,
- signs of erosion,
- evidence of vehicular traffic, and
- status of revegetated areas.

Recommended maintenance or corrective actions will be documented monthly immediately following the inspection with copies provided to the Plant Manager and to the Vertac Director of Environment and Safety.

2.5 **WASTE WATER TREATMENT PLANT CHECKLIST**

The waste water treatment plant will be inspected routinely in accordance with existing plant policy. Samples will be collected and analyzed in accordance with the plant waste water discharge permit and with applicable federal and state regulations.

2.6 **INSPECTION DOCUMENTS AND MAINTENANCE LOG**

Monthly inspection reports will be reviewed by the designated maintenance foreman and plant manager within two days after the monthly inspection. Requisite actions will be authorized and scheduled on a prescribed log established specifically to record compliance with this maintenance plan.

A suspense date will be set for the maintenance supervisor to verify initiation and completion of any necessary actions. All minor repairs
will be scheduled to be completed within 30 days as stipulated in Attachment A to the Vertac letter dated September 8, 1983.

The same log will be annotated to record the data and findings of the inspection of each of the above noted areas and to record the date and evaluated adequacy of the maintenance actions required as a result of the inspections. These records will be maintained at the plant for a period of three years and will be made available for review by EPA or ADPCE staff.

The maintenance log will also be used to record quarterly monitor well piezometric levels, and bailing and sampling dates. Sections of the log book will be provided for compiling the analytical results for french drain sump leachate and ground water samples. Piezometric levels and analytical data will be graphed. A copy of the results and an updated graph will be submitted to EPA and ADPCE within one week of Vertac's receipt of the results.

2.7 EVALUATION AND REPORTING OF ANALYTICAL DATA

The analytical results for ground water and leachate samples will be reviewed and evaluated at the time of submittal to EPA and ADPCE. The transmittal letter shall include Vertac observations regarding any appropriate findings or remedial actions that may be indicated by the results.

No later than one month following receipt of the final results for three years of monitoring (subsequent to completion of the remedial plan construction), a comprehensive review of the analytical data will be submitted to EPA and ADPCE. This review will include Vertac's proposal for any future monitoring and maintenance activities that may be required.
3.0 SUMMARY

This maintenance plan has been prepared in accordance with agreements reached between Vertac, EPA and ADPCE as documented in the Vertac letters previously noted. The plan calls for systematic monthly inspections and recording of inspection observations on appropriate inspection checklists in order to assure that the proposed remedial actions continue to protect public health and the environment.

A maintenance log will be used to record inspection dates and results and to facilitate timely completion of any requisite repairs or equipment maintenance. Monitor wells and leachate collection sumps will be sampled semi-annually and the analytic results evaluated and submitted to EPA and ADPCE.

All monitoring and maintenance records will be maintained at the plants for at least three years and will be made available for review by agency staff.
ATTACHMENT A
GROUNDWATER SAMPLING
AND
ANALYSIS PROCEDURES
ATTACHMENT A

1.0 GROUNDWATER SAMPLING PROCEDURES

1. The initial water level in the well will be measured and recorded. The initial water level will be recorded to the nearest 0.01 ft. with a calibrated M scope, an electric probe water level sensor. (The accuracy of the water surface elevation reading is about ±0.05 feet.) The probe will be lowered down the well until the meter dial moves indicating the contact of the probe with the water surface has occurred, as is illustrated in Figure 1. Three replicate measurements will be made to ensure reproducibility. The depth to water will be referenced to the top of the casing. This will be converted to water level elevation (msl) from the surveyed elevation of the top of casing. The data will be recorded with date, time, monitor well number, depth to water, name of person recording the data, and weather conditions on the form shown as Figure 2. The probe will be rinsed with distilled water after each use.

2. A volume of water equal to at least the volume of water initially contained in the well will be removed. The volume of water which must be removed prior to sampling will be determined by the following:

\[ V_w = (L - H) \pi r^2 \]

where \( V_w \) is the volume of water initially in the well in \( \text{ft}^3 \), \( L \) is the length of the well casing in ft, \( H \) is the depth in ft from the top of casing to the initial water level, and \( r \) is the inside radius of the well in ft.

Water will be removed from the well by bailing. The number of times that the well must be bailed will be determined from the following:

\[ N = \frac{V_w}{V_B} \]

where \( N \) is the number of times the well must be bailed, \( V_B \) is the capacity of the bailer in cubic feet and \( V_w \) is as defined above.

Bailing will be accomplished using an all PVC bailer with a polypropylene cord. The bailer will be rinsed with distilled water following use at each well. Water bailed from each well will be placed in a container and disposed of in the wastewater treatment system.

3. Samples will be collected using a Kemmerer sampler after the water level in the well recovers to near its original value. All collection bottles will have been washed in accordance with EPA Hand- book for Analytical Quality Control in Water and Wastewater Laboratories, 1979. Field data will be recorded on the forms shown as Figure 3. A water resistant marker will also be used to label the
samples. The sample bottles will be sealed to preserve the integrity of the sample until it is analyzed using labels as shown in Figure 4. A copy of these forms will accompany the samples to the laboratory. The originals of the forms will be filed.

2.0 SAMPLE PRESERVATION AND SHIPMENT

Samples will be collected and preserved following procedures in the EPA Solid Waste Manual ("Test Methods for Evaluating Solid Waste," SW-846), and as proposed in the Federal Register, April 4, 1983. Samples will be preserved in the field immediately following sampling by cooling to 4°C.

1. The appropriate amount of chemical preservatives, if any, will be added to the sample bottles, following which the caps will be replaced in the sample bottles.

2. The cap will then be sealed with a sample label to prevent loosening during shipping.

3. The bottles will be placed in ice chests containing "blue ice" or a similar pack of frozen gel. The ice chests will be wrapped with a packing tape to prevent jarring open during shipment. The ice chests will be addressed and identified.

4. The ice chests containing groundwater samples to be shipped will be delivered to the designated Vertac sample shipper by the designated sampling personnel. Samples will be shipped by bus, picked up by the designated laboratory personnel, and delivered to an EPA certified laboratory for physical and chemical testing and signed over to laboratory personnel. The samples must be accompanied with a chain-of-custody record and by a sample analysis request sheet. (Figures 5 and 3, respectively).

5. The ice chests containing groundwater samples to be analyzed at the Vertac Chemical Corporation Plant Laboratory will be delivered to the laboratory by the personnel who collected the samples and signed over to laboratory personnel for storage or preparation for analysis. No samples are to be accepted which are not properly labeled and sealed.

3.0 ANALYTICAL PROCEDURES

Samples will be analysed in accordance with the guidelines of ADPCE and EPA.

1. Field parameters, temperature, pH, and specific conductance will be analysed immediately following sampling. Instrument calibration will be checked and recorded before and after each measurement. Field analyses will be recorded on the form shown as Figure 3.
2. Laboratory analyses will be performed according to the EPA methods listed in the Solid Waste Manual or equivalent procedure approved by EPA. Results of analyses will be reported on the form shown on Table 2.

4.0 CHAIN OF CUSTODY AND RECORDKEEPING

These chain of custody procedures are intended to document sample possession from the time of collection to disposal, in accordance with regulations. For the purpose of these procedures, a sample is considered in custody if it is:

- in one's actual possession,
- in view, after being in physical possession,
- locked so that no one can tamper with it, after having been in physical custody, or
- in a secured area, restricted to authorized personnel.

1. A chain of custody record (Figure 5) will be initiated in the field and a copy will accompany every sample.

2. Each time responsibility for custody of the sample changes, the new custodian will sign the record and denote the date. A copy of the signed record will be made by the immediately previous custodian and sent to Vertac files to allow tracking of sample possession. All changes of custody samples must be a person-to-person change of custody.

3. Upon sample destruction/disposal, the custodian responsible for the disposal will complete the chain of custody record, file a copy, and send a copy to Mr. R. D. Karkkainen at Vertac or to his designated representative for recordkeeping.

4. In addition to the chain of custody records that will be maintained throughout the active life of the facility and the requisite post-closure period, the following recordkeeping procedures discussed previously will supplement the chain of custody records:

- field log book remain with collector
- sample label (Figure 4) on each sample
- sample seal (Figure 4) on each sample
- water quality field collection report and analysis request (Figure 3) copy accompanies the samples
A-4

o analytical report form (Table 2) sent by the lab(s) to Mr. Karkkainen or his designated representative at Vertac.

5. Prior to sampling, all personnel involved will have received copies of the custody procedures. A prestudy briefing will be held prior to any person's participation in the monitoring program to detail chain-of-custody procedures (as well as sampling and sampling handling procedures). Briefing of personnel is the responsibility of the designated representative.
TABLE 1
INFORMATION RECORDED
IN FIELD LOG BOOK

- Purpose and location of sampling
- Client Contact:
- Client Address:

- Type of facility (e.g., sulfuric acid tank)
- Type of Sample
- Parameters to be analysed
- Preservation and treatment
- Number and volume of sample
- Description of sampling method
- Date and time of collection
- Sampler's name
- Sample number
- Sample distribution
- Reference to map of site
- Field observations
- Field measurements
TABLE 2
FORM FOR REPORTING GROUNDWATER ANALYSES
ANALYTICAL REPORT - MONITOR WELL NUMBER:

<table>
<thead>
<tr>
<th>Analyses For:</th>
<th>Project No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td></td>
</tr>
</tbody>
</table>

| Attention:    |              |
| Title:        |              |
| Sampling Method: |            |
| Volume Water Removed Before Sampling: | |
| Diameter of Casing: | Casing Material: |
| Well Depth:    |              |
| Perforated Interval: |          |
| Static Water Level: |          |

| Remarks:      |              |
| Date Collected: | Time Collected: |
| Collected By: | Time:        |
| Date Received: |            |
| Received By:  |              |

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Concentration</th>
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</table>

03107468
ILLUSTRATION OF THE APPARATUS
USED TO MEASURE WATER LEVEL

FIGURE 1

DEFLECTED AMMETER

ELECTRIC LEAD

RULER MARKED EVERY 0.01 FEET

LEVEL LINE OF SIGHT

3 INCH ID PVC CASING

TO M-SCOPE PROBE

03107469

FIGURE 1

D'APPIAONIA
**GROUNDSWATER MONITORING DATA SHEET**

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>TODAY</th>
<th>LAST NIGHT</th>
<th>REMARKS</th>
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</thead>
<tbody>
<tr>
<td>RANGE</td>
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<td>ON</td>
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<thead>
<tr>
<th>R NO.</th>
<th>ELEVATION OF TOP-OF-PIEZOMETER (FT)</th>
<th>DEPTH TO GROUNDWATER (FT)</th>
<th>ELEVATION OF GROUNDWATER (FT)</th>
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</table>

**INDICATOR SERIAL NO.** 03107470

**BY** ____________________________ **DATE** ____________________________

**ACTION DUE** ____________________________

**FIGURE 2**