AGI
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Cleanup Action Plan
Former Bingo Fuel Stop
Thorp, Washington

April 7, 1995

Prepared For :

Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

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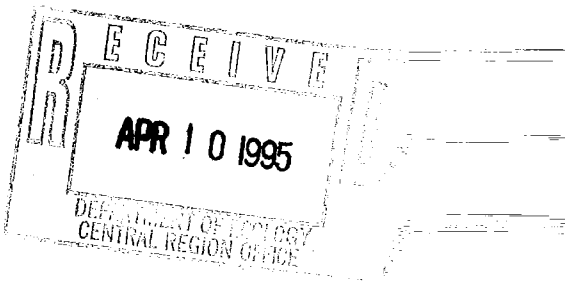

AGI Project No. 15,659.001

AGI
TECHNOLOGIES

A Plan Prepared For :

Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

CLEANUP ACTION PLAN
FORMER BINGO FUEL STOP
THORP, WASHINGTON

April 7, 1995

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INTRODUCTION

This Cleanup Action Plan (CAP) has been prepared by AGI Technologies (AGI) for Burns Bros., Inc. to guide remediation activities at the former Bingo Fuel Stop in Thorp, Washington. The location of the Bingo Fuel Stop is shown on **Figure 1**. Soil and groundwater containing concentrations of petroleum hydrocarbons in exceedance of Washington State Method A (routine site) cleanup levels, as defined by the Model Toxics Control Act (MTCA), promulgated by Washington Administrative Code (WAC) 173-340, were encountered during the Remedial Investigation/Feasibility Study (RI/FS). The goal of the Cleanup Action is to reduce or remove petroleum hydrocarbon concentrations in soil and groundwater to at or below cleanup levels. This CAP is intended to be used in conjunction with the Sampling and Analysis Plan (SAP), the Quality Assurance Project Plan (QAPP), and the Health and Safety Plan (HASP) prepared for this site. These plans are provided in **Appendices A, B, and C**, respectively.

RI/FS SUMMARY

Twelve soil borings were drilled during the RI and completed as 12 groundwater monitoring wells and one piezometer. Locations of the wells are shown on **Figure 2**. Soil and groundwater samples were collected from the borings and wells and submitted to a laboratory for chemical analyses. Two surface water samples and two sediment samples were collected during the RI and submitted to a laboratory for chemical analyses.

The results of the chemical analyses indicated soil and groundwater in the vicinity and hydraulically downgradient of the former underground storage tanks (USTs) and dispenser islands contained petroleum hydrocarbons above cleanup levels. In addition, one sediment sample northeast of the site contained petroleum hydrocarbons above cleanup levels, likely a result of surface spills in the past. The extent of impacted soil and groundwater is shown on **Figure 3**.

Risk-based soil and groundwater cleanup levels were developed for chemicals of concern. Cleanup levels for chemicals present above draft cleanup levels are shown in **Table 1**.

The FS identified three alternatives for site cleanup. We understand Burns Bros., Inc. has chosen to implement Alternative 3. Alternative 3 consists of product recovery, source area and downgradient petroleum-contaminated soil (PCS) excavation and treatment, and groundwater extraction and treatment. In addition, vapor extraction will be implemented in the vicinity of the former gasoline USTs, if excavation is halted at the west edge of Thorp Highway and gasoline-contaminated soil extends beneath Thorp Highway.

PCS will be placed in a soil containment area and remediated using Solid Phase treatment. Treated soil will be used as backfill at the site. Recovered product will be transported to a state-licensed facility for recycling or disposal. Recovered groundwater will be treated in an aboveground bioreactor to at or near drinking water standards and discharged to the subsurface at the site. Recovered vapors will be treated in an aboveground bioreactor or carbon adsorption unit, if necessary, and discharged to the atmosphere.

OWNERSHIP, OPERATION, AND MAINTENANCE OF THE CLEANUP ACTION

Burns Bros., Inc. leases the property and owns the former Bingo Fuel Stop facility, and will provide resources to finance the cleanup. The property is owned by the Brain Estate. AGI will operate and maintain the cleanup equipment on behalf of Burns Bros., Inc.

CLEANUP ACTION ACTIVITIES

The cleanup action at Bingo Fuel Stop will be conducted in four phases. Each phase consists of one or more of the following activities:

- Excavation of PCS from source areas and downgradient
- Aboveground Solid Phase treatment of PCS
- Product and groundwater recovery and reintroduction trench installation
- Product and contaminated groundwater recovery
- Groundwater treatment system operation and maintenance
- Groundwater treatment system monitoring
- Vapor extraction system (VES) installation and operation, if necessary
- Groundwater monitoring following the completion of site cleanup

Soil excavation and treatment during the Cleanup Action is anticipated to be conducted in two phases, during two successive field seasons (mid-April to mid-October). Prior to the first phase of soil excavation, groundwater extraction and reintroduction trenches will be installed to extend the recovery network. Expanded groundwater recovery and treatment for one season will reduce the total volume of impacted soil requiring excavation and treatment. Activities conducted during Phase 1 will consist of:

- Installation of recovery trenches near MW3 and east of Thorp Highway.
- Groundwater reintroduction trench installation.
- Treatment of PCS.
- Groundwater treatment system operation and maintenance.

Activities conducted during Phase 2 will consist of:

- Excavation and treatment of PCS.
- Backfilling excavations with treated soil.
- Continued groundwater treatment system operation and maintenance.
- Vapor extraction system installation and operation, if necessary.

Phase 3 activities consist of:

- Excavation and treatment of PCS.
- Backfilling remaining excavations with treated soil.
- Continued groundwater treatment system operation and maintenance.

Phase 4 activities, following the completion of groundwater treatment system operation and maintenance, consist of:

- Backfilling remaining excavations with treated soil.
- Groundwater monitoring.

CLEANUP LEVELS

Cleanup levels for benzene, ethylbenzene, toluene, total xylenes, and total petroleum hydrocarbons (TPH) developed during the RI are shown in Table 1. The Washington State Department of Ecology has suggested cleanup action levels (CALs) for the site of 400 mg/kg for TPH quantified as gasoline and as diesel.

DETAILS OF CLEANUP ACTION

Excavation of PCS

Soil in the vicinity of the former USTs, dispenser islands, and aboveground storage tanks will be excavated laterally until verification samples indicate remaining soil contains petroleum hydrocarbon concentrations at or below CALs, or until further excavation becomes impractical due to the presence of Thorp Highway. Sediment in the irrigation canal near the location of sample S31 will also be excavated. Irrigation water in the canal will be diverted to auxiliary canal works during excavation. We estimate approximately 12,000 cubic yards (yd^3) of contaminated soil will be excavated from these areas.

Excavated soil will be screened to remove oversized material and transported to a soil containment area for Solid Phase treatment. Soil from the existing treatment area which is at or below cleanup levels and oversized material from the excavations will be used to backfill excavations which jeopardize structures or pose a safety hazard. Excavations in the central portion of the site will remain open until soil has been treated and is considered suitable for use as backfill.

The excavation activities will likely occur in two to three stages, due to the limited area on site for Solid Phase soil treatment and to the cold winter temperatures, which will inhibit microbial activity. The first stage will consist of excavating soil above CALs and placing it in the soil containment area for Solid Phase treatment. The second to third stages will occur the following years, after soil treatment has been completed. Treated soil will be backfilled during the second to third stages, and additional contaminated soil excavation and subsequent treatment will occur.

Solid Phase Soil Treatment

Solid Phase treatment relies on a combination of photolysis, volatilization, and bioremediation to remediate petroleum hydrocarbon contaminated soil. Photolysis relies on photochemical reactions driven by energy from the sunlight to oxidize petroleum hydrocarbon compounds. Photolysis is active in the upper 2 to 3 inches of the exposed soil. Below this, the amount of available sunlight is limited. Biodegradation refers to the breakdown of organic compounds (hydrocarbons) in soils by the action of microorganisms such as bacteria. Treatment generally consists of optimizing pH, temperature, soil moisture content, available oxygen, and nutrient concentration to stimulate the

growth of microorganisms that utilize the hydrocarbons as a food source. Volatilization is driven by diffusion in response to exposed surface areas of hydrocarbon contaminated soils. The volatile nature of hydrocarbons, concentration gradients, gravity, and convection caused by natural changes in the vapor pressure at the Solid Phase treatment area regulate the rates of volatilization.

The soil treatment area will be constructed using berms along all four sides of the area, and a plastic liner will be placed over the area and across the berms to prevent contamination migration from the treatment area. A typical soil treatment area is shown on **Figure 4.** Stockpiled soil will be distributed evenly across the treatment area. Thickness of soil in the treatment area will likely be between 4 to 5 feet. Conventional soil treatment equipment typically tills soil to depths between 8 and 12 inches below the surface. The soil will be treated in layers, or "lifts." When petroleum hydrocarbon concentrations in soil in the upper lift are below CALs, the lift will be removed, exposing the next underlying lift for treatment. This process will continue until all lifts are treated.

Supplemental nutrient concentrations will be established at a concentration of approximately 100 parts per million ammonia-nitrogen and phosphorus. Nutrient analyses will be performed periodically to monitor nutrient concentrations during treatment. Moisture content of treatment area soils will be maintained between 10 and 15 percent. Soil will be tilled periodically to provide oxygen to the microorganisms and to bring microorganisms into contact with remaining hydrocarbons.

Soil samples will be collected periodically and analyzed by EPA Method 8020 for benzene, ethylbenzene, toluene, and xylenes (BETX), and by Washington State Methods WTPH-G and WTPH-D for total petroleum hydrocarbons (TPH) in the gasoline and diesel range.

Product and Groundwater Recovery and Reintroduction Trench Installation

Recovery trenches will be installed near MW3 and east of Thorp Highway, south of MW8. A groundwater reintroduction trench will be installed along the northeast side of the property, between RS2 and MW4 (**Figure 3**). The recovery/reintroduction trenches will be used to flush mobile hydrocarbons from beneath Thorp Highway to the recovery trench, and to stimulate in situ biological activity to degrade any remaining hydrocarbons beneath Thorp Highway. Recovery trench construction will consist of pea gravel bedding perforated horizontal piping. The piping will serve as a conduit to a recovery sump, constructed of corrugated slotted metal pipe. The sump will extend to a depth of approximately 5 feet below the water table. A typical recovery trench is shown on **Figure 5.**

Treated groundwater will be piped to the reintroduction trench. Reintroduction trench construction will be similar to recovery trench construction, but will include horizontal slotted piping bedded in pea gravel above the water table.

Product and Groundwater Recovery

Recovery trench process piping will cross under Thorp Highway through the culvert north of MW6. Recovered product and groundwater will be piped to an oil/water separator and the on-site bioreactor for separation and treatment. Submersible centrifugal pumps will be used for product and groundwater recovery.

Groundwater Treatment System Operation and Maintenance

The groundwater treatment system consists of an oil/water separator and an aboveground bioreactor. Recovered product and groundwater are routed through a 1,100-gallon oil/water separator, and discharge water is routed to the bioreactor. The bioreactor consists of a 10,000-gallon capacity reactor, segmented into two chambers. Each chamber is supplied with atmospheric oxygen by a set of diffuser pads. A regenerative blower provides sufficient air to the bioreactor diffuser pads to maintain the concentration of dissolved oxygen in the bioreactor at approximately 10 parts per million. A diagram of the groundwater treatment system is shown on **Figure 6.**

Nutrients are added to the primary chamber by a peristaltic pump. The nutrient addition rate is approximately 30 parts per million ammonium sulfate and 2 parts per million potassium phosphate.

The regenerative blower requires no maintenance; however, care must be taken to ensure backpressure does not exceed manufacturer's recommendations. If backpressure rises more than 10 percent above standard operational pressure, it is likely the diffuser bars on the diffuser pads require cleaning. The bioreactor should be drained and the diffuser pads and bars inspected and repaired, if necessary, once per year. The nutrient addition pump requires replacement tubing every 6 months.

All aboveground recovery and reintroduction piping must be insulated to prevent freezing during the winter months. The bioreactor temperature must be maintained at or above 50°F to ensure adequate microbial activity. Installation of a submersible heating element may be necessary to maintain this temperature during the colder winter months.

We estimate the system will require 2 to 4 years of operation to remediate soil below Thorp Highway. Recovered water will be sampled for chemical analyses periodically, and the system will be turned off when recovered water sample analyses indicate remaining petroleum hydrocarbons in groundwater are at or below cleanup levels.

Groundwater Treatment System Monitoring

Discharge from the groundwater treatment system will be monitored in accordance with the Temporary State Waste Discharge Permit No. ST-9172. Monitoring consists of periodically collecting samples from the treatment system discharge and submitting the samples for chemical analyses for BETX and TPH quantified as gasoline and diesel.

Vapor Extraction System Installation and Operation

Installation of a soil VES may be necessary if gasoline-range petroleum- contaminated soil extends east of the former gasoline UST excavation beneath Thorp Highway. The VES will consist of 4-inch-diameter machine-slotted PVC piping extending along the eastern edge of the Bingo Fuel Stop property. The piping will be buried approximately 6 feet below ground surface and will be connected to an aboveground regenerative blower. The blower will provide suction to the subsurface piping, which will cause contaminated soil vapor to flow into the piping. Extracted vapors will be treated, if necessary, using the aboveground bioreactor or activated carbon filters. A typical VES is shown on **Figure 7.**

The VES discharge will be monitored on a monthly basis. Volatile organic compounds in the air stream will be measured using an organic vapor meter equipped with a photoionization detector (OVM-PID), and cross-checked using Draeger tubes or equivalent. Air flow will be measured using a magnehelic gauge or an air velocity meter.

POINTS OF COMPLIANCE

Points of compliance for soil are throughout the site, and will be demonstrated at the perimeter of excavations, where concentration of TPH in soil are below CALs. In addition, the completeness of soil cleanup will be further evaluated during groundwater compliance monitoring.

Points of compliance for groundwater are throughout the site, and will be demonstrated by samples obtained from selected on- and off-site groundwater monitoring wells. Samples collected from monitoring wells will provide information to evaluate the completeness of soil and groundwater remediation.

INSTITUTIONAL CONTROLS

A restrictive covenant will be placed on the property preventing activities which may result in a release of hazardous substances present on the property or exposure of human health or the environment to hazardous substances remaining on the property, if any remain. The covenant will be recorded with the registrar of deeds for Kittitas County. The covenant will require notice to and approval by Ecology for any future excavation activities.

GROUNDWATER MONITORING

Groundwater monitoring after cleanup is necessary to verify the completion of cleanup and to evaluate any residual contamination which may be present. We understand groundwater monitoring will be required until no soil or groundwater above Method A cleanup levels is present on site. Groundwater monitoring well samples will likely be analyzed for BETX by EPA Method 8020 and for TPH quantified as gasoline and diesel by WTPH-G and WTPH-D. A Compliance Monitoring Plan will be developed based on results of soil and groundwater sample analyses obtained during the Cleanup Action.

SCHEDULE

The Cleanup Action is anticipated to be completed in approximately 3 to 4 seasons, followed by 1 to 2 years of groundwater monitoring. Based on a start date of April 15, 1995, remediation should be completed in mid-1998 to mid-1999. A schedule showing the anticipated sequence of activities is shown on **Figure 8**.

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DISTRIBUTION

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3 Copies

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Attention: Ms. Susan Burgdorff

Quality Assurance/Technical Review by:

Gary Laakso
Remediation Services Manager

PPB/GMB/tag

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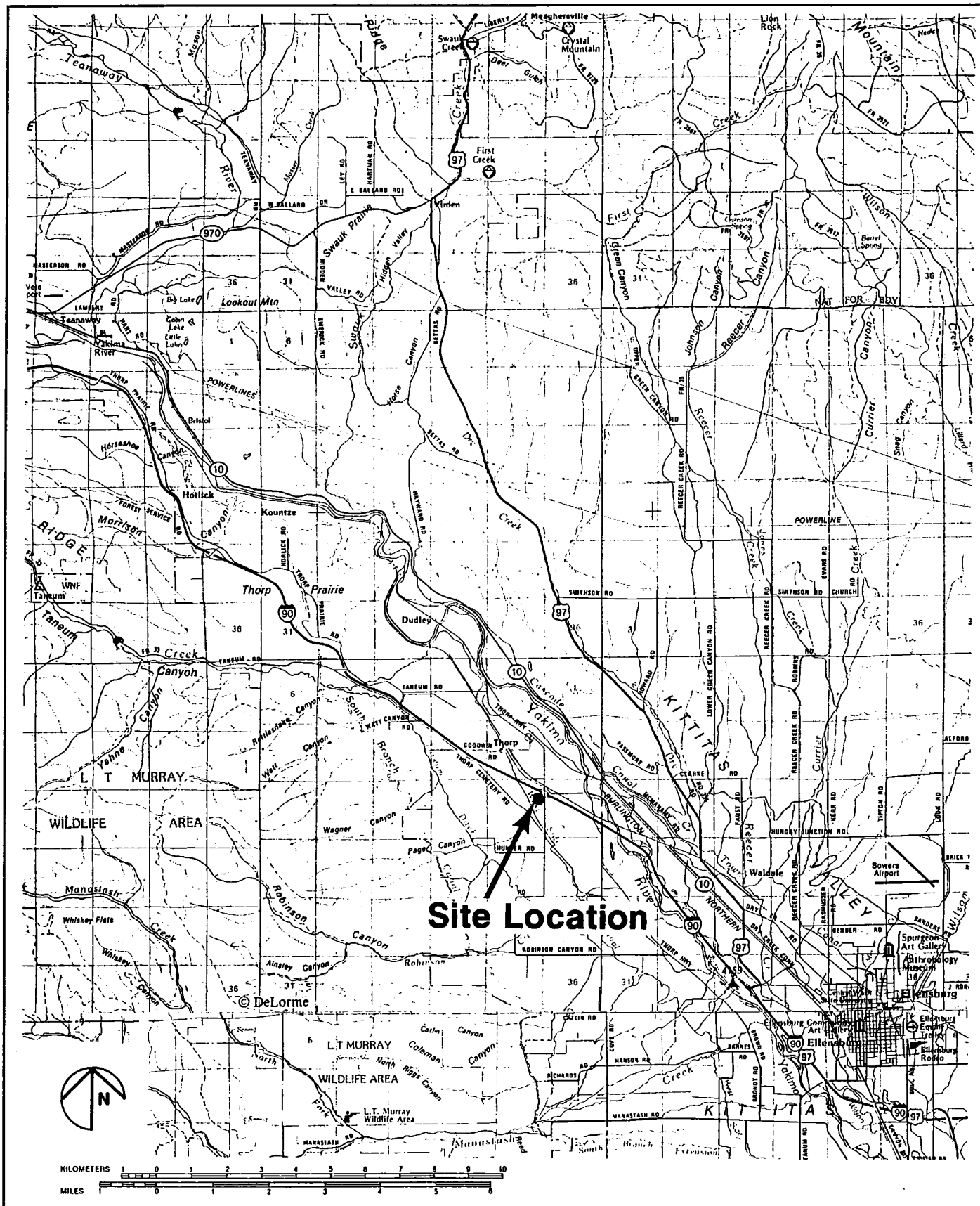
Table 1
Cleanup Levels for Soil and Groundwater
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Chemical	Soil (mg/kg)	Basis for Selection	Groundwater (µg/L)	Basis for Selection
Volatile Organic Compounds				
Benzene	0.5	Cross media (groundwater ARAR)	5.0	Groundwater ARAR
Ethylbenzene	40	Cross media (groundwater risk–based)	400	Risk–based: groundwater
Toluene	80	Cross media (groundwater risk–based)	800	Risk–based: groundwater
Total Xylenes	800	Cross media (groundwater risk–based)	8,000	Risk–based: groundwater
Total Petroleum Hydrocarbons				
Gasoline	100	Method A	1,000	Method A
Diesel	200	Method A	1,000	Method A

Notes:

Cleanup levels have been rounded to two significant digits.
ARAR – Applicable or Relevant and Appropriate Requirement.
mg/kg – Milligrams per kilogram.
µg/L – Micrograms per liter.



Reference: From DeLorme Mapping Co., page 66

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Vicinity Map

Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE **1**

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
15,659.001	DFF	25 Jul 94			

SR90

Culvert

Culvert

Culvert

Drain

Culvert

Culvert

MW12

W-4
200'

MW9

MW10

Canal

MW8

Ditch

Property Line

Culvert

MW6

RS2

Approximate
Location of
Drain Field

Debris

MW3

MW4

Utility
Pole

RS4

RS3

THORP HIGHWAY

MW7

Culvert

Asphalt

MW2

WW1

RS1

Property Line

Building

MW11

Aboveground Diesel
Storage Tanks

Trailer

MW1

MW5

Ditch

Pond

Drainage Ditch

Tanks

Drainage Ditch

Shed

Approximate Location
of Septic Tank

Swampy
Area

Canal

Cattle Guard

W-3

House

Barn

House

N

0 40 80

Scale in Feet

LEGEND

- MW2 ⊕ Monitoring Well number and approximate location
- RS2 ● Recovery Sump number and approximate location
- Fuel Pump Island
- ····· Fuel Lines
- – – – – Previous excavation limits
- W-3 × Water sample number and approximate location
- [ ] Former USTs

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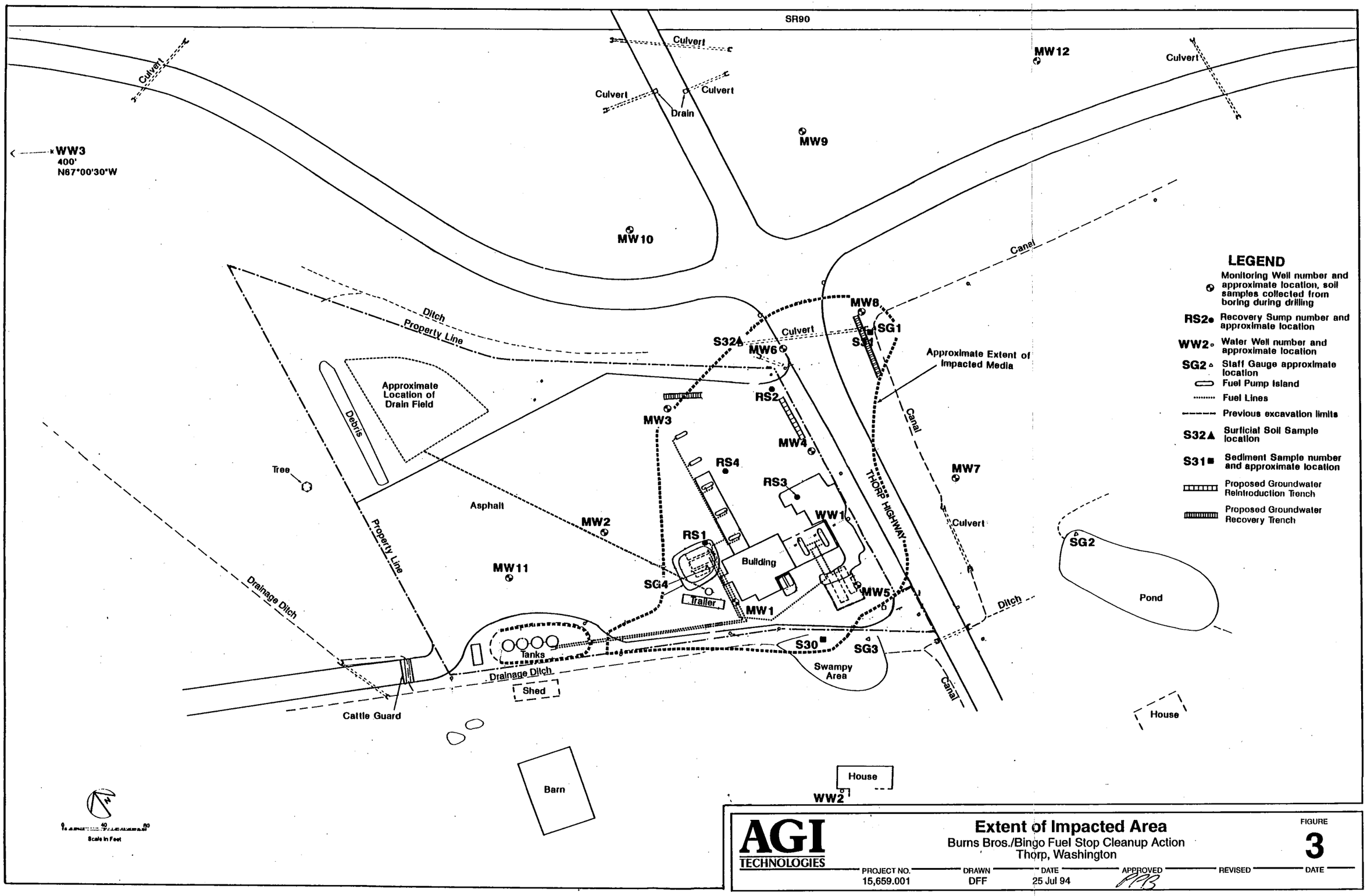
Site Plan

Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE 2

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
15,659.001	DFF	25 Jul 94			



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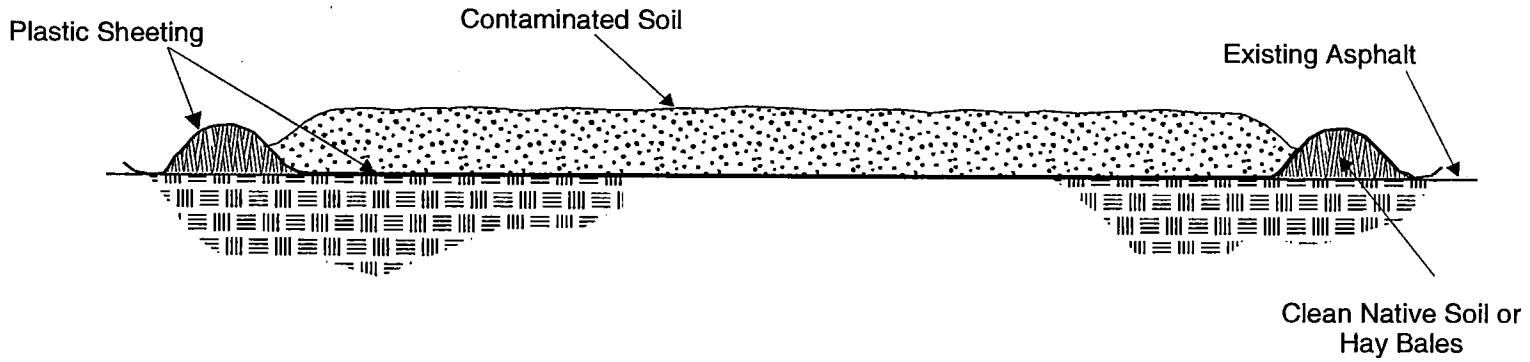
Extent of Impacted Area

Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE 3

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
15,659.001	DFF	25 Jul 94	RAB		



Note: Not to scale

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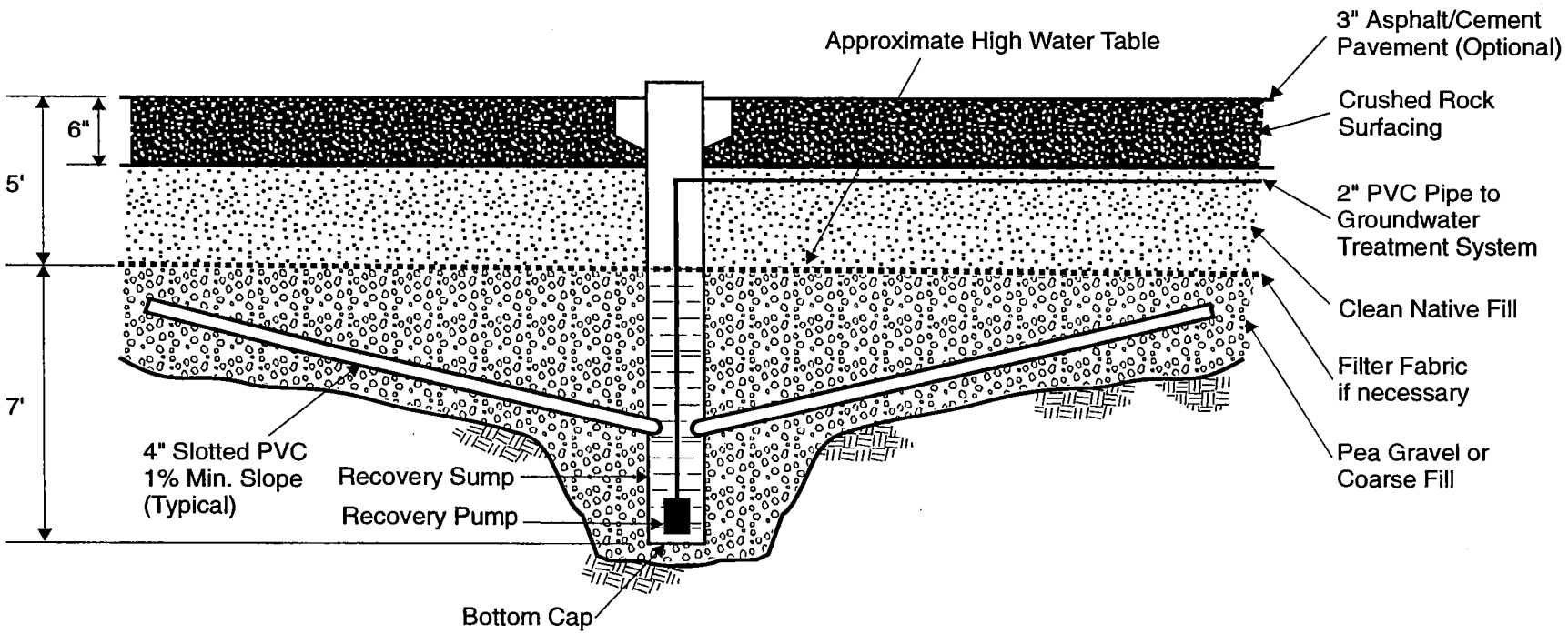
Typical Soil Treatment Area

Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE 4

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
659001st.cdr	15,659.001	DFF	25 Jul 94		



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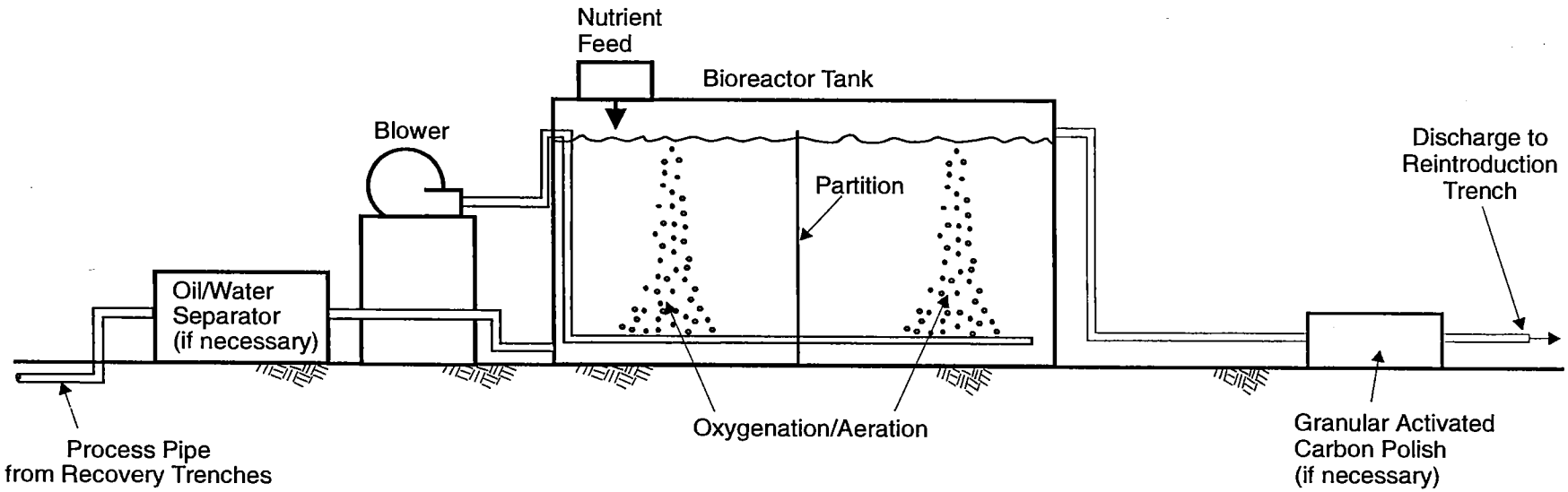
Typical Recovery Trench

Burns Bros./ Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE 5

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
659001RT.cdr	15,659.001	DFF	22 JuL 94		



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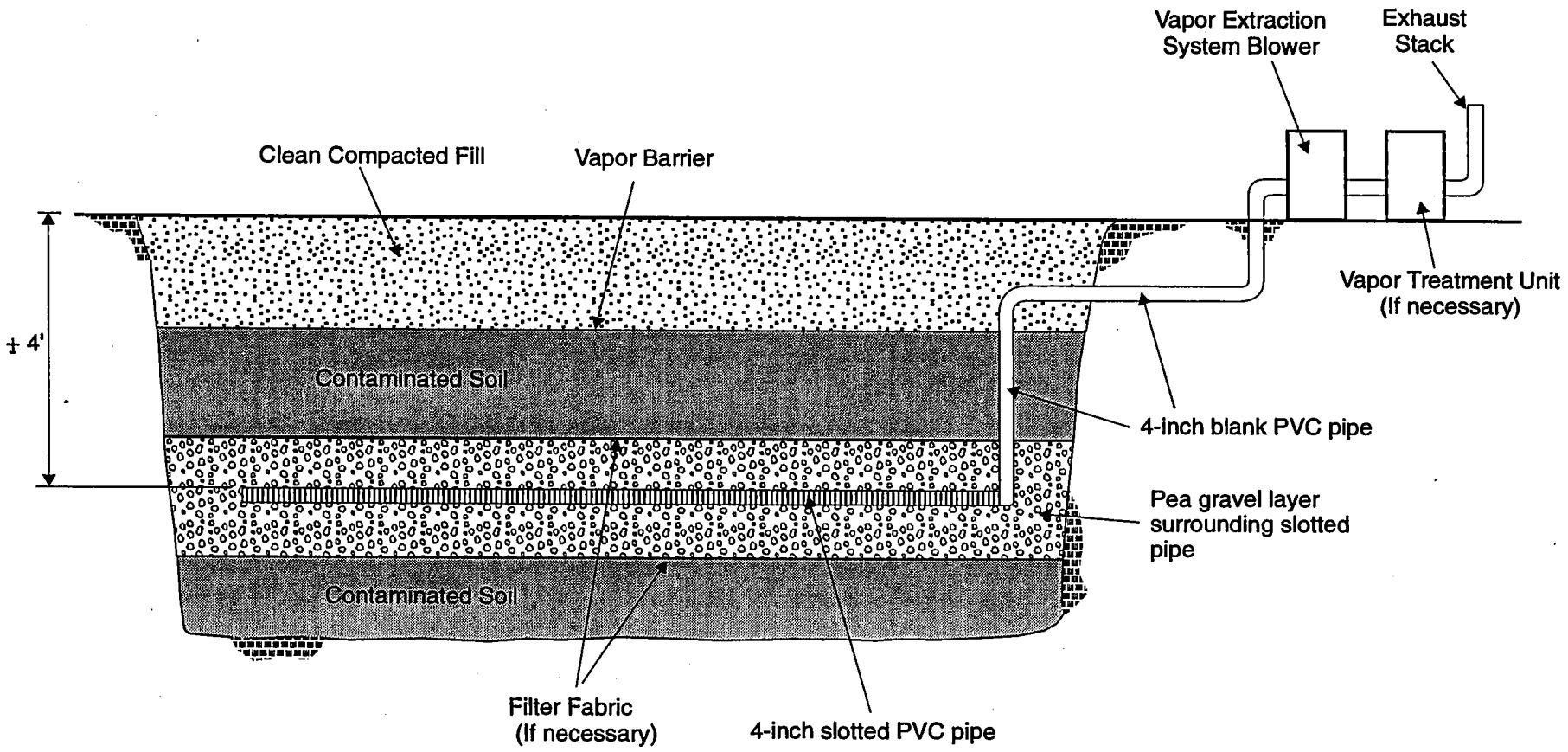
Groundwater Treatment System Diagram

Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE **6**

659001GT.cdr	PROJECT NO. 15,659.001	DRAWN DFF	DATE 20 Jul 94	APPROVED	REVISED	DATE



SCHEMATIC ONLY - NOT TO SCALE

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Typical Vapor Extraction System

Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE 7

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
659001VE.cdr	15659.001	DFF	25 Jul 94		

Task	Duration	Year 1				Year 2				Year 3				Year 4				Year 5				Year 6			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Phase 1	**260d**																								
Installation of Trenches	8w																								
Treatment of Petroleum-Contaminated Soil	26w																								
Groundwater Recovery and Treatment	52w																								
Phase 2	**260d**																								
Backfilling Treated Soil	8w																								
Excavation of Petroleum-Contaminated Soil	8w																								
VES Installation	8w																								
VES Operation	52w																								
Treatment of Petroleum-Contaminated Soil	26w																								
Groundwater Recovery and Treatment	52w																								
Phase 3	**260d**																								
Backfilling Treated Soil	8w																								
Excavation of Petroleum-Contaminated Soil	7.6w																								
Treatment of Petroleum-Contaminated Soil	26w																								
Groundwater Recovery and Treatment	52w																								
Phase 4	**520d**																								
Backfilling Treated Soil	8w																								
Groundwater Monitoring	104w																								

LEGEND

Task Duration

Summary

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Project Schedule

Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

FIGURE **8**

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
PROJSCH.CDR	15,659.001	DFF	2 Aug 95	DFF	28 Mar 95

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Prepared For :

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APPENDIX A
SAMPLING AND ANALYSIS PLAN
CLEANUP ACTION
BINGO FUEL STOP
THORP, WASHINGTON

April 7, 1995

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AGI Project No. 15,659.001

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been developed by AGI Technologies (AGI) for the Cleanup Action being conducted at the Bingo Fuel Stop in Thorp, Washington (site). This SAP, along with the Cleanup Action Plan (CAP), Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP), describes the technical approach and procedures to be used in completing the Cleanup Action.

1.1 PURPOSE

The SAP discusses remediation activities and sampling procedures in detail. The objective of the SAP is to ensure Cleanup Action field methods are consistent and reliable so that data generated are of known and acceptable quality.

1.2 ORGANIZATION

The SAP is organized by the following field activities:

- Field measurement objectives, procedures, and equipment.
- Petroleum-contaminated soil (PCS) excavation and treatment.
- Groundwater recovery and reintroduction.
- Equipment decontamination and waste control objectives and procedures.
- Physical and chemical data analysis schedule.

Examples of field records, reports, forms, and logs are attached at the end of the SAP.

2.0 FIELD MEASUREMENT PROCEDURES

Various field measurements will be made during the course of the Cleanup Action, including organic vapor concentrations, water levels, and water quality parameters. All field activities will be documented on a Field Investigation Daily Report. An example of a Daily Report is attached to this SAP. The following sections describe the field measurements required for the Cleanup Action.

2.1 ORGANIC VAPOR MEASUREMENTS

Measurements will be taken to characterize organic vapors and evaluate their extent and distribution in soil. These measurements will be used as a semi-quantitative screening tool for evaluating contaminant levels.

Organic vapor meters equipped with photoionization detectors (OVM-PID) will be the primary tools used to screen for volatile organic compounds (VOCs) in soil. A Thermoenvironmental Model 580A or 580B will be used.

Soil samples collected during the Cleanup Action will be screened for the presence of organic vapors using the following procedures:

1. Disaggregated portions of soil samples not submitted for chemical analysis will be placed in a glass jar or plastic bag.

2. The jar or bag will be sealed, agitated for approximately 30 seconds, and the soil allowed to equilibrate in the air space (headspace) for approximately 30 seconds.

3. The lid of the jar will be opened slightly or the bag will be punctured, and the OVM-PID probe inserted.

4. The OVM-PID display will be observed until the reading peaks and begins to decline. The maximum value will be recorded.

2.2 COMBUSTIBLE GAS MEASUREMENTS

Combustible gas meters (CGMs) will be used to quantify levels of oxygen and explosive gases. CGMs indicate the presence of combustible gases relative to the lower explosive limit (LEL) of methane in the atmosphere and will be calibrated to a 2.5 percent (50 percent of LEL) methane standard. Oxygen will be measured in percent by volume. An MSA 361 CGM or equivalent will be used.

2.3 DEPTH TO WATER MEASUREMENTS

To check for the presence of nonaqueous phase liquid (NAPL), initial depth to water measurements will be made using an ORS (or equivalent) interface probe. In wells with NAPL, product thickness and depth to water measurements will also be made with an interface probe. In wells without NAPL, depth to water measurements will be obtained using a Slope Indicator Company (SINCO) sounder. Measurements will be recorded to the nearest 0.01 foot on a Water Level Measurements form. An example of this form is attached to this SAP.

2.4 WATER QUALITY PARAMETER MEASUREMENTS

During groundwater monitoring well purging and sampling, water quality parameters will be measured. Water quality parameters include temperature, conductivity, and pH. A groundwater monitoring well will be considered purged when water quality parameters have stabilized such that three successive measurements vary less than 10 percent, or after five well casing volumes have been removed.

3.0 PETROLEUM-CONTAMINATED SOIL EXCAVATION AND TREATMENT

3.1 OVERVIEW

Approximately 12,000 cubic yards of PCS will be excavated and treated at the Bingo Fuel Stop. Soil samples will be collected from the excavations and from the soil treatment area to verify the completeness of excavation and treatment, respectively.

3.2 EXCAVATION SOIL SAMPLING

At a minimum, soil samples will be collected at 25-linear-foot intervals along the sides of excavations. The excavation base will be sampled on approximately 25-foot centers. In general, specific soil sample locations will be chosen such that the most contaminated soil exposed within the excavation is sampled. Visual signs of staining and sheen in conjunction with detections of volatile organic compounds by an OVM will be used to select sampling points. Information pertaining to each soil sample will be recorded on a Soil Sampling Record. An example of this form is attached to this SAP.

3.3 TREATMENT AREA SOIL SAMPLING

During treatment, the treatment area will be sectioned into a 3-dimensional grid. Representative samples will be collected from cells of this grid to depths of approximately 1 foot. The number of samples collected will be in accordance with Washington Department of Ecology publication No. 91-30, *Guidance for Remediation of Petroleum Contaminated Soils*, revised April 1994. The total number of samples will be determined as results of prior sampling are evaluated.

4.0 GROUNDWATER SAMPLING PROCEDURES

All groundwater quality sampling will be performed in accordance with U.S. Environmental Protection Agency (EPA) specifications and recommendations as presented in EPA's *Groundwater Technical Enforcement Guidance Document* (EPA, 1988a) and the Illinois State Worker Survey's *Practical Guide for Groundwater Sampling* (M.J. Barcelona, et al., 1985). The following field sampling procedures will be adhered to throughout the sampling program.

4.1 DEPTH TO WATER MEASUREMENTS

Prior to purging, water depths will be measured to the nearest 0.01 foot using an electric water level sounder or interface probe.

4.2 PURGING

After initial measurements have been recorded, monitoring wells will be purged using a bailer, or a submersible sampling pump. During purging, pH, temperature, and electrical conductivity will be monitored and recorded to verify these indicator parameters have stabilized such that three successive 5-gallon incremental measurements vary less than 10 percent. A maximum of five casing volumes will be removed from wells which produce sufficient quantities of water. Purge water will be placed into the on-site water treatment system.

4.3 SAMPLE COLLECTION

After purging is complete, groundwater samples will be collected using a Teflon or stainless steel bailer suspended on a nylon cord. The bailer will be lowered slowly into the water and emptied slowly to avoid degassing the sample. The nylon cord will be discarded after collecting each sample. The sample will be handled in accordance with procedures outlined in Sections 3.0 and 4.0 of the QAPP. Information pertaining to the groundwater samples will be recorded on a Groundwater Sampling form. An example of this form is attached to this SAP.

4.4 DECONTAMINATION

All sampling equipment will be thoroughly decontaminated between each sampling in accordance with procedures presented in Section 6.0 of this SAP.

5.0 SOIL SAMPLING PROCEDURES

5.1 GENERAL

An AGI field representative will monitor excavation and treatment operations. Soil samples will be monitored in the field with an OVM. The OVM detects organic gases present in the soil matrix. Instrument readings are expressed in parts per million (ppm) and are an approximation of organic gas concentrations.

Containers, preservation, and holding time for soil samples prior to analysis are discussed in the QAPP. All samples for chemical analysis will be submitted to Analytical Technologies, Inc.'s (ATI) laboratory in Renton, Washington.

5.2 EXCAVATION SAMPLING PROCEDURES

Soil samples from excavation operations will be collected using stainless steel spoons. If access to the excavation is unsafe, soil in the excavator bucket will be sampled. One precleaned 8-ounce glass jar will be filled at each sampling point. The jars will be capped with Teflon-lined caps and placed in a cooler with Blue Ice. The sampling spoons will be decontaminated between each sampling point using decontamination procedures described in Section 5.0 of this plan. The samples will be kept chilled to 39°F and shipped to the laboratory under chain of custody protocols.

5.3 TREATMENT AREA SAMPLING PROCEDURES

To facilitate sampling, the treatment area will be divided into cells. Final compliance with treatment standards will be demonstrated based on a statistical evaluation of the analytical results of samples taken from each cell.

All samples from the treatment area will consist of five-point composites. Samples from the treatment area will be collected using a stainless steel spoon and bowl. Each composite sample will be homogenized in the bowl before being transferred to a precleaned 8-ounce glass jar with a Teflon-lined cap. Jars will be placed in a cooler with Blue Ice and kept chilled to 39°F until delivery to the laboratory. Strict chain of custody protocols will be observed. The spoon and bowl used for sampling will be decontaminated between each sampling event using procedures described in Section 6.4 of this SAP.

6.0 EQUIPMENT DECONTAMINATION AND WASTE CONTROL

6.1 OBJECTIVES

Equipment decontamination and waste control for proposed remedial action activities are very important to prevent the spread of contaminants and ensure integrity of the work. Specifically, the main objectives are as follows:

- Contain all contaminated soil and water on the site in such a manner that work performed during the Cleanup Action does not cause the spread of any hazardous constituents within or off the site.
- Decontaminate all excavation and sampling equipment in such a manner that no hazardous constituents are introduced into the subsurface or samples through cross contamination.

6.2 DECONTAMINATION AREA

Decontamination of equipment will be performed in such a manner as to enable the capture of rinsate. Decontamination will be accomplished by steam cleaning. All decontamination water will be captured and contained.

6.3 EQUIPMENT DECONTAMINATION

Excavation equipment will be decontaminated prior to and after each use. The specific steps used for decontamination of this equipment are as follows:

Step 1: Large chunks of soil or debris will be scraped away.

Step 2: If oil is visible, a solvent such as methanol or hexane will be used to cut or dissolve oil from the equipment.

Step 3: The equipment will be placed on the decontamination pad. Equipment will then be thoroughly washed with a high-pressure steam cleaner/pressure washer.

6.4 SOIL SAMPLING EQUIPMENT

Soil sampling equipment will be decontaminated at decontamination facilities set up at each excavation location. Soil sampling decontamination facilities will consist of a sheet of visqueen placed under four clean PVC buckets. The first bucket will contain clean potable water; the second will contain clean potable water with nonphosphate-based soap; the third will contain clean potable water; and the fourth will contain clean deionized water. Water within the wash buckets will be changed between each sampling location.

All sampling equipment will be decontaminated before and after each sampling event. The specific steps used are as follows:

Step 1: Rinse and preclean in potable water.

Step 2: Wash in solution of nonphosphate-based soap and potable water. Nylon pads are used to facilitate washing; bottle brushes are used to scrub the inside of Teflon bailers.

Step 3: Dip rinse in potable water.

Step 4: Rinse in potable water.

Step 5: Rinse in distilled water.

Step 6: Place on clean polyethylene sheeting to drain and air dry.

Sponges and nylon scrubbers will be used during Steps 1 through 3. All equipment will be air dried, if possible, between samplings.

6.5 WATER SAMPLING EQUIPMENT

Water sampling equipment will be decontaminated by the same means as described in Section 6.4 for soil sampling equipment.

6.6 SOLID WASTE CONTROL

Solids generated during Cleanup Action work will primarily be limited to excavated soil. Soil removed from the excavations will be placed in the on-site petroleum-contaminated soil treatment area referenced in the Work Plan.

6.7 LIQUIDS WASTE CONTROL

Liquids generated during Cleanup Action activities will be limited to water from well purging and from decontamination procedures. Water from these procedures will be placed into the on-site bioreactor.

6.8 MISCELLANEOUS

Other waste generated during the Cleanup Action may include the following:

- Visqueen used to construct decontamination facilities at various sampling locations.

- Plastic bags used to temporarily contain contaminated sampling equipment.
- Protective gear, including suits and gloves.

All these materials and equipment will be decontaminated on site and disposed of in a municipal landfill.

7.0 CHEMICAL ANALYSES

7.1 OBJECTIVES

The primary objective for performing chemical analyses on site soil and groundwater samples is to obtain that data necessary to verify remaining petroleum hydrocarbon concentrations in soil and groundwater do not exceed cleanup levels or cleanup action levels. All analyses will be performed using methods in accordance with current applicable regulations.

7.2 SOIL CLASSIFICATION

All soil samples will be visually examined in the field by AGI's field representative at the time they are obtained and described in accordance with the Unified Soil Classification System, ASTM Test Method D-2487-83.

The number and locations of soil samples for analysis are described in Section 3.2.

7.3 GROUNDWATER CHEMICAL ANALYSES

Groundwater and field quality control samples will be submitted for the following chemical analyses:

- Benzene, ethylbenzene, toluene, and total xylenes (BETX) by EPA Method 8020. Samples will be prepared by EPA Method 5030.
- Total petroleum hydrocarbons (TPH) quantified as gasoline and diesel by Washington State Methods WTPH-D and WTPH-G, respectively.

Detection limits for groundwater chemical analyses referenced above are shown in **Table A1**.

7.4 SOIL CHEMICAL ANALYSIS

Subsurface and treatment area soil samples will be submitted for the following chemical analyses:

- BETX by EPA Method 8020. Samples will be prepared by EPA Method 5030.
- Gasoline- and diesel-range fuel hydrocarbons by Washington State WTPH-G and WTPH-D.

Detection limits for soil chemical analyses referenced above are shown in Table A1.

8.0 ATTACHMENTS

Examples of forms to be used to record on-site activities are attached. These include:

- Field Investigation Daily Report
- Water Level Measurements
- Soil Sampling Record
- Groundwater Sampling Record

AGI
TECHNOLOGIES

FIELD INVESTIGATION DAILY REPORT

Sheet _____ of _____

Project _____ Job No. _____

Location _____ Date _____

Equipment Rental _____ Company _____ To _____

Equipment Hours _____ F.E. Time from: _____ to: _____ By _____

Visitors:

Attachments ☐ Continued

Distribution Initial

fld.01/7-94

AGI
TECHNOLOGIES

WATER LEVEL MEASUREMENTS

Project _____ Job No. _____
Weather Conditions _____ Date _____
Site Conditions _____ Measured By _____
Measurement Device _____ Calculations By _____
Elevation Datum _____

Well	Time	Depth to Water	Reference	Reference Elevation	Water Elevation	Comments

Additional Comments _____

_____

_____

_____

_____

AGI
TECHNOLOGIES

SOIL SAMPLING RECORD

Sheet _____ of _____

Project _____ Date _____

Project No. _____ Sampled By _____

Weather _____ Reviewed By _____

NO.	Sample No.						
	Time Collected						
LOCATION	Location						
	Depth						
	Surface Elevation (feet)						
SAMPLING	Sampling Method						
	Container						
	Composited	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
	Cooled By						
SAMPLE DESCRIPTION	Soil Description/ Classification						
	Odor						
	Head Space Analysis	Instrument					
		Background					
		Reading					
DISPOSITION	Split	Name					
		Organization					
	Duplicate No.						
	Archive	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
	AGI Lab	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
	Other (Describe)						
	Name of Analytical Lab						
	Date Sent						
	Delivery Method						
	Chain-of-Custody No.						
	Comments						

field. x/12-93

AGI TECHNOLOGIES

GROUNDWATER SAMPLING RECORD

Well ID

Project _____ Date _____

Project No. _____ Sampled By _____

Weather _____ Reviewed By _____

PURGING

Depth to Water (TOC)	Time	Comments
Water Volume in Casing	Total Well Depth (TOC)	
Volume Purged Before Sampling	Screened Interval (TOC)	
Purging Method	Purge Volume Measurement Method	

Time	Flow Rate	Cumulative Volume	Temp	Specific Conductance	pH	Turbidity	Dissolved Oxygen	El.

SAMPLING

Sampling Method

Analytical Matrix ☐ Yes ☐ No ☐ Attached Time Sampled

Sample Container	Preserved By	At What pH	Filter Type	Cooled By

SAMPLE DATA

Appearance/Odor

pH (last stabilized)	Temperature (ºC)
Eh (millivolts)	Specific Conductance (microsiemens/cm)
Other	Comments

DISPOSITION

Chain of Custody ☐ Yes ☐ No Chain of Custody ID

Duplicate Sample ID Replicate Sample Nos.

ANALYTIC LAB	Lab Name	Date Sent to Lab
	Shipment Method	
SPLIT WITH	Name (s)	
	Organization (s)	

Other

field. x/12-93

TABLE

AGI
TECHNOLOGIES

Prepared For :

Burns Bros., Inc.
516 S.E. Morrison, Suite 1200
Portland, Oregon 97214

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN
CLEANUP ACTION
BINGO FUEL STOP
THORP, WASHINGTON

April 7, 1995

AGI Technologies
300 120th Avenue N.E.
Building 4
Bellevue, Washington 98005
206/453-8383

AGI Project No. 15,659.001

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1.0 PROJECT DESCRIPTION

Quality assurance (QA) is an integrated program for establishing reliability of monitoring and measurement data. Quality control (QC) is the routine application of procedures to obtain prescribed standards of performance in the monitoring and measurements process.

This Quality Assurance Project Plan (QAPP) discusses field, laboratory, and office procedures that will be used to assure data generated for the Bingo Fuel Stop Cleanup Action are of known and acceptable quality. Field measurements and laboratory analyses must meet specific data quality objectives for representativeness, comparability, accuracy, precision, and completeness.

AGI Technologies' (AGI) field tasks will consist of these major tasks:

- Surface and subsurface soil sampling
- Groundwater sampling
- Soil treatment area sampling
- Groundwater treatment system sampling
- Vapor extraction system sampling

These tasks are described in the Cleanup Action Plan. Sampling procedures are described in detail in the Sampling and Analysis Plan (SAP). All soil and groundwater samples will be analyzed at Analytical Technologies, Inc. (ATI) of Renton, Washington. ATI has received Washington Department of Ecology (Ecology) certification for analysis of groundwater. No Ecology laboratory certification currently exists for soils.

2.0 QUALITY ASSURANCE OBJECTIVES

The QA objectives of the Bingo Fuel Stop Cleanup Action are to develop and implement procedures to provide data of known and acceptable quality. Data quality is assessed by the following criteria:

- representativeness
- comparability
- accuracy
- precision
- completeness

Definitions of these criteria are provided below.

2.1 REPRESENTATIVENESS

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the soil and water sampled. The sampling plan, including the number and location of samples, sampling techniques, and sample handling protocols (e.g., storage, preservation, and transportation), has been developed to provide data that are representative of the matrix sampled. Proposed documentation will establish that protocols have been followed and sample identification and integrity assured.

2.2 COMPARABILITY

Comparability of data is essential so that different agencies and organizations can compare data generated in different projects and at different times. Data comparability will be maintained by use of consistent methods, detection limits, and units. The specific methods are identified in subsequent sections of this report. U.S. Environmental Protection Agency (EPA) and the Association of Standard Testing Methods (ASTM) methods will be used whenever available.

2.3 ACCURACY

Accuracy is an assessment of the closeness of the measured value to the true value. Accuracy of chemical test results is assessed by spiking samples with known standards and establishing the average recovery (%R) and by analyzing known standards and calculating the percent difference (%D) between the measured value and the known value of the standard. For organic compounds, two types of recoveries are generally measured: matrix spike recoveries and surrogate spike recoveries. For a matrix spike, known amounts of the analytes are added to the sample. For a surrogate spike, the standards are chemically similar but not identical to the compounds in the fraction being analyzed. The purpose of the surrogate spike is to provide quality control on every sample by constantly monitoring for unusual matrix effects and gross sample processing errors.

2.4 PRECISION

Precision is the measure of the analytical system's ability to be reproducible (i.e., to obtain the same or similar results on replicate measurements of the same sample). For duplicate measurements, precision can be expressed as the relative percent difference (RPD).

2.5 COMPLETENESS

Completeness is a measure of the amount of valid data obtained from the analytical measurement system. Completeness may be defined for field sampling as the ratio of the number of valid samples collected to the total number of samples collected in the field. In the laboratory, completeness may be defined as the ratio of the number of samples measured for a specific analyte which meets QA goals to the total number of samples measured for a specific analyte.

The target completeness objective will be 90 percent; the actual completeness may vary depending on the intrinsic nature of the samples. Data completeness will be assessed during QC reviews.

2.6 QUANTITATIVE GOALS

Quantitative goals for assuring known and acceptable data quality are dictated by intended data usage, analytical methods, and sampling procedures. For this project, the data are needed to evaluate the nature, extent, and source of contaminants on site.

The QAPP and SAP contain the protocols and procedures to meet and assess compliance with this goal.

3.0 SAMPLE COLLECTION PROCEDURES

The quality of the data collected in an environmental study depends on the quality of the sampling activities. Field operations must be well conceived and carefully implemented. Detailed procedures and protocols for site selection, sample collection, handling, preservation, shipping, and storage must be specified and documented. The Cleanup Action Plan provides a detailed description of the proposed scope of work. The SAP contains detailed protocols for field activities.

This section of the QAPP covers field QC samples, sample containers, preservation, holding times, and shipment.

3.1 CONTAINERS, PRESERVATIVES, AND SAMPLE HANDLING

All sample containers are to be provided by ATI and all required preservatives will be added at the analytical laboratory prior to shipment from the lab. The containers will be kept closed and in their shipping boxes until used. After sampling, all containers will be placed in iced coolers. Sample collection data will be documented on specified sampling records indicated in Section 4.0 of this QAPP. All entries will be made in indelible ink. Corrections will be made by drawing a single line through the error, adding the correction, and initialing the change. **Table B1** identifies containers, preservatives, and holding times for soil and water samples.

3.2 FIELD QUALITY CONTROL SAMPLES

3.2.1 *Rinsate Samples*

Rinsate samples are used to check whether sampling equipment has been properly decontaminated between sample collections. Soil sample rinsates will be obtained by passing distilled, deionized water over the sampling device used for sampling and capturing the water in a sample jar.

A rinsate sample will be collected after soil and groundwater sampling events, representing approximately 10 percent of the total samples obtained. Rinsate samples will be analyzed for the same parameters as groundwater listed in **Table B1**.

3.2.2 *Blind Duplicate Samples*

Blind duplicate samples provide an independent check of laboratory precision and an indication of the variability within a sample or composite. A duplicate groundwater sample will be collected and analyzed for benzene, ethylbenzene, toluene, and total xylenes (BETX); lead; polycyclic aromatic hydrocarbons (PAHs); and fuel hydrocarbons.

A duplicate sample will be obtained for every 10 groundwater samples submitted to the laboratory. Each duplicate sample container will be given an independent sample number so that upon arrival at the analytical laboratory, the duplicate appears as an additional sample.

3.3 DECONTAMINATION OF SAMPLING EQUIPMENT

All equipment used for soil and water sample collection will be decontaminated prior to use. Split-spoon samplers and other sampling equipment will also be decontaminated prior to obtaining samples. The sampling equipment decontamination procedures are described in Sections 6.4 and 6.5 of the SAP.

4.0 SAMPLE CUSTODY

Samples collected during the Bingo Fuel Stop Cleanup Action represent physical evidence collected from the site or its immediate surroundings. Because of the potential use of these samples as evidence, their possession must be traceable from collection until data from them are ultimately used.

Chain-of-custody procedures will be used to maintain and document sample possession. The principal documents that will be used are:

- Sample labels and seals
- Field records
- Chain-of-custody records
- Shipping records

These documents are discussed below.

4.1 SAMPLE LABELS AND SEALS

Each sample will be labeled and have a custody seal fixed to its cap immediately after collection. All sample labels and seals will be provided by AGI. Each label will include, at a minimum, the following information:

- Project name
- AGI project number
- Name of collector
- Date and time of collection
- Number which uniquely identifies the sample and its collection location. The sample numbering sequence will not indicate to the laboratory which samples are duplicates or field blanks.
- Preservative (if any)

A custody seal will be affixed to all samples to prevent tampering during shipment to the laboratory. If any custody seals are found broken when the laboratory receives a sample shipment, no analysis will be performed unless there is incontrovertible evidence the samples were not compromised. Broken or missing custody seals will be noted on the chain-of-custody records by the receiving analytical laboratory.

Samples will be kept in AGI's possession until the end of each day, when they will be shipped to the analytical laboratory. A sample will be considered in AGI's custody if:

- It is in the field team's possession, or

- It is in a designated secure area, under AGI control.

4.2 FIELD RECORDS

Daily field investigation reports and sample collection forms will be filled out by the sampling team. These documents will contain a detailed summary of all field activities, including, but not limited to, the following:

- Samples collected
- Sampling personnel on site
- Any deviations from the Work Plan or its appendices
- Any field decisions
- Major observations

4.3 CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

A chain-of-custody record will be completed and accompany every sample and every shipment of samples to the analytical laboratory to establish the documentation necessary to trace sample possession from the time of collection. The chain-of-custody records will be sequentially numbered and contain, at a minimum, the following information:

- Sample number
- Signature of collector
- Date and time of collection
- Place of collection
- Sample matrix
- Signatures of persons involved in the chain of possession
- Inclusive dates of possession
- Condition of samples

The chain-of-custody record will also be used to indicate what analyses are required by checking the appropriate box(s) on the form.

4.4 SHIPPING RECORDS

Following proper sealing and labeling, sample containers will be placed on Blue Ice in a cooler. The cooler will be sealed shut and a custody seal affixed across the box. Samples will be transported to the analytical laboratory within 48 hours of collection.

4.5 CORRECTIONS TO DOCUMENTATION

All original data recorded on field sampling forms, sample identification labels, and chain-of-custody records will be written in indelible ink. All of these documents will be kept in AGI's Bellevue office for at least 1 year after the sampling date, after which they will be microfiched.

If an error is made in a document, the sampler will make corrections by drawing a single line through the error and entering the correct information. The erroneous information will not be obliterated. Any subsequent error discovered on a document will be corrected by either the sampler, the Project Manager, or editing geologist, engineer, or chemist. All corrections must be initialed and dated.

5.0 ANALYTICAL PROCEDURES

5.1 CHEMICAL ANALYSES AND DETECTION LIMITS

Table B2 presents the media, parameters, analytical methods, and detection limits.

5.2 TIMELINESS

Sample handling, shipment, and custody procedures (discussed in detail in Section 4.0) are meant to ensure timeliness in sample delivery and analysis. **Table B1** lists the holding times for each chemical analysis.

5.3 INITIAL AND CONTINUING CALIBRATION

The analytical laboratory will perform initial and continuing calibration checks for the instruments used during the investigation.

5.4 REAGENT BLANKS

The analytical laboratory will supply reagent blanks for every batch of samples analyzed for organic compounds. The analytical methods listed below will have a reagent blank included as part of their lab QC data.

- Washington State Methods WTPH-G and WTPH-D
- EPA Method 8020

5.5 MATRIX SPIKES AND MATRIX SPIKE DUPLICATES

The project laboratory will supply matrix and/or matrix spike duplicate samples for samples analyzed for volatile organic compounds (VOCs). The matrix spiking compounds will be those specified in SW-846 for the analytical methods listed below.

- EPA Method 8020

5.6 SURROGATE SPIKES

The analytical laboratory will supply surrogate spike data for every sample analyzed for VOCs. The surrogate spiking compounds will be those specified in SW-846 or by Ecology for the analytical methods listed below.

- Washington State Methods WTPH-G and WTPH-D
- EPA Method 8020

6.0 DATA REDUCTION AND VALIDATION

The analytical laboratory will submit adequate supporting information to enable report reviewers to conclusively determine the data quality. The laboratory must also provide in the data package, where applicable, the following:

- Reagent blank results
- Matrix spike and matrix spike duplicate results
- Surrogate results

All control limits for each QC parameter developed also must be provided by the laboratory and be consistent with the precision and accuracy statement developed for the method by EPA where they are available.

All QC data provided by the laboratory will be reviewed by AGI during data analysis and compilation. Appropriate data qualifier codes (J, U, UJ, B, R) will be applied to those data for which QA parameters do not meet acceptance criteria specified in EPA Laboratory Data Validation Functional Guidelines for Organic and Inorganic Analyses (EPA, February 1988 and July 1988) and the precision and accuracy statements published in SW-846 (Test Methods for Evaluating Solid Waste).

The interpretation of the data qualifier codes is as follows:

- Data flagged with a J indicate estimated values because some of the quality assurance criteria were not met due to either matrix interference, a method blank detection of an analyte, or analyte detections in field or trip blanks at a concentration that would affect the concentration of the analyte in the field sample.

- Data flagged with a U indicate the analyte was not detected at or above the listed detection (practical quantification limit).

- Data flagged with a UJ indicate the analyte was not detected at or above the listed value (practical quantification limit), and the reported quantification limit is an estimate.

- Data flagged with a B indicate the analyte was detected in a method blank.

- Data flagged with an R indicate the data are unusable because several QA parameters failed to meet acceptance criteria.

7.0 QUALITY ASSURANCE AUDITS

This section describes the internal quality assurance audits required to monitor the sampling and analysis programs. A QA Officer will monitor and audit the performance of the laboratory QA procedures to ensure that data of known and acceptable quality are provided. Specific audit procedures are described below.

7.1 CHAIN-OF-CUSTODY RECORDS

The auditor will select a predetermined number of chain-of-custody records to be audited at AGI's office. The records must be reviewed to determine if the station number, station description, date, and time correspond to the sample identification label; the parameters to be analyzed have been appropriately identified; and all custody transfers have been documented and the date and time of transfer recorded. The auditor will also determine if samples have been kept in custody at all times and secured to prevent tampering.

7.2 FIELD RECORDS

Field records will be reviewed to see that each is signed and all entries are dated. Any lost, damaged, or voided records will be reported to the Project Manager. Photographs may be taken for evidentiary purposes by the Site Manager.

TABLES

AGI TECHNOLOGIES

Table B1
Containers, Preservatives, and Holding Times for Samples
Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

SOIL

Reference Methods [a]	Parameter	Technique [b]	Container	Preservative	Holding Time
EPA 8020	BETX	GC-PID	(1) 3-in stainless steel ring	Cool to 4° C Protect from sunlight, minimize headspace	14 days
WTPH-G, WTPH-D	Fuel Hydrocarbons	GC-FID	(1) 4 oz glass jar	Cool to 4° C	14 days

WATER

Reference Methods [a]	Parameter	Technique [b]	Container	Preservative	Holding Time
EPA 8020	BETX	GC-PID	(2) 40 ml vials	HCl, Cool to 4° C	14 days
WTPH-G, WTPH-D	Fuel Hydrocarbons	GC-FID	(1) 1 liter glass bottle	HCl, Cool to 4° C	7 days

Notes:

a) EPA methods are taken from "Test Methods for Evaluating Solid Waste," SW-846, 3rd Edition (1986). WTPH methods are Washington State methods.
b) FID - Flame Ionization Detector
GC - Gas Chromatograph
PID - Photoionization Detector

AGI TECHNOLOGIES

Table B2
Chemical Analyses and Detection Limits for Soil and Water Samples
Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

Parameter	Analytical Method*	Detection Limits Soil (mg/kg)	Water (µg/L)
Benzene	8020	0.025	0.5
Ethylbenzene	8020	0.025	0.5
Toluene	8020	0.025	0.5
Xylenes	8020	0.025	0.5
Diesel Range Fuel Hydrocarbons	WTPH–D	5	1,000
Gasoline Range Fuel Hydrocarbons	WTPH–G	5	100

Notes:

*EPA methods are taken from "Test Methods for Evaluating Solid Waste," SW–846, 3rd Edition (1986). WTPH methods are Washington State methods.
mg/kg – Milligrams per kilogram is equivalent to parts per million.
µg/L – Micrograms per liter is approximately equivalent to parts per billion, depending on density of water sample.

AGI
TECHNOLOGIES

Prepared For :

Burns Bros., Inc.
516 S.E. Morrison, Suite 1200
Portland, Oregon 97214

APPENDIX C
PROJECT-SPECIFIC HEALTH AND SAFETY PLAN
CLEANUP ACTION
BINGO FUEL STOP
THORP, WASHINGTON

September 19, 1994

AGI Technologies
300 120th Avenue N.E.
Building 4
Bellevue, Washington 98005
206/453-8383

AGI Project No. 15,659.001

AGI TECHNOLOGIES

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1.0 GENERAL INFORMATION

1.1 INTRODUCTION

The purpose of this project-specific Health and Safety Plan (HASP) is to provide guidance and procedures to ensure the physical well being of AGI Technologies (AGI) personnel observing, directing, and documenting field activities in support of the Cleanup Action at the Bingo Fuel Stop site. This project-specific HASP has been written to meet Washington Department of Labor and Industries, Division of Industrial Safety and Health regulations.

1.2 SCOPE/APPLICATION

This project-specific HASP is for AGI personnel engaged in field activities at the Bingo Fuel Stop site. Soil and water containing petroleum hydrocarbon compounds are present at the site. This HASP includes hazards and corrective procedures common to sites containing petroleum hydrocarbons. Information concerning the site history, location, and description is included in Section 2.0. If special or unusual hazards (e.g., confined space entries) are believed present at the site, the AGI Health and Safety Manager (HSM), Monica Beckman, or Project Manager (PM), Peter Barry, should prepare and implement an addendum to this project-specific HASP.

Prior to working at the site, a copy of this HASP will be provided to employees by the HSM or PM. AGI employees are expected to conduct site work in a safe manner and comply with the project-specific HASP and applicable federal, state, and local regulations. When no policies or regulations apply, AGI employees should act in a manner to reduce potential risk of injury or health effects.

AGI routinely hires contractors to assist in field activities. This project-specific HASP was developed by AGI and is not intended to apply to contractors working on the site. Contractors are responsible for providing and implementing their own HASP.

1.3 RESPONSIBILITIES

Project Manager	Peter Barry	(206) 453-8383
Health and Safety Manager	Monica Beckman	(206) 453-8383
Site Safety Officer	David Dawson	(206) 453-8383
Occupational Physician	Dr. Randall Franke (Virginia Mason Occupational Medicine Clinic)	(206) 822-3651

The AGI PM and HSM are responsible for preparing the project-specific HASP. If additional AGI employees enter the site, the PM should provide them with copies of the project-specific HASP and ensure they follow the procedures contained therein.

The Site Safety Officer (SSO) is responsible for implementing the project-specific HASP for AGI employees and notifying the HSM of additional hazards or deviations from the HASP.

1.4 WORK ACTIVITIES

AGI is conducting a Cleanup Action at the Bingo Fuel Stop site. Field tasks to be conducted as part of the Cleanup Action include the following:

- Excavating petroleum-contaminated soil (PCS)
- Installing groundwater recovery and reintroduction trenches
- Installing a vapor extraction system (if necessary)
- Operating and maintaining a groundwater treatment system
- Collecting soil samples from a Solid Phase treatment area
- Observing backfilling of excavations
- Sampling groundwater monitoring wells

2.0 SITE-SPECIFIC INFORMATION

2.1 SITE LOCATION AND DESCRIPTION

The Bingo Fuel Stop is located immediately south of Exit 101 on Interstate Highway 90 near Thorp, Washington. The site has been operated as a truck stop for over 20 years.

Seven underground storage tanks (USTs) were located on the Bingo Truck Stop. The tank sizes and contents included: one 5,000-gallon unleaded gasoline, one 10,000-gallon unleaded gasoline, one 10,000-gallon regular gasoline, one 12,000-gallon regular gasoline, one 10,000-gallon diesel, and two heating oil tanks of unknown capacity. In addition, four aboveground diesel tanks are located on the site.

2.2 PREVIOUS SITE WORK

Several exploratory test pits have been completed at the site within the past year. Three product recovery sumps were installed in areas where free product was encountered.

Washington State Department of Ecology (Ecology) issued an Enforcement Order February 11, 1992, directing activities at the site to stop and requiring preparation and implementation of an Emergency Remedial Action Work Plan. The USTs were removed from service in February 1992 in compliance with the Ecology order.

AGI prepared and submitted a Work Plan to perform an Emergency Remedial Action at the site. After receiving approval of the Work Plan from Ecology, the five unleaded gasoline, regular gasoline, and diesel USTs were removed during the Emergency Remedial Action. In addition, approximately 700 gallons of floating product were recovered from four recovery sumps.

AGI conducted a Remedial Investigation/Feasibility Study between May 1993 and July 1994. Twelve groundwater monitoring wells were installed and sampled. The results of the RI/FS are documented in our March 31, 1994 and July 29, 1994 reports.

2.3 NEAREST HOSPITAL

Appropriate action should be taken to stabilize minor emergencies (i.e., first aid injury cases.) For major emergencies, the appropriate response agency should be summoned by calling 911. If an AGI employee has been injured, the AGI PM and HSM should be contacted as soon as possible after the situation has been stabilized. The injured employee should then complete an AGI Supplementary Record of Occupational Injuries and Illnesses Form included as Attachment A. Additional emergency procedures are included in Section 7.0.

Nearest Hospital: Kittitas Valley Hospital

Address: 603 South Chestnut
Ellensburg, Washington 98926

Telephone Number: (509)962-9841

Driving directions to the hospital are shown on the Hospital Route Map, Figure C1.

2.4 EMERGENCY TELEPHONE NUMBERS

Emergency telephone numbers include:

Fire	911
Ambulance	911
Police	911
Poison Control Center	911

3.0 HAZARD ASSESSMENT

3.1 CHEMICAL HAZARDS

AGI employees may be exposed to hazardous chemicals while performing field activities at Bingo Truck Stop. Exposure could be the result of contact with soil or water containing petroleum hydrocarbons. The following products are considered potential contaminants at the site:

- Diesel fuel
- Gasoline (regular and unleaded)
- Heating fuel
- Benzene, ethylbenzene, toluene, and total xylenes (BETX)
- Polycyclic aromatic hydrocarbon (PAH) compounds
- Additives

3.1.1 Gasoline Products

Gasoline products usually include benzene, ethylbenzene, hexane, toluene, and xylenes. Gasoline products may also contain cyclohexane, methyl tert butyl ether, tetraethyl lead (leaded gasoline only), and PAH compounds. The most common routes of exposure for the above-referenced compounds include inhalation and skin contact or absorption. Acute short-term inhalation of petroleum hydrocarbon concentrations up to 1,000 parts per million (ppm) may result in headache, dizziness, loss of appetite, weakness, loss of coordination, and upper respiratory tract irritation. Inhalation of vapor concentrations in excess of 5,000 ppm may result in loss of consciousness, coma, and death. Dermal contact may result in eye and skin irritation. Benzene and some PAH compounds are considered carcinogenic; therefore, exposure should be minimized.

3.1.2 Heating Fuels and Diesel Fuels

Constituents of heating and diesel fuels usually include kerosene and light- to middle-weight distillates; some also contain naphthalene. The most common routes of exposure for heating and diesel fuels include inhalation and skin contact or absorption. Prolonged inhalation of these compounds may cause headache, dizziness, loss of appetite, weakness, and loss of coordination. Prolonged skin contact may result in pain or a feeling of heat, discoloration, swelling, and blistering. Overexposure to naphthalene may result in fever, sweating, nausea, abdominal pain, diarrhea, lethargy, tremors, and convulsions. Toxicology tests reportedly indicate middle-weight distillates can cause skin cancer and mutagenic effects.

3.1.3 Gasoline Additives

Gasoline additives usually contain naphtha, 1,2,4-trimethylbenzene, xylene, cumene, and additional trade secret additives. Dermal contact and inhalation are considered the most common routes of exposure to gasoline additives. Prolonged inhalation of the vapors may cause central nervous system effects, including headache, dizziness, loss of appetite, weakness, and loss of coordination. Gasoline additives may also be considered severe skin irritants. Signs and symptoms of exposure include pain or a feeling of heat, discoloration, swelling, and blistering. Eye contact may result in pain, tears, swelling, redness, and blurred vision.

3.2 FIRE AND EXPLOSION HAZARDS

The risk of fire or explosion exists during site activities. Certain gasoline products are considered extremely flammable. Heating fuel, diesel fuels, and gasoline additives are considered combustible liquids.

A combustible gas meter should be utilized during field activities when highly flammable or combustible products are suspected. If combustible gas meter readings indicate the Lower Explosive Level (LEL) has reached 20 percent in the general area, AGI personnel should inform the contractor and leave the site.

AGI personnel should not smoke or light open flames at the site. Electrical equipment used in hazardous areas should be of explosion-proof design. In addition, containers should be grounded and bonded while flammable liquids are transferred. If AGI personnel note these precautions are not being followed, they should notify the contractor and leave the site. In addition, AGI personnel should maintain a safe distance between themselves and drilling activities.

3.3 OXYGEN DEFICIENCY HAZARDS

It is not expected that AGI employees will be exposed to an oxygen deficient atmosphere during Cleanup Action activities at Bingo Truck Stop. Entry into a confined space is considered a last resort, requiring an addendum to this project-specific HASP. Confined spaces are defined as any space having a limited means of exit which is subject to the accumulation of toxic or flammable vapors or has an oxygen deficient atmosphere.

3.4 ELECTRICAL HAZARDS

AGI personnel should be aware of overhead powerlines in the work area. If such lines are present, the excavation contractor should be responsible for ensuring they are guarded, insulated, or turned off. In addition, a locate service should be utilized prior to beginning excavation activities to determine whether underground utilities are in the area. Utilities should be notified a minimum of 48 hours prior to the start of excavation. AGI personnel should be satisfied this notice has been given and utilities have been located. As a precautionary measure, AGI personnel should not contact the excavation equipment while it is in operation.

AGI personnel are responsible for ensuring AGI equipment and activities are adequately clear of utilities. Other site contractors are responsible for their own equipment and activities. AGI personnel should take particular care to never direct a contractor to act in an unsafe manner.

3.5 PHYSICAL HAZARDS

The principal site safety hazards are expected to be those associated with excavation and sampling activities. AGI personnel should be aware of moving equipment at the site and stay out of its way; particular attention should be paid when backup alarms are sounding because operator visibility in the direction of travel may be decreased.

Physical hazards during fieldwork can be a result of temperature extremes ranging from hypothermia to heat stress. Appropriate clothing and a heated rest area should be available if outside temperatures fall below 40°F for more than 2 hours. If symptoms of hypothermia (e.g., uncontrolled shivering, feeling disoriented, etc.) are noted, AGI personnel should stop working and seek warm shelter. Personnel performing physical labor while wearing protective clothing at temperatures above 70°F are subject to developing heat-related disorders. In this case, employee oral temperatures and radial pulse rates should be monitored hourly to ensure an adequate work-rest regimen is followed. If an employee's oral temperature exceeds 99.6°F or pulse rate exceeds 110 beats per minute, the next work cycle should be reduced by one third.

4.0 SITE CONTROL

4.1 WORK ZONES

The excavation contractor should establish exclusion zones at the site; therefore, AGI personnel should check with the excavator operator concerning the location of exclusion zones before entering the area. If the contractor has not established work zones at the site, the AGI SSO should designate such zones for use by AGI employees. Only AGI personnel meeting training and medical surveillance requirements described in Sections 8.0 and 9.0, respectively, are eligible to enter exclusion zones.

Generally, exclusion zones are established around potentially hazardous areas, including drilling operations, excavations, soil treatment areas, open groundwater monitoring wells, and treatment systems. The size of the exclusion zone depends on weather conditions and site operations.

A contamination reduction zone should be established outside and adjacent to each exclusion zone. This zone is used as a transition area and for decontamination activities. Decontamination should take place upwind from the exclusion zone.

The remaining areas of a site are referred to as the support zone. This zone is considered clean and is used for support facilities including office areas, vehicle parking, employee rest areas, etc.

4.2 DECONTAMINATION PROCEDURES

The excavation contractor should have established decontamination procedures to prevent contaminated materials from migrating from exclusion zones. If the contractor has not established decontamination procedures, the SSO should implement such procedures for AGI employees. Generally, decontamination procedures consist of the following:

- *Personnel*: At the end of each work day (and before lunch breaks), AGI personnel should wash, rinse, and dispose of non-reusable equipment. Reusable equipment should be thoroughly cleaned and properly stored for the next use. Coveralls should be placed in the laundry bag at AGI for pickup by the dry cleaning service. Personnel should also wash their hands and face before eating, and should shower as soon after leaving the site as possible.

- *Sampling Equipment*: Sampling equipment should be decontaminated after use, before returning it to the AGI equipment storage room. Samples and sample coolers should be wiped down to prevent laboratory personnel from contacting contaminated soil or groundwater.

4.3 MINIMIZATION OF CONTACT

AGI personnel should minimize contact with contaminated soil and groundwater. This may be accomplished by remaining upwind as much as possible, walking around excavated soil, using plastic as a barrier on sampling and air monitoring equipment, etc.

4.4 GENERAL SAFE WORK PRACTICES

- A 10-unit first aid kit, eyewash kit, and at least one fire extinguisher rated for Class A, B, and C fires should be available to AGI personnel.
- Work should take place during daylight hours unless adequate lighting is provided in the work area.
- Personnel should not eat, drink, smoke, or chew gum or tobacco in the exclusion zone.
- AGI personnel should not ignite flammable liquids or start open flames at the site.
- Contact lenses should not be worn while working in an exclusion zone. In the rare case that glasses cannot be worn, vapor-proof goggles may be worn over contact lenses.

5.0 PERSONNEL PROTECTION

This section describes the personal protective equipment (PPE) that should be worn by AGI personnel performing field activities at Bingo Truck Stop. Appropriate PPE was determined based on information in Sections 2.0 and 3.0. The following PPE should be worn by AGI personnel working near the excavation equipment and collecting environmental samples:

- Hard hats.
- Safety glasses. Face shields should also be worn if there is a high splash potential.
- Steel toe and shank work boots.
- Cotton coveralls.
- Chemically protective gloves.

AGI personnel should stay upwind during site operations as much as possible to limit the potential for overexposure situations. If air monitoring conducted in the breathing zone indicates organic vapor concentrations are reaching the action levels (see Section 6.3), additional engineering and administrative controls may be necessary to minimize exposure to AGI employees.

If vapor levels cannot be controlled and AGI personnel must stay in the area, they should wear National Institute for Occupational Safety and Health (NIOSH) approved, properly fitted air-purifying respirators. Respirators should be equipped with organic vapor cartridges.

6.0 AIR MONITORING AND SAMPLING

6.1 GENERAL

During operations having a high potential for airborne chemical exposure, air monitoring and sampling is conducted to document exposure levels and ensure precautions are taken to protect AGI personnel.

Air monitoring should be conducted using either a photoionization detector (PID) or flame ionization detector (FID). Monitoring and sampling equipment should be calibrated daily in accordance with the manufacturer's requirements. Calibration data, wind direction, background readings, air monitoring readings, and air sampling information should be recorded as part of the daily field logs.

6.2 AIR SAMPLING

Air sampling using organic vapor diffusion OVD badges may be performed at Bingo Truck Stop to document exposure of AGI personnel to benzene and total petroleum hydrocarbons (TPH). For personnel sampling, the sample media should be placed within 1 foot of an individual's nose and exposed 8 to 10 hours. Sample media may be exposed for shorter durations if personnel leave the exclusion zone. Upon sampling completion, the sample media should be collected and sealed, exposure times recorded, and the sample media sent to an independent laboratory accredited to perform industrial hygiene analysis.

Personnel air samples have been collected at sites similar to the Bingo Truck Stop. The samples were analyzed for benzene by NIOSH Reference Method 1501 and TPH by NIOSH Reference Method 1500. Analytical results received from these samples indicated no exposures to benzene above the permissible exposure limit (PEL) of 1 ppm measured as an 8-hour Time Weighted Average (TWA) at any site.

6.3 AIR MONITORING

Air monitoring should be conducted during excavation activities at Bingo Truck Stop. Breathing zone organic vapor concentrations should be measured at least 5 times, on a random basis during the work day. An employee's breathing zone is considered to encompass a 1-foot radius around his or her nose.

Personnel action levels for organic vapors were established with particular attention given to benzene. Benzene reportedly accounts for up to 5 percent of the gasoline mixture and has the lowest PEL. The 15-minute short-term exposure limit (STEL) for benzene is 5 ppm. Based on this information, the personnel organic vapor action level is a sustained (5 minutes) reading of 5 ppm greater than background, measured in the breathing zone with a PID or FID.

If the personnel organic vapor action level is reached, AGI personnel should implement engineering controls or don respiratory protection. Half-face respirators may be worn in concentrations up to 10 ppm. At concentrations greater than 10 ppm, full-face respirators should be worn and at sustained breathing zone concentrations greater than 100 ppm, AGI personnel should leave the site.

Colorimetric tubes may be utilized to determine the presence and concentration of benzene in the breathing zone. If colorimetric tubes indicate benzene is not present at the concentrations listed above, half-face and full-face respirators may be worn at concentrations up to 50 ppm and 500 ppm, respectively.

Combustible gas monitoring should be conducted when organic vapor concentrations exceed 2,000 ppm (i.e., approximately 15 percent of the LEL for gasoline) near work operations to prevent AGI personnel from working in potentially explosive atmospheres. The combustible gas action level considered to be the industry standard is 20 percent of the LEL. If 20 percent of the LEL is measured near a work operation, AGI personnel should leave the area. AGI personnel may reenter the area when measured explosive levels fall below 10 percent of the LEL.

The action levels discussed above were determined to be sufficient based on a comparison of air sampling analytical results to air monitoring readings obtained using a PID or FID during the sampling time. Action levels may be altered as additional information is obtained. AGI employees are instructed to stay outside an exclusion zone or upwind as much as possible. Such work practices will minimize the potential for exposures above the established PEL.

7.0 EMERGENCY PROCEDURES

Emergency response procedures have been developed for extraordinary events that could occur during operations at the site. These events include accidents, chemical exposures, fires, and spills.

In general, the following actions should be implemented in the event of an emergency:

- First aid or other appropriate initial action should be administered by those closest to the accident or event. This assistance should be conducted so those rendering assistance are not placed in a situation of unacceptable risk.
- The AGI PM and HSM should be contacted.
- If an AGI employee is injured, an AGI Supplementary Record of Occupational Injuries and Illnesses Form should be completed and forwarded to the PM and HSM. Any necessary changes to the operation should be made to prevent the same accident or event from occurring in the future.

7.1 ACCIDENTS

If a person working in an exclusion zone is physically injured, American Red Cross first aid procedures should be followed. Depending on the severity of the injury, emergency medical response may be sought. If the person can be moved, he or she should be taken to the edge of the work area where PPE may be decontaminated and removed (if necessary), emergency first aid administered, and transportation to an emergency medical facility awaited.

7.2 CHEMICAL EXPOSURES

If the injury is chemical in nature, the following first aid procedures should be followed:

- *Eye Exposure* - If solid or liquid enters the eyes, both eyes should be flushed with large amounts of clean water while lifting the upper and lower eye lids occasionally. Medical attention should be obtained.
- *Skin Exposure* - If contaminated material contacts the skin, the affected area should be washed with soap and water. If the materials penetrate clothing or protective equipment, the items should be removed and the affected skin areas washed. Medical attention should be obtained if symptoms warrant.
- *Inhalation* - If a person breathes a large volume of potentially toxic vapors, they should be moved to fresh air. If breathing has stopped, artificial respiration should be performed. Medical attention should be obtained.

- *Ingestion* - If contaminated material is swallowed, medical attention should be obtained and a poison control center contacted for further instructions.

7.3 FIRES

Fire extinguishers should be available on site and in vehicle cabs. In the case of a fire at the site, the following actions should be taken:

- Evacuate personnel from the area, preferably to an upwind location.
- Notify the local fire department and emergency response agencies.
- Attempt to extinguish the fire using portable fire extinguishers or by smothering (ONLY IF SMALL).
- Notify the AGI PM and HSM.

7.4 SPILLS

The primary considerations during a hazardous materials spill are to warn unsuspecting personnel, contain existing spillage, and prevent further spillage. In the event of a spill of stored material (except potable water), the following actions should be taken:

- Evacuate personnel from the area.
- Summon local emergency medical or fire services if the spill involves extremely toxic or flammable materials.
- Contain the spill with absorbent booms or other means and block off the area. Drains and sewers should be blocked to prevent material from migrating from the site.
- Attempt to stop the flow of material from the container.
- Notify the AGI PM and HSM.

7.5 EMERGENCY SERVICES

The SSO should locate the nearest telephone prior to entering the site. In the case of an on-site emergency or injury requiring outside services (e.g., ambulance, fire, police), field personnel should telephone the emergency medical system at 911. If medical attention is needed but the situation is not an emergency, the injured employee may be transported by other field personnel to the medical facility identified in Section 2.3.

8.0 TRAINING REQUIREMENTS

AGI employees performing field activities at Bingo Truck Stop should have received training in accordance with state and federal regulations. This training should include the following topics:

- Names of personnel and alternates responsible for the safety and health of AGI employees and accident reporting procedures.
- Safety, health, and potential hazards at UST sites, including chemical hazards and benzene exposure.
- Use of personal protective equipment, including the use of respirators and a fit test.
- Additional work practices and engineering controls that should be followed to minimize the potential risks present at UST sites, including excavation and confined space hazards.
- Medical surveillance requirements.
- Recognition of symptoms and signs which may indicate overexposure to hazardous chemicals.
- Site control measures, including work zones, decontamination procedures, emergency response procedures, and spill containment procedures.

AGI personnel should review this project-specific HASP and sign the Field Team Review Form included as Attachment A prior to commencing fieldwork at the site.

9.0 MEDICAL SURVEILLANCE REQUIREMENTS

AGI employees observing, directing, and documenting operations at the site should participate in the Medical Surveillance Program. Medical surveillance examinations are required for employees potentially exposed to chemicals at concentrations greater than the respective PEL more than 30 times per year, employees who wear respirators more than 30 times per year, and employees who are injured, become ill, or develop signs or symptoms due to potential overexposure.

Direct hire and new employees are given a baseline physical and current employees are up-to-date with respect to their annual exam. The examining physician verifies whether individuals are fit to work at hazardous waste sites and utilize protective equipment, including respirators.

Additional medical exams are given if overexposure to petroleum hydrocarbons or an injury occurs. In addition, exit physicals are required upon an employee's termination. Exit exams are performed at the discretion of the examining physician if the previous exam was conducted less than 6 months prior.

The AGI Medical Surveillance Program is administered by a physician board certified in Occupational Medicine. The occupational physician determines the content of medical examinations, but the physicals include, at a minimum, a detailed work history, head to toe examination, pulmonary function test, audiogram, vision acuity test, blood work, and a urinalysis. Documentation of the Medical Surveillance Program is maintained by the AGI HSM.

10.0 HASP MODIFICATIONS

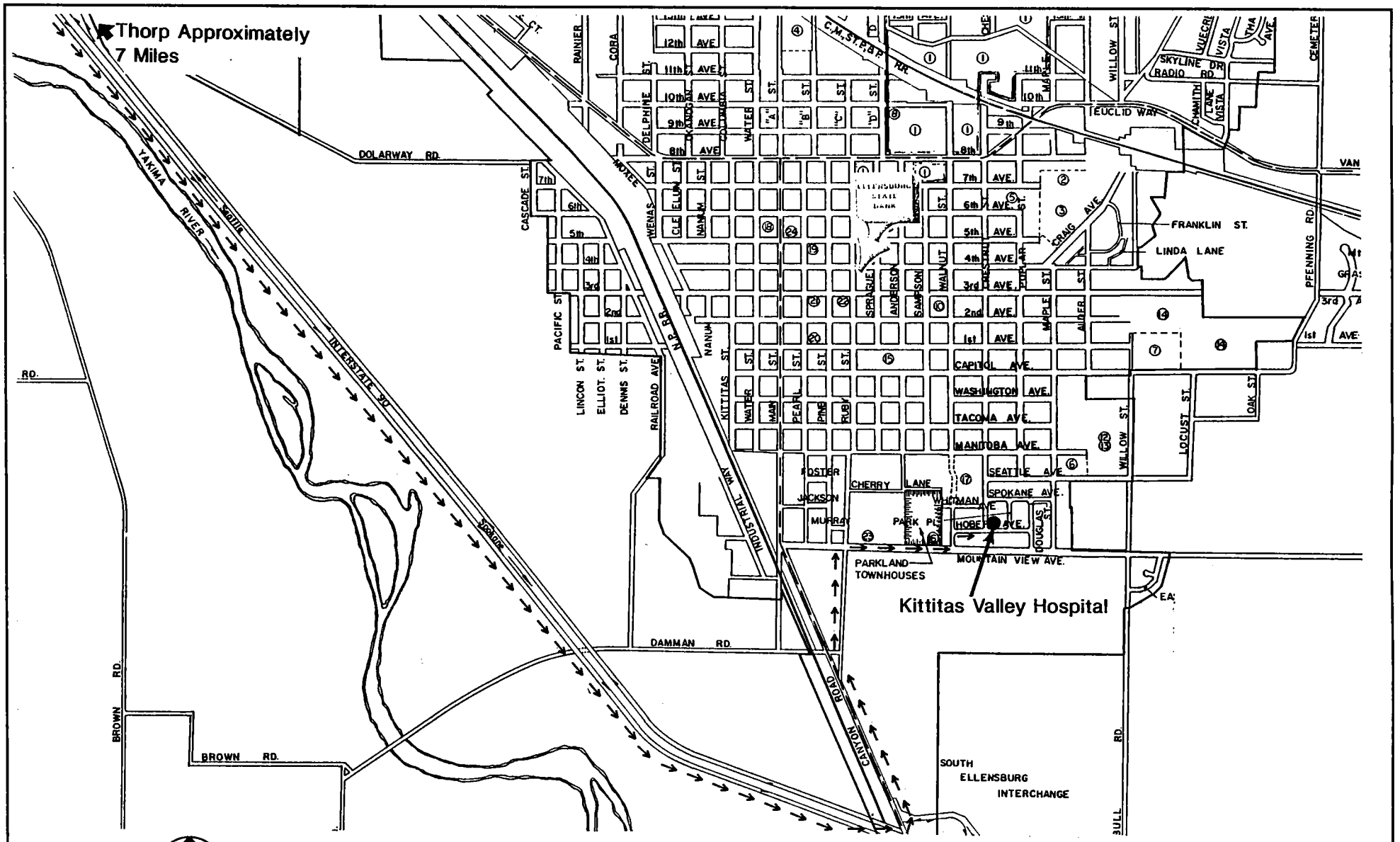
This project-specific HASP should be reviewed and amended, if necessary, whenever:

- Applicable regulations are revised.
- Additional information concerning site hazards, operations, personnel, emergency services, etc. is obtained.
- Site operations are revised.

When this project-specific HASP is revised, personnel should review the changes and file a new Field Team Review Form with the AGI HSM.

AGI
TECHNOLOGIES

PLATE C1
HOSPITAL ROUTE MAP



Reference: Map from Yakima Chamber of Commerce

AGI TECHNOLOGIES

Hospital Route Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
C1

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
15,659.001	DFF	6 Mar 95			

AGI
TECHNOLOGIES

ATTACHMENT A

Field Team Review Form

AGI
TECHNOLOGIES

Field Team Review Form

I have read and reviewed the most recent revision, dated September 19, 1994, of the project-specific Health and Safety Plan (HASP) for work at the Bingo Fuel Stop site in Thorp, Washington. I have been given a chance to ask questions regarding the project-specific HASP and understand the information contained therein. I agree to comply with all aspects of the project-specific HASP.

Name: _____

Signature: _____

Date: _____

Completed copies of this form should be forwarded to the AGI Health and Safety Manager.