SIT 6.1

WASHINGTON STATE DEPARTMENT OF ECOLOGY

FINAL CLEANUP ACTION PLAN

HAMILTON STREET BRIDGE SITE

SPOKANE, WA

Washington Department of Ecology

Eastern Regional Office

Toxics Cleanup Program

AUGUST 10, 2001

EXECUTIVE SUMMARY

This Final Cleanup Action Plan (FCAP) presents the selected remedial action for the Hamilton Street Bridge Site located in Spokane, Washington, developed in accordance with the Model Toxics Control Act (MTCA), Chapter 70.105D RCW and Chapter 173-340 WAC. The FCAP is issued after having completed the public comment period for the Draft Cleanup Action Plan (DCAP), and after review and consideration of the comments received.

The Hamilton Street Bridge Site was once the location of the Spokane Manufactured Gas Plant (SGP) and the American Tar Company (ATC). The SGP used a coal gasification process to manufacture gas between 1905 and 1940. The ATC processed coal tar, a by-product of the SGP operation from the 1930s until 1967; shipping coal tar from Seattle after the SGP was shut down in 1940. Disposal practices at the SGP and ATC have resulted in the contamination of soil and ground water at the Site.

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the proposed cleanup action, present a threat to human health and the environment.

The major components of the cleanup action include:

- Covering and bringing to grade the ATC area with clean soil or gravel;
- Use of existing fill materials as a barrier or cover for the contaminated soils in the SGP area;
- Stormwater management that includes abandonment of existing dry wells on Site;
- Construction of a streambank bioengineering along the vulnerable or impacted shoreline of the Spokane River;
- Ground water monitoring;
- Institutional controls that includes a Restrictive Covenant on the properties;
- Five-year reviews.

Ecology has determined that this selected remedy is protective of human health and the environment, and is permanent to the maximum extent practicable.

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1.0 INTRODUCTION

1.1 THE CLEANUP PROCESS AND THE FINAL CLEANUP ACTION PLAN

The Final Cleanup Action Plan (FCAP) is one of a series of documents used by Ecology to monitor the progress of site investigation and cleanup. Figure 1 identifies the documents required under the Model Toxics Control Act (MTCA) Cleanup Regulation, Chapter 173-340 WAC.

The Remedial Investigation (RI) Report presents results of investigations into the nature and extent of contamination. The Feasibility Study (FS) Report assesses the risk posed by the contamination, and evaluates cleanup actions that eliminate, reduce or control these risks. Evaluations of cleanup actions in the FS are done in accordance with MTCA requirements. The RI and FS are conducted in accordance with work plans approved by Ecology. These Reports are made available for public review and comment.

The selection of a cleanup action by Ecology is initially presented in the Draft Cleanup Action Plan (DCAP). Upon completion of a public comment period on the DCAP, and after review and consideration of the comments received, a Final Cleanup Action Plan (FCAP) is issued.

The FCAP is incorporated into a Consent Decree or Agreed Order that provides the legal agreement for implementing the cleanup action. The remaining documents implement the selected cleanup action.

1.2 PURPOSE AND OBJECTIVES

Having completed the public comment period for the DCAP, and after review and consideration of the comments received, Ecology is issuing this FCAP. This decision document presents Ecology's final selected cleanup action for the Hamilton Street Bridge Site (the Site). This Site is located at 111 North Erie Street in Spokane, Washington (as shown in Figures 2 and 3). The selected cleanup action is primarily based upon the following documents:

- Focused Remedial Investigation Report SR 290 Southriver Drive Alignment, EMCON, August 28, 1998;
- Focused Site Assessment Former American Tar Company Site, Spokane, WA, Geoengineers, April 30, 1999;
- Supplemental Investigation Former Spokane Manufactured Gas Plant, Spokane, WA, Landau Associates, January 7, 1999;
- Second Supplemental and Remedial Investigation, Hamilton Street Bridge Site, Spokane, WA, Landau Associates, Inc., February 9, 2001;

- Feasibility Study Report, Hamilton Street Bridge Site, GEI Consultants, Inc., November 30, 2000;
- The Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC.

Portions of the FCAP and DCAP text and most of the figures are taken directly from these documents.

This FCAP includes the following:

- Brief description of the Site;
- The nature and extent of contamination at the Site;
- The cleanup standards for the Site;
- A description of the proposed remedial alternatives or actions presented in the FS Report;
- Evaluation of proposed alternatives; and
- Ecology's selected cleanup action.

1.3 DECLARATION

Ecology's selected remedy is protective of human health and the environment. Furthermore, the selected site-specific remedy is permanent to the maximum extent practicable and is therefore consistent with the preference for permanence of the State of Washington as stated in RCW 70.105D.030(1)(b).

1.4 APPLICABILITY

This Cleanup Action Plan is applicable only to the Hamilton Street Bridge Site. Cleanup standards and cleanup actions have been developed as an overall remediation process being conducted under Ecology oversight using MTCA authority, and should not be considered as setting precedents for other sites.

1.5 ADMINISTRATIVE RECORD

The documents used to make the decisions discussed in this cleanup action plan are constituents of the administrative record for the site. These documents are listed in the Reference Section.

The entire administrative record for the site is available for public review by appointment at Ecology's Eastern Regional Office, 4601 N. Monroe, Spokane, WA 99205-1295. Documents that were made available for public comment and review are also available at the Spokane Public Library, 906 West Main Avenue, Spokane, WA.

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION

The Site is located at North 111 Erie Street, Spokane, Washington (Figure 2). It is currently where the Brown Building Materials salvage and sales operation is located and is situated beneath the Hamilton Street James E. Keefe Bridge along the Spokane River. It includes properties now owned by the Spokane River Properties (SRP) and Burlington Northern Santa Fe (BNSF) which were once associated with the former Spokane Manufactured Gas Plant (SGP), the American Tar Company (ATC), and the Chicago Milwaukee & Saint Paul Railroad (CM&SPR) (see Figure 3).

2.2 SITE HISTORY

SGP produced coal gas and carbureted water gas at the property between 1905 and 1948. From 1948 to approximately 1956, a propane-air system was operated from the facility for gas mixing, storage, and distribution. The propane-air system was utilized until natural gas was available, and to reflect the change from coal gas manufacturing to natural gas distribution, the company changed its name to Spokane Natural Gas Company in 1956. In 1958, Washington Water Power (WWP), now Avista Corporation, merged with the Spokane Natural Gas Company and dispensed natural gas from the Site until 1962 or 1963. In 1963, Mr. Richard Brown leased the SGP property from WWP and established Brown Building Materials. Mr. Brown purchased the property in 1978 and conveyed the property to SRP in 1982, of which he is a general partner.

During the operation of the manufactured gas plant, coal tar, a by-product of coal gas production was conveyed to a coal tar processing plant and distribution facility located on a parcel leased from the Northern Pacific Railroad (contemporary BNSF) adjacent to the south side of the former SGP property. The C.G. Betts Company operated the facility until the early 1930s when the operations were taken over by the ATC. The ATC utilized the facility until the early 1967, shipping tar to the Site from Seattle after the SGP was shut down. Mr. Brown began leasing the ATC property from the BNSF in 1968 and continues to lease the property today.

CM&SPR formerly owned the existing riverfront property west of the SGP property and north of the BNSF land. Mr. Brown purchased this property in 1981, and the title is now held by SRP.

2.3 SITE INVESTIGATIONS

In 1987, the U.S. Environmental Protection Agency (EPA) completed a preliminary assessment of both the SGP and the ATC properties and recommended additional investigations for the ATC property. In 1988 EPA conducted a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) screening site investigation of the ATC property.

In 1981, the Washington State Department of Transportation (DOT) conducted drilling on and around the former SPG and ATC properties to provide design information for the James Keefe Bridge. Contamination was observed at depth in several of the borings and was observed during the bridge construction in 1982.

In 1995, EPA conducted a screening site investigation of the SGP that included sampling and chemical testing of surface water and sediment from the Spokane River. EPA concluded that the samples did not reflect a release of contamination from the Site to the Spokane River. Consequently, EPA did not anticipate further investigation under CERCLA, and referred the Site to the state for further consideration.

DOT conducted further exploratory activities on the Site in 1997 as part of a proposed highway realignment of Trent Avenue. Their study showed the presence of coal-tar waste covering an area of two to three acres and extending below ground surface to a depth in excess of 40 feet. The most heavily impacted soil was reportedly observed in the central portion of the SGP operation areas and near the refining process areas of the ATC property. No coal tar constituents were detected in the nearest city water supply well, the Nevada Street well, located approximately 8,500 feet north-northeast from the Site.

A health consultation prepared for the Washington State Department of Health (DOH) under a cooperative agreement with the U.S. Department of Health and Human Services, Agency for Toxics Substances and Disease Registry (ATSDR) in 1998 stated that no apparent public health hazards exist based on current land and ground water use, but identified the need for further study should Site or local ground water use change. The Spokane County Health District (SCHD) completed a MTCA site hazard assessment of the former SGP property in 1998 and assigned the property a hazard ranking of 3.

Avista Corporation conducted further investigations in 1997 and 1998 to evaluate the effect of the soil contamination on ground water and to determine whether site contaminants had migrated to the Spokane River. The results of these studies further defined the lateral boundaries of the soil contamination identified in the DOT study. These studies also showed that soil contamination does not adversely affect ground water outside the limits of soil contamination. Data from this investigation indicated that during the period of observation, ground water flow appeared to be from the Spokane River toward the Site.

A supplemental site investigation was conducted by Avista Corporation in 1998 to evaluate the vertical extent of contamination, ground water quality and hydraulic gradients in the vicinity of the Site, and to characterize the nonaqueous phase liquid (NAPL) found in the soil contaminated area. The results further defined the lateral and vertical boundaries of the soil contamination at the Site. NAPL was encountered in soil during drilling up to 80 feet below ground surface. The ground water outside of the area of soil contamination showed sporadic detectable levels of chemicals associated with the gas plant operations or coal tar processing

A focused site investigation was conducted by BNSF on the ATC property in 1999 to collect soil and ground water data. Soil samples showed contamination in the ATC area. Ground water samples collected from monitoring wells in the property did not detect the presence of constituents above cleanup levels.

Ecology has combined the Spokane Manufactured Gas Plant and the American Tar Company sites into one referred to as the Hamilton Street Bridge Site with a ranking of three (3) under MTCA.

Avista and BNSF conducted a second supplemental investigation and completed a Remedial Investigation and Feasibility Study under a MTCA Agreed Order in 1999. This supplemental study evaluated the vertical extent of contamination, ground water quality, and hydraulic gradient. Findings of the study, in conjunction with the other previous site investigations, were used to determine the nature and extent of contamination. The Feasibility Study evaluated remedial technologies applicable to the Site.

2.4 PHYSICAL SITE CHARACTERISTICS

2.4.1 Site Condition and Geology

Geologic units encountered at the Site include, youngest to oldest, recent surficial fill materials (including cinder, brick, soil, and basalt cobbles and boulders), unconsolidated sediment, and basalt bedrock.

During the early 1900s, substantial quantities of fill materials were placed in the river for the construction of the CM&SPR. Limited quantities of fill have also been placed across the Site surface at the time. Placement of the fill shifted the riverbank as much as 230 feet north as shown on Figure 3. Fill materials range from 2.5 feet up to approximately 30 feet in thickness, and are thickest on the western portion of the Site and near the river.

The unconsolidated sediments on the Site consist primarily of Spokane River deposits of silt, sand, gravel, and cobbles, and glaciofluvial sediments deposited by the Pleistocene catastrophic floods. The sand, gravel, and cobbles deposited by the Spokane River are undifferentiated from the glaciofluvial deposits. The glaciofluvial deposits consist primarily of sand, gravel, cobbles, and boulders, with some silt. The unconsolidated sediments in the central area of the Site are over 115 feet thick. Bedrock underlying the unconsolidated sediments on Site has only been encountered at a depth of 90 feet BGS in one location but has not been encountered in other locations.

Basalt bedrock outcrops along the western edge of the Site. The basalt forms a cliff face comprising the western boundary of the Site and diverts the Spokane River to the north.

Figures 5 and 6 show two north –south geologic cross sections of the Site for locations shown in Figure 4.

2.4.2 Ground Water Hydrology

The Site is on the southwestern edge of the Spokane-Rathdrum Prairie Aquifer, the primary aquifer in the region and designated by EPA as a sole source aquifer.

Ground water at the Site is encountered approximately 10 to 20 feet below the Site surface with fluctuations of less than 8 feet. Ground water was observed at the highest levels in the spring (April – May), and at the lowest levels in the late summer to fall (August – November). The high and low groundwater levels correspond with the Spokane River levels.

The Spokane River surface water level is generally higher in elevation than ground water except in late spring to early summer. This indicates that the Spokane River locally recharges ground water, and receives only limited recharge from ground water during periods of peak runoff in the late spring to early summer.

River water interacts rapidly with the highly permeable fill materials; the shallow ground water elevations correspond closely to the river level. The native soils, composed of sand and gravel, have a lower hydraulic conductivity than the fill. The coarse fill material acts as an extension of the river while the native deposits, though heavily influenced by the river also reflect regional hydrogeologic conditions.

During most of the year shallow ground water gradients are from the river to the fill, and from the fill laterally and downward into the native sand and gravel aquifer. Intermediate and deeper ground water gradients are northerly. The horizontal water table surface gradients in the shallow zone are very low. During monitoring events, only hundredths of a foot difference observed across the entire Site. During most of the year the water level gradients suggest a convergence of river water, shallow ground water, and deeper ground water in the intermediate zone of the aquifer.

3.0 NATURE AND EXTENT OF CONTAMINATION

The primary sources of contamination at the Site are waste materials from the SGP and ATC. These wastes are residuals or by-products from the coal gasification process and tar processing and include hydrocarbons, light and heavy polycyclic aromatic hydrocarbons (PAHs), and some inorganic compounds.

3.1 SOILS

Constituents typically associated with the former SGP and ATC operations were detected in soil samples at depths up to 80 feet below ground surface that include Volatile Organic Hydrocarbons (VOCs), Semivolatile Organic Hydrocarbons (sVOCs), PAHs, and inorganic compounds. Nonaqueous Phase Liquid (NAPL) or "free phase" product as a black tarry substance, and "free phase" coal were observed in some soil samples. Studies reveal the presence of many of these chemicals with PAHs being the widest spread and in the highest concentrations. Figure 7 shows the areas where the carcinogenic PAHs exceed the MTCA Method A cleanup level. Figures 5 and 6 show the depth of contamination in two cross-sections. Other organic and inorganic chemicals have been found in the same areas where the PAHs are found. Table 3 shows the frequency and maximum concentrations of the different constituents detected in site soils.

3.2 GROUND WATER

The evaluation of ground water quality is based on several samples collected from 28 monitoring wells installed in three aquifer zones, located adjacent to and below the areas of affected soil (see Figure 4). Ground water inside the area of soil contamination as outlined in Figure 7 is assumed to be contaminated.

Ground water data analyzed are primarily from monitoring wells constructed outside of the areas where NAPL or soil contamination was observed. Table 4 shows the frequency of the constituents detected. Only low levels of contaminants that do not exceed the cleanup levels were detected.

Evaluation of natural attenuation parameters in ground water shows that natural attenuation processes such as aerobic biodegradation and oxidation are occurring at the Site. These indicators, presented in the Second Supplemental and Remedial Investigation Report, include free carbon dioxide, sulfate, methane, and nitrogen and were measured in wells screened within the source area, near the source area, below the source area, and away from the source area,

3.3 SURFACE WATER AND SEDIMENT

No constituents above MTCA cleanup levels were identified in sediments and in surface water samples from the Spokane River. Table 5 shows the analytical results compared with the applicable criteria.

3.4 CONTAMINANT TRANSPORT

The contamination at the Site is an area of soils containing constituents related to coal and coal tar with pockets of NAPL or free-phase waste coal tar in the surface and subsurface soils. Ground water within this NAPL affected area is contaminated. Current data show that ground water contamination is not migrating out of the affected area at rates that would result in cleanup level exceedances. The limited extent of ground water contamination detected outside of the impacted soil areas indicate that the source materials generally have low solubilities, and any constituents that may be partitioning into ground water are rapidly attenuating though natural physical, chemical, and biological natural attenuation processes.

Ground water flow is predominantly from the river to the Site and down into the intermediate aquifer for most of the year. During periods of peak runoff in the late spring to early summer, the ground water gradient has been observed to be toward the Spokane River.

3.5 RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

The Site is zoned and currently used for commercial or industrial purposes. Commercial purposes may include dwelling units. The owners have filed an application with the City of Spokane for a proposed mixed development use at the Site that includes an apartment dwelling.

The following are potential exposure pathways identified for the Site:

<u>Soil</u>

Human contact (dermal, incidental ingestion, or inhalation) with contaminated soils including exposure to workers and visitors on Site.

Transport of constituents in site soils to ground water at concentrations that could cause exceedances of ground water cleanup levels.

<u>Ground Water</u>

Human exposure through ingestion, inhalation, or dermal contact to site constituents in ground water from its use as a potable water source;

Human ingestion of water or aquatic organisms in the Spokane River affected by site constituents in ground water discharging to the Spokane River;

Exposure of aquatic biota to constituents by exposure to constituents in Site ground water discharging to the Spokane River.

4.0 CLEANUP STANDARDS

The two primary components of cleanup standards are (1) cleanup levels and (2) points of compliance. Both must be established for each site. Cleanup levels determine at what concentration a particular hazardous substance does not threaten human health or the environment. The goal is to address all material above those concentrations with some remedy that prevents exposure to those materials. Points of compliance designate the locations on the site where the cleanup levels must be met.

4.1 CLEANUP LEVELS

Developing cleanup levels involves several steps: determining which method to use; determining the reasonable maximum exposure scenario; developing cleanup levels for individual substances in individual media, taking into account potential cross-media contamination; determining what substances contribute to overall risks at the site (indicator hazardous substances); evaluating concentrations of single hazardous substances in single media (i.e. soil or water) to select indicators; and, adjusting individual concentration levels downward to meet site total cancer risk and hazard index limits specified in MTCA.

There are three methods used to determine cleanup levels under MTCA: Methods A, B, and C. Method A is used for routine sites or sites that involve relatively few hazardous substances which have available numerical levels. Method B is the standard method for determining cleanup levels and is applicable to all sites. Method C is a conditional method used when a cleanup level under Method A or B is technically impossible to achieve or may cause greater environmental harm. Method C may also be applied to qualifying industrial properties. Cleanup level methods are established for ground water, surface water, soil, and air.

WAC 173-340-708 states that "when defining cleanup requirements at a site that is contaminated with a large number of hazardous substances, the department may eliminate from consideration those hazardous substances that contribute a small percentage of the overall threat to human and the environment. The remaining hazardous substances shall serve as indicator hazardous substances for purposes of defining site cleanup requirements."

The factors to be considered in determining whether or not a substance should be retained for an analysis of overall site risk or hazard are:

1. The frequency of detection of the substance. It may be appropriate to eliminate compounds, which are detected with a frequency of 5 % or less.

2. The concentration of the substance. Substances with concentrations marginally above their cleanup standards may not be important in considerations of overall hazard and risk.

3. The toxicity of the substance. It may be suitable to delete substances of low toxicity.

4. Environmental fate. Substances, which readily degrade in the environment, may not be of importance to overall hazard or risk. Conversely, those with highly toxic degradation products should be included in an analysis of overall hazard and risk.

5. The natural background levels of the substance. MTCA regulates risks due to substances found at contaminated waste sites. The risks caused by substances at background concentrations are not addressed by MTCA.

6. The mobility and potential for exposure to the substance. Substances may be eliminated if the values for these factors are low.

Limitations of analytical chemistry are also considered. The practical quantitation limit (PQL) for detection of a substance may be greater than its risk-based cleanup level. The risk-based cleanup level is used in the analysis of the over-all site hazard and risk in such cases, but the regulatory limit for that substance will be the PQL. Improvements in analytical technology will result in readjustment of the regulatory limit to match the new, lower PQL during any subsequent evaluation of the Site.

Once a list of substances to be assessed for cumulative risks and hazards has been developed, total site risk is calculated based upon the established cleanup levels. The total cancer risk for a site must not exceed 1×10^{-5} and the hazard index, calculated for chemicals with similar non-carcinogenic toxicity endpoints, must not exceed 1.

4.2 SITE CLEANUP LEVELS CRITERIA

4.2.1 Ground Water

Ecology has determined that the highest beneficial use of ground water at this Site is drinking water. Exposure to hazardous substances via ingestion of drinking water and other domestic uses represents the reasonable maximum exposure, and standards developed to protect these uses will be protective of all other uses. Method B is the appropriate method for developing cleanup levels for ground water. The Site is also located along the shores of the Spokane River. During periods of peak runoff in the late spring to early summer, the ground water gradient has been observed to be toward the Spokane River. Therefore, ground water must not violate surface water cleanup levels at the point of compliance. The Spokane River is classified as a Class A fresh surface water of the state under Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington. Characteristic uses for Class A water bodies include: domestic, industrial, agricultural water supply; stock watering; fish and shellfish; wildlife habitat; recreation, and commerce and navigation.

The Method B ground water cleanup levels are developed from:

1. Drinking water criteria that include:

   - Applicable or Relevant and Appropriate Requirements (ARARs) including Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs). An ARAR value can be used as a cleanup level if it is sufficiently protective of human health and environment (i.e., the cancer risk is less that 1×10^{-5} or if the hazard quotient is less than 1).

   - Formula values based on human health under WAC 173-340-720(3)(ii) for those substances for which sufficiently protective, health-based criteria have not been established under ARARs.

2. Levels to protect surface water that include (based on WAC 173-340-730):

   - All water quality criteria published under Chapter 173-201A WAC, Water Quality Standards for Surface Water of the State of Washington;

   - The EPA Ambient Water Criteria (AWQC) which are based on the protection of aquatic organisms (acute and chronic criteria) and human health published pursuant to section 304 of the Clean Water Act. These human health criteria are promulgated in the National Toxics Rule (NTR);

   - Formula values under WAC 173-340-730(3)(iii) for hazardous substances which sufficiently protective, health-based criteria or standards have not been established under ARARs;

   - For surface waters which represent a source or potential future source of drinking water, concentrations which are anticipated to result in no adverse impacts to human health as established in accordance with WAC 173-340-720(3), the Method B drinking water levels. These are the same criteria listed under #1.

3. Method A cleanup levels may be used for substances that do not have Method B levels. Method A levels are not included in the overall site risk calculations.

4. Levels based on natural or area background of the hazardous substances are also considered. Background levels are not included in the overall site risk calculations.

The Practical Quantitation Limits (PQL) for a substance may be greater than the health-based number. In such cases, the cleanup level becomes the PQL. If the PQL is lowered during cleanup of the site or during periodic review, the regulatory limit will be adjusted downward. However, total site risk will be calculated using actual health based levels.

Table 1 shows the applicable cleanup levels criteria for chemicals detected in site ground water. The most stringent of these criteria or the background concentration whichever is higher is the selected preliminary Method B cleanup level for each individual substance. PQLs are not considered until after the risk calculations. Soil cleanup levels that will be developed hereafter shall be protective of these ground water Method B cleanup levels.

4.2.2 Soils

The Site is currently zoned light industrial. However, because of surrounding urban revitalization in the area and preliminary plans for development expressed by SRP, Method B cleanup levels are proposed. Method B soil cleanup levels for soils are developed from:

- Concentrations established under applicable state and federal laws;
- Formula values based on human health under WAC 173-340-740(3)(iii) for which health-based criteria or standards have not been established under applicable state and federal laws.
- Concentrations which will not cause contamination of ground water at levels which exceed Method B ground water cleanup levels. For individual substances, concentrations that are equal or less than 100 times the ground water cleanup level is protective of ground water at the site unless demonstrated otherwise;

Table 2 shows the cleanup levels criteria for site soils. The soil concentration that is considered to be protective of ground water is 100 times the Method B ground water cleanup level developed in Table 1. The most stringent of these criteria or the background concentration whichever is higher is the preliminary Method B cleanup level for soil.

4.2.3 Surface Water

The Spokane River is a Class A Surface Water of the State. Method B Cleanup levels for surface water shall be at least as stringent as all of the following:

- Concentrations established under applicable state and federal laws including: All water quality criteria published in the water quality standards for surface waters of the state of Washington, Chapter 173-201A WAC; and, Water quality criteria based on protection of aquatic organisms (acute and chronic criteria) and human heal published pursuant to section 304 of the Clean Water Act.
- Concentrations which are estimated to result in no adverse effects on the protection and propagation of wildlife, fish, and other aquatic life;

- For hazardous substances for which sufficiently protective, health-based criteria, or standards have not been established under applicable state and federal laws, formula values based on protection of human health under WAC 173-340-730(3)(iii) or for surface waters which represent a source of potential future source of drinking water, concentrations established under WAC 173-340-72(3).

Since the Spokane River is a Class A Surface Water of the state, the cleanup levels criteria are the same as those presented in Table 1.

4.2.4 Sediments

Ecology is in the process of establishing cleanup levels for freshwater sediments. There are currently no sediments cleanup levels under MTCA. Ecology has however identified freshwater sediment quality values (FSQV) for a number of constituents as shown in Table 5. These values represent a currently available criteria for development of preliminary cleanup levels for sediments.

4.3 SITE INDICATORS

4.3.1 Soil

Table 3 shows the screening for soil indicators. TPH, PAHs, carbazole, and inorganic compounds typically associated with coal tars (arsenic, barium, cadmium, lead, mercury, and selenium) are identified as the indicator substances. Benzene and styrene are not considered indicators, the frequency of detection being near 5% with only 6 % exceeding cleanup levels.

4.3.2 Ground Water

The data considered for ground water analysis were all collected from wells outside of the area of contamination. The frequency of detection and maximum concentrations based on the results are shown in Table 4. These show that ground water outside of the contaminated area has concentrations all below the cleanup levels.

Ground water samples collected from borings that went through contaminated soils were considered to be not representative of the ground water. Since all soil indicator substances concentrations exceed those that are protective of ground water, as indicated in Table 3, ground water inside the soil impacted area is assumed to be contaminated. All soil indicators are considered to be ground water indicators.

4.3.3 Surface Water/Sediments

Table 5 shows the maximum concentration measured in surface water and sediments. The maximum concentration of beryllium exceeds the Method B cleanup level for surface water. Since beryllium is not a ground water indicator for the Site, it is not considered a surface water indicator. The maximum concentration of lead also exceeds the Method B cleanup level for surface water. This concentration is typical of lead concentrations measured in the River which have been shown to vary seasonally and exceed standards during certain times of the year. Lead is not considered an indicator for surface water.

There are no indicators for surface water and sediment.

4.4 SITE CLEANUP LEVELS AND CANCER RISK/HAZARD QUOTIENT

Cleanup levels are to be set for soils and ground water. Table 6 shows the cleanup levels with the cancer risk and hazard quotients calculations for the Site. As shown, the resulting total Site cancer risk is less than $1x10^{-5}$ and the Hazard Index for each end effect is less than or close to 1. The proposed cleanup levels meet the MTCA cancer risk and hazard index criteria; no downward adjustment of the levels would be necessary.

These cleanup levels in Table 6 levels are compared with the PQLs in Table 7. If the PQL is higher, the PQL becomes the cleanup level. For both the soils and ground water, the cleanup levels for all of the cPAHs are all below the PQL. Thus, for ground water, the Method A cleanup level for total cPAHs will be used since this is based on Method B concentrations but modified based on analytical considerations. For soils, because of the low solubility of cPAHs, the Method A cleanup level for cPAHs in soil is also adequately protective and will be used.

Table 7 shows the final Site cleanup levels.

4.5 POINTS OF COMPLIANCE

The Point of Compliance is defined in MTCA as the point or points where cleanup levels established in accordance with WAC 173-340-720 through WAC 173-340-760 shall be attained (WAC 173-340-200). Once those cleanup levels have been attained at that point, the site is no longer considered a threat to human health and the environment.

4.5.1 Soil

For soil cleanup levels based on protection of ground water, the point of compliance shall be established in the soils throughout the Site under WAC 173-340-740(6).

For soil cleanup levels based on human exposure via direct contact, the point of compliance shall be established in the soils throughout the Site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of the soil that could be excavated and distributed at the soil surface as a result of site development activities.

4.5.2 Ground Water

For ground water, WAC 173-340-720(6) governs the definition of the point of compliance. The point of compliance in ground water is established throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth, which could potentially be affected by the Site.

If hazardous substances remain contained on site, the department may approve a conditional point of compliance as close as practicable to the source of hazardous substances, not to exceed the property boundary.

At sites where the affected ground water flows into nearby surface water, the cleanup level may be based on protection of surface water. At these sites, the department may approve a conditional point of compliance that is located within the surface water as close as technically possible to the points or points where ground water flows into the surface water. Conditional points of compliance may be approved only under the conditions specified in WAC 173-340-720(6)(d).

5.0 PROPOSED CLEANUP ACTIONS

5.1 REMEDIAL ACTION OBJECTIVES

The Site remedial action objectives are intended to protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. They are developed considering the characteristics of the contaminated medium, the characteristics of the hazardous substances present, migration and exposure pathways, and potential receptor points.

Based on the remedial investigation results, soils and ground water are the contaminated media at the Site. The volume of impacted soil at the Site, based on exceedances of the cPAH cleanup level, is estimated to be 92,100 cubic yards. At least 2.5 feet of fill material covers the majority of the contaminated soils except for the surface or near surface soils at the ATC property. Fill materials range up to approximately 30 feet in thickness, and are thickest on the western portion of the Site and near the river. The volume of contaminated soil for the top 5 feet is estimated at 8,900 cubic yards while the estimated contaminated soil volume above the ground water level is estimated to be 24,630 cubic yards. The majority of the impacted soil is below the ground water table (see Figures 5 and 6); 67,470 cubic yards of contaminated soil or around 73% of the total is in ground water.

Mobile contaminants leaching into ground water at the Site undergo natural attenuation. Current data show that contaminants are found at very low levels in the surface water and sediments in the Spokane River, and in ground water surrounding the contaminated area. This condition is unlikely to change unless there is an increase or significant change in ground water flow or hydraulic gradient, disturbance of the area occupied by the contaminants, or increase in concentrations in ground water at or near the source due to chemical changes.

The remedial action objectives (RAOs) for the Site are:

- Prevent human exposure (direct contact, ingestion, and inhalation) to contaminated soils at the Site.
- Minimize the leaching of contaminants from soils to ground water and surface water.
- Prevent erosion of impacted soils to the Spokane River.
- Prevent ingestion and exposures (direct contact, ingestion, and inhalation) to contaminated ground water.

- Prevent changes in hydrogeologic conditions that will likely cause migration of contaminated ground water to the Spokane River or to areas outside of the impacted soils area in concentrations that exceed cleanup standards.

- Ensure that Spokane River is not impacted by any future significant increase in mass flux of contaminants through storm water migration.

- Prevent contaminated ground water, with concentrations above cleanup levels, from migrating beyond the conditional point of compliance established in accordance with WAC 173-340-720(6)(c).

- Ensure that NAPL is not mobilized.

5.2 SUMMARY OF FEASIBILITY STUDY CLEANUP ALTERNATIVES

Remedial technologies that are applicable to soils and ground water were evaluated in the Feasibility Study Report, GEI Consultants, Inc., 2000. A preliminary screening phase eliminated technologies that were not implementable at the Site. The technologies that were considered for implementation to site soils were:

- Institutional Controls/Access Restrictions

- In-situ Containment Technologies/Process Options
    - Capping
    - Shallow slurry wall
    - Jet grout wall

- In-situ Treatment Technologies/Process Options
    - Solidification/stabilization
    - Bioremediation
    - Streambank bioengineering

- Ex-situ Treatment Technologies/Process Options
    - Excavation
    - Off-site or on-site LTTD
    - Landfilling

The ground water technologies retained were:

- Institutional Controls/Access Restrictions

- Ground Water Monitoring

- Containment Technologies/Process Options

  - Capping
  - Shallow slurry wall
  - Jet grout wall

- In-situ Treatment Technologies/Process Options

  - Natural attenuation
  - Bioremediation/air sparging

- Ground Water Extraction Technologies/Process Options

Remedial technologies/process options were combined to develop remedial alternatives for the Site. After an initial screening of the alternatives, five alternatives (A through E) were retained for detailed analysis according to MTCA criteria. Four of the alternatives rely on containment with one alternative involving partial removal of contaminated soils. The removal or treatment in place of all of the contaminated soils that reach 80 feet in depth, most of which is in ground water, has been determined to be not feasible due to concerns regarding implementability, mobilization of the contaminants, safety, management of a large volume of water, and cost.

5.3 CLEANUP ACTION ALTERNATIVES

5.3.1 Alternative A: Limited Soil Capping, Natural Attenuation, Ground Water Monitoring, and Institutional Controls

This alternative consists of capping a limited portion of the ATC property with 2 feet of crushed stone, gravel or other select fill where surface or near surface contamination is present. The area proposed for capping is limited to an approximate 8,500 square feet area located in the west portion of the former ATC area, specifically along the roadway traversing the west portion of the ATC area and the areas between and immediately adjacent to the two buildings. Natural attenuation, as shown by data from the RI Report, prevents the migration of contaminated ground water off-site or to the Spokane River at rates that could cause exceedances to cleanup levels. Long-term ground water monitoring will determine if contaminants continue to be mostly contained/destroyed inside the contaminated area. Institutional controls will include deed restrictions that will prevent ground water use and land use restrictions in order to prevent unacceptable exposures to contaminants and to prevent further migration of contaminants.

5.3.2 Alternative B: Low Permeability Cap, Natural Attenuation, Ground Water Monitoring, and Institutional Controls

This alternative involves installing a low permeability cap, such as asphalt or a High Density Polyethylene (HDPE) flexible membrane liner system. A stormwater drainage and disposal system would be required to control surface water. Natural attenuation, ground water monitoring, and institutional controls would be the same elements as in Alternative A.

5.3.3 Alternative C: Shallow Excavation of Soils and Filling to 15 Feet Over the Site, Natural Attenuation, Ground Water Monitoring, and Limited Institutional Controls

This alternative would consist of excavating impacted soils to an approximate depth of 1 foot above the seasonal high groundwater table (or approximately 10 feet below grade), disposal or thermal treatment of the soil off Site, covering the remaining contaminated soil with 15 feet of imported (clean) fill. Natural attenuation, ground water monitoring would be conducted as in Alternative A. Institutional controls would include deed restrictions that would prevent ground water use and land use restrictions in order to prevent unacceptable exposures to contaminants and prevent further migration of contaminants. There would be no restrictions on ground intrusive activities to the top 15 feet of soils.

5.3.4 Alternative D: Shallow Barrier Wall Installed Between the Site and River, Limited Soil Capping, Natural Attenuation, Ground Water Monitoring, and Institutional Controls

This alternative includes all the elements of Alternative A plus the installation of a shallow, hanging barrier wall parallel to the Spokane River along the Site boundary. A hanging barrier wall is not keyed into a low permeability layer or aquitard at the bottom of the aquifer.

5.3.5 Alternative E: Streambank Bioengineering, Limited Soil Cap, Natural Attenuation, Ground Water Monitoring, and Institutional Controls

This is Alternative A with the addition of streambank bioengineering that would consist of placing a concrete revetment mat or HDPE geocell layer, or similar technology as determined in the Engineering Design Report, along an appropriate length of shoreline, backfilling the mat or layer with soil, and establishing a vegetative cover within the backfill soil.

6.0 CLEANUP ACTION CRITERIA

The Model Toxics Control Act Cleanup Regulation describes the requirements for selecting cleanup action (WAC 173-340-360). It specifies the criteria for approving cleanup actions, the order of preference for cleanup technologies, policies for permanent solutions, the application of these criteria to particular situations, and the process for making these decisions.

6.1 THRESHOLD REQUIREMENTS [WAC 173-340-360(2)]

All cleanup actions shall:

1. Protect human health and the environment.

2. Comply with cleanup standards.

3. Comply with applicable state and federal laws.

4. Provide for compliance monitoring.

6.2 OTHER REQUIREMENTS [WAC 173-340-360(3)]

The selected cleanup action must also:

1. Use permanent solutions to the maximum extent practicable.

2. Provide for a reasonable restoration time frame.

3. Consider public concerns raised during public comment on the draft cleanup action plan.

6.3 CLEANUP TECHNOLOGY HEIRARCHY [WAC 173-340-360(4)]

Cleanup of hazardous waste sites shall utilize technologies that minimize the amount of untreated hazardous substances remaining at a site. The following technologies shall be considered in order of descending preference:

1. Reuse or recycling;
2. Destruction or detoxification;
3. Separation or volume reduction followed by reuse, recycling, destruction, or detoxification of the residual hazardous substances;
4. Immobilization of hazardous substances;

5. On-site or off-site disposal at an engineering facility designed to minimize the future release of hazardous substances and in accordance with applicable state and federal laws;
6. Isolation or containment with attendant engineering controls;
7. Institutional controls and monitoring.

6.4 CRITERIA FOR PERMANENT SOLUTIONS [WAC 173-340-360(5)]

When selecting a cleanup action, preference shall be given to permanent solutions to the maximum extent practicable. The following criteria are used to determine whether a cleanup action is permanent to the maximum extent practicable:

- Overall protection of human health and the environment including the degree to which existing risks are reduced, time required to reduce the risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, the degree the cleanup action may perform to a higher level than specified cleanup standards, and improvement of the overall environmental quality.

- Long term effectiveness including degree of certainty that the alternative will be successful, long-term reliability, magnitude of residual risk, and effectiveness of controls required to manage treatment residues and wastes.

- Short-term effectiveness including protection of human health and the environment during construction and implementation of the alternative, and the degree of risk to human health and the environment prior to attainment of cleanup standards.

- Permanent reduction of toxicity, mobility and volume of hazardous substances including adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substances releases and sources of releases, degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.

- Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction, operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.

- Cleanup costs. A cleanup action shall not be considered practicable if the incremental cost of the cleanup action is substantial and disproportionate to the incremental degree of protection it would achieve over a lower preference cleanup action. When selecting from among two or more cleanup action alternatives, which have an equivalent level of preference, preference may be given to the least cost alternative.

- The degree to which community concerns is addressed.

7.0 EVALUATION OF PROPOSED REMEDIAL ALTERNATIVES

7.1 THRESHOLD CRITERIA

All the proposed alternatives protect human health and the environment, comply with cleanup standards, comply with applicable state and federal laws, and provide for compliance monitoring. All proposed alternatives rely on containment measures, natural attenuation, institutional controls, and ground water monitoring with one alternative providing for a partial removal and treatment of contaminated soils.

The 2-feet of gravel in the ATC area and the existing fill material in the former SGP property that cover the contaminated soils in Alternatives A, D, and E would serve as a barrier to prevent direct exposure to contaminated soils. The low permeability cap over the contaminated area in Alternative B would further prevent direct exposure and reduce the amount of infiltration through the impacted soils. The stormwater drainage system in Alternative B would prevent precipitation surface runoff from infiltrating into the contaminated soils. In Alternative C, after remediation is complete, direct contact with contaminated soils from the surface to near the water table would be further reduced beyond Alternatives A, D, and E, by the presence of 15 feet of clean soil.

All alternatives rely on natural attenuation to prevent migration of chemicals of concern in ground water at rates that would cause exceedances of cleanup levels outside of the impacted soil area or in the Spokane River. A ground water monitoring program would be used to identify changes in site conditions as a result of contamination left on Site and to assess compliance at appropriately selected wells that would ensure that natural attenuation continues to occur and cleanup levels are not exceeded at these wells.

Long-term institutional controls that restrict ground water use to prevent exposure to contaminated ground water would be required for all alternatives. Institutional controls would also restrict activities on the Site that may result in the release or exposure of contaminated soil that was contained as part of the cleanup action; restrictions on such activities would be less under Alternative C since soil cleanup levels would be met for the top 15 feet.

The barrier wall in Alternative D and the bioengineered slope in Alternative E would serve to reduce the rapid interaction between the groundwater and the river water and thus reduce or delay migration of Site groundwater to the Spokane River. The bioengineered slope of Alternative E would also provide a combination of erosion control and riparian corridor enhancement.

Soil cleanup standards would be met from the ground surface to fifteen feet below the ground surface under Alternative C. All alternatives would comply with soil cleanup standards under WAC 173-340-740(6)(d) that says:

> The department recognizes that, for those cleanup actions selected under WAC 173-340-360 that involve containment of hazardous substances, the soil cleanup levels will typically not be met at the points of compliance in (b) and (c) of this subsection. In these cases the cleanup action may be determined to comply with cleanup standards, provided that the compliance monitoring program is designed to ensure the long-term integrity of the containment system, and the other requirements for containment technologies in WAC 173-340-360(8) are met.

Periodic inspections and maintenance of the gravel and fill material cover under Alternatives A, D, and E, and of the low permeability cover in Alternative B would ensure the long-term integrity of the containment system. Ground water cleanup standards would be met at the conditional points of compliance to be located as close as practicable to the source of hazardous substances, not to exceed the property boundary as specified in WAC 173-230-720(6)(c).

All alternatives would comply with the applicable state and federal laws (ARARs). These ARARs are identified in the FS Report.

All alternatives provide for compliance monitoring.

7.2 OTHER REQUIREMENTS

7.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

When selecting a cleanup action, preference is given to permanent solutions to the maximum extent practicable. A permanent solution is one in which cleanup standards can be met without further action required at the site. Ecology recognizes that permanent solutions may not be practicable for all sites. The criteria for evaluating whether a solution is permanent to the maximum extent practicable are discussed individually below and a comparison of the alternatives with the criteria is shown in Table 8. This Table uses a scale of 1 to 10 with 10 being the most favorable.

7.2.1.1 Overall Protection of Human Health and the Environment

The current potential human health risks identified at the Site are attributed to soil exposure and consumption of ground water. Future risks are possible due to the potential migration or exposure of contamination left on Site. The Site remedial action objectives provide for preventing or controlling current risks as well as preventing/monitoring future migration of contaminants to the Spokane River and to ground water outside the contaminated area. An evaluation of the ability of each alternative to meet RAOs is included in Table 9.

All five alternatives would prevent direct human exposures to contaminated soils. Direct contact with contaminated soils would be prevented by the gravel cover or existing fill materials under Alternatives A, D, and E. Alternative B would prevent direct contact to contaminated soils exposure through the installation of a low permeability cap. Shallow excavation of soil and filling to 15 feet with clean soils provided for in Alternative C would represent the reasonable estimate of depth of soil that could be excavated and distributed at the soil surface as a result of site development activities. All alternatives provide for deed restrictions that would reduce risk to human health by implementing ground water and land uses restrictions that could cause unacceptable risk to human health including risks to workers or visitors at the Site.

Of the five alternatives presented, Alternative C is the most protective of human health and the environment. The least protective is Alternative A. Alternatives D and E rank slightly higher than A; although off-site transport of contaminants is not occurring at levels that are considered significant under current conditions, these alternatives include elements that would prevent erosion of contaminated soils and may mitigate future off-site migration to the Spokane River. Alternatives B and C would reduce leaching of contaminants from the soils to ground water. However, because most of the contaminated soil is in ground water, the reduction of leaching is not expected to significantly impact overall water quality at the site under current conditions. All alternatives rely on natural attenuation to prevent off-site transport of contaminants in ground water at rates that are considered significant. Ground water monitoring would be used to identify changes in site conditions relating to the fate and transport of contaminants.

7.2.1.2 Long Term Effectiveness

After completion of soil removal and treatment, the partial removal of contaminated soils in Alternative C would provide a greater level of long-term effectiveness over the other alternatives in terms of long-term dermal contact with soil in the upper 15 feet of the Site. Alternative B, which provides for a low permeability cap to prevent exposure to contaminated soils and to minimize leaching by preventing infiltration, is the next highest in terms of long-term effectiveness. Alternatives D and E, which address the potential for future migration to the river, are slightly higher than Alternative A. All alternatives rely on institutional controls to prevent consumption of ground water and to prevent exposures to contaminated soils left on site and to protect the integrity of the containment remedy. Long-term ground water monitoring, maintenance of the cover/cap system would be designed to provide long-term success.

7.2.1.3 Short Term Effectiveness

Alternative A has the highest degree of short-term effectiveness because there is little to no new exposure or disturbance to contaminated soils or ground water. Alternative C has the lowest degree of short-term effectiveness because the excavation and off-site transportation and treatment of contaminated soils involve a level of short-term risk to site workers; these impacts could be minimized and mitigated through a variety of measures. Alternatives D and E would involve risks to worker during construction of the barrier wall or streambank bioengineering.

7.2.1.4 Permanent Reduction in Toxicity, Mobility, and Volume of Hazardous Substances

Alternative C that involves shallow soil excavation and off-site treatment of soils would provide the maximum reductions in toxicity, mobility, and volume among the proposed alternatives. In all of the alternatives, natural attenuation provides some measure of reduction in the toxicity of the ground water. Limited capping provided under Alternatives A, D, and E would provide reduction of exposure but not the reduction in mobility since infiltration is not being prevented. The low permeability cap of Alternative B would reduce the mobility and exposure to toxicity to a greater degree than Alternatives A, D, and E.

7.2.1.5 Implementability

Alternative A is the easiest to implement with Alternative C the most difficult to implement.

7.2.1.6 Cleanup Costs

Table 10 shows the cleanup costs. The costs developed for this document were obtained from the Feasibility Study Report and are intended for comparison purposes only.

7.2.2 Provide for a Reasonable Restoration Time Frame

Criteria for establishing a reasonable restoration time frame are outlined in WAC 173-340-360(6). All proposed alternatives require some level of on-site containment and rely on natural attenuation to reduce concentrations in ground water. All alternatives are consistent with the current use of the site; potential exposures due to future site use or development are addressed through institutional controls. All alternatives have the ability to monitor migration of contaminants from the Site with Alternatives D and E having the slight ability to mitigate future migration to the river. Alternative C ranks higher over the other alternatives in terms of providing for a reasonable restoration time frame because of the partial removal of soils and less restriction on land use. All other alternatives rank almost equally in terms of providing for a reasonable restoration time frame.

7.2.3 Consider Public Concerns Raised During Public Comment on the Draft Cleanup Action Plan

Ecology provides the public for an opportunity to review and comment on the Draft Cleanup Action Plan during a 30-day public comment period

7.3 CLEANUP TECHNOLOGY PREFERENCE

All proposed alternatives rely on containment measures, institutional control, and monitoring. Natural attenuation occurring in ground water constitutes destruction of the hazardous substances. Alternative C ranks the highest as it includes shallow soil removal and off-site treatment. All other alternatives rank equally since all involve isolation or containment with attendant engineering controls; and institutional controls and monitoring.

8.0 SITE CLEANUP ACTION

8.1 SELECTED CLEANUP ACTION

All the five alternatives evaluated in the FS rely on containment measures with Alternative C providing for partial removal of contaminated soils. MTCA recognizes that permanent solutions may not be practicable for all sites but requires that the cleanup action must satisfy the criteria outlined in WAC 173-340-360(5)(d) used to determine whether cleanup is "permanent to the maximum extent practicable". Table 8 shows that in terms of environmental benefit, Alternative C scores the highest. However, Alternative C ranks the lowest in terms of permanence to the maximum extent practicable because it is more difficult to implement and because of the cost. As per WAC 173-340-360(5)(d)(vi), a cleanup action shall not be considered practicable if the incremental cost of the cleanup action is substantial and disproportionate to the incremental degree of protection it would achieve over a lower preference cleanup action. Table 10 shows the high cost of Alternative C over the other alternatives. Alternatives B and E score the highest in terms of permanence to the maximum extent practicable as shown in Table 8. Alternative E, which costs less than Alternative B, includes erosion control as a component of the cleanup. Alternative B provides for a low permeability cap and a stormwater management that would reduce the leaching of contaminants to ground water. Because the low permeability cap is not expected to significantly change ground water quality at the Site, Alternative E is preferred over Alternative B.

Ecology's selected cleanup action is Alternative E, plus a stormwater management system at the Site and clean-capping with a grade to prevent direct contact with contaminated soil and to promote stormwater drainage, as determined in the engineering design report. A stormwater management system is necessary because under the current Site conditions, the infiltration of precipitation surface runoff through the dry wells at the Site adds unnecessary loading and has the potential to impact leaching rates. The selected cleanup action shall consist of the following:

- Covering and bringing to grade the ATC area with clean soil or gravel; periodic inspection and maintenance of the soil or gravel cover.
- Continuing the use of the existing fill in the former SGP area to serve as a barrier that prevents direct contact with contaminated soils; periodic inspection and maintenance of this fill material.
- Abandonment of existing dry wells in the SGP area; stormwater management to reroute stormwater to swales outside the area of contamination or to nearby storm sewers.

- Construction of a streambank bioengineering along the contaminant impacted shoreline of the Spokane River.

- Ground water monitoring.

- Institutional controls to prevent exposure to contamination and to protect the remedy.

- Five-year review to ensure that the remedy continues to provide adequate protection of human health and the environment.

8.2 POINTS OF COMPLIANCE

8.2.1 Soil

The point of compliance for Site soils is in the soils throughout the Site.

8.2.2 Ground Water

The cleanup action relies on containment measures. All practicable methods of treatment are utilized for the Site. Therefore, a conditional point of compliance for ground water which shall be as close as practicable to the source of hazardous substances, not to exceed the property boundary shall be used.

8.3 MONITORING

A compliance monitoring plan, prepared in accordance with the requirements of WAC 173-340-410 shall be prepared to address the following objectives:

1. Protection monitoring. Monitoring will be conducted to confirm that human health and the environment are being protected during construction and operation of the cleanup action.

2. Performance monitoring. Monitoring will be conducted to confirm that the cleanup action has attained cleanup standards and other performance standards.

3. Confirmational monitoring. The long-term effectiveness of the cleanup action will be confirmed through continued monitoring.

8.4 INSTITUTIONAL CONTROLS

Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of the cleanup action or result in exposure to hazardous substances at the Site.

Institutional controls are a vital element of this cleanup action plan to ensure protection of human health and the environment. Institutional controls are required because the selected remedy involves containment and a conditional point of compliance is used for ground water. Institutional controls include: physical measures, such as fences and signs, to limit activities that may interfere with the cleanup action or result in exposure to hazardous substances at the Site; and, legal and administrative mechanisms to limit site use (i.e. restricting use of property for industrials or commercial purposes, restricting disturbance of a cap or use of ground water) and/or to ensure that any physical measures are maintained over time (i.e., inspection and repair of monitoring wells, treatment systems, caps or ground water barrier systems). Appropriate institutional controls would be described in a restrictive covenant on the property that shall be executed and recorded with the register of deeds for the county. The Restrictive Covenant shall run with the land, and be binding on the owner's successors and assigns.

Based on the requirements under WAC 173-340-440(5), the restrictive covenant shall prohibit any activity on the property that may interfere with the integrity of the cleanup action and shall continue protection of human health and the environment. If activities on the property are proposed, they must be approved by Ecology. A draft Restrictive Covenant is included as Appendix A.

8.5 PERMIT REQUIREMENTS

RCW 70.105D.090 exempts remedial actions at a facility conducted under a consent decree, order, or agreed order from the procedural requirements of chapters 70.94, 70.95, 70.105, 75.20, 90.48 and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals. However, the Department shall ensure compliance with the substantive provisions of such permits or approvals.

9.0 EVALUATION OF THE CLEANUP ACTION WITH RESPECT TO MTCA CRITERIA

9.1 EVALUATION WITH RESPECT TO THRESHOLD CRITERIA

9.1.1 Protection of Human Health and the Environment

The selected remedy would reduce the risks posed to human health and the environment by eliminating, reducing or controlling exposures to human and environmental receptors through containment, engineering controls, and institutional controls. The soil and fill materials, that serve as cover to the contaminated soils left on site, along with periodic inspection and maintenance, would prevent direct exposure to the contamination. Stormwater management would reduce concentrated precipitation from locally infiltrating into the contaminated soils. The streambank bioengineering would provide for erosion control and riparian corridor enhancement and locally help dampen rapid interaction between the ground water and the river. Institutional controls include deed restrictions that would prevent the use of contaminated ground water, and that will restrict land use that could result in unacceptable risks to human health and the environment. Long-term monitoring would insure that the remedy remains protective in the future.

9.1.2 Compliance with Cleanup Standards

Soil cleanup standards would be met using containment consistent with the requirements of WAC 173-340-740(6)(c). Compliance monitoring would be designed to ensure the long-term integrity of the containment systems. Ground water cleanup levels would be met at conditional points of compliance to be located as close as practicable to the source of contamination.

9.1.3 Compliance with Applicable State and Federal Laws

The selected cleanup action would meet Applicable State and Federal laws. Applicable laws for the selected remedy are listed in Table 11. Local laws, which may be more stringent than specified state and federal law, will govern where applicable.

9.1.4 Provide for Compliance Monitoring

The selected remedy provides for compliance monitoring. A compliance monitoring plan will be prepared in accordance with the requirements in WAC 173-340-410.

9.2 EVALUATION WITH RESPECT TO OTHER REQUIREMENTS

Ecology has determined that the selected remedy is permanent to the maximum extent practicable. Ecology believes that the selected remedy would provide a reasonable restoration time frame based on the criteria under WAC 173-340-360(6).

Ecology provided the public with an opportunity to review and comment on the Draft Cleanup Action Plan from July 2 to August 1, 2001. Written comments were evaluated and addressed in the Responsiveness Summary dated August 8, 2001.

10.0 IMPLEMENTATION SCHEDULE

Submittal of the following documents for Ecology's review and approval will be required within 120 days of the date of signing the Consent Decree or other instrument implementing this cleanup action plan:

Engineering Design Report
Compliance Monitoring Plan
Institutional Control Plan
Health and Safety Plan

Public notice and opportunity to comment will be provided on these plans.

The Construction Plans and Specifications, and the Operation and Maintenance Plan will be submitted according to a schedule approved in the final Engineering Design Report. A cleanup action report will be submitted no later than 3 months after completion of the cleanup action.

11.0 REFERENCES CITED

Department of Ecology, July 2001, Draft Cleanup Action Plan, Hamilton Street Bridge Site.

Department of Ecology, August 8, 2001, Responsiveness Summary – Draft Cleanup Action Plan, Hamilton Street Site.

EMCON. Focused Remedial Investigation Report ST 290 Southriver Drive Alignment. August 28, 1998.

GEI Consultants, Inc. Feasibility Study Report, Hamilton Street Bridge Site. November 30, 2000.

Geoengineers. Focused Site Assessment, Former American Tar Company Site, Spokane, WA. April 30, 1999.

Landau Associates. Supplemental Investigation, Former Spokane Manufactured Gas Plant, Spokane, WA. January 7, 1999.

Landau Associates. Second Supplemental and Remedial Investigation, Hamilton Street Bridge Site, Spokane, WA. February 9, 2001.

FIGURES

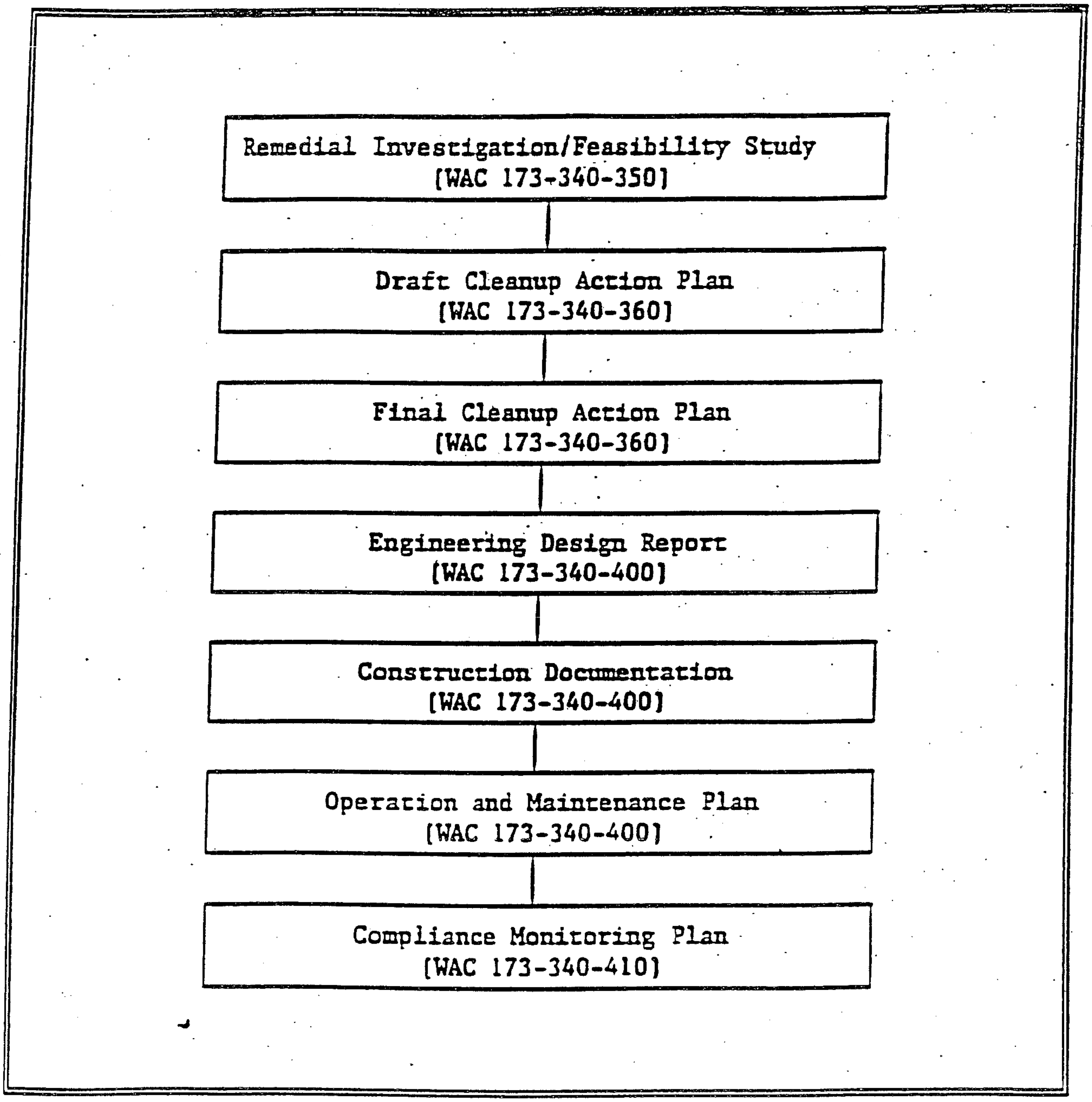
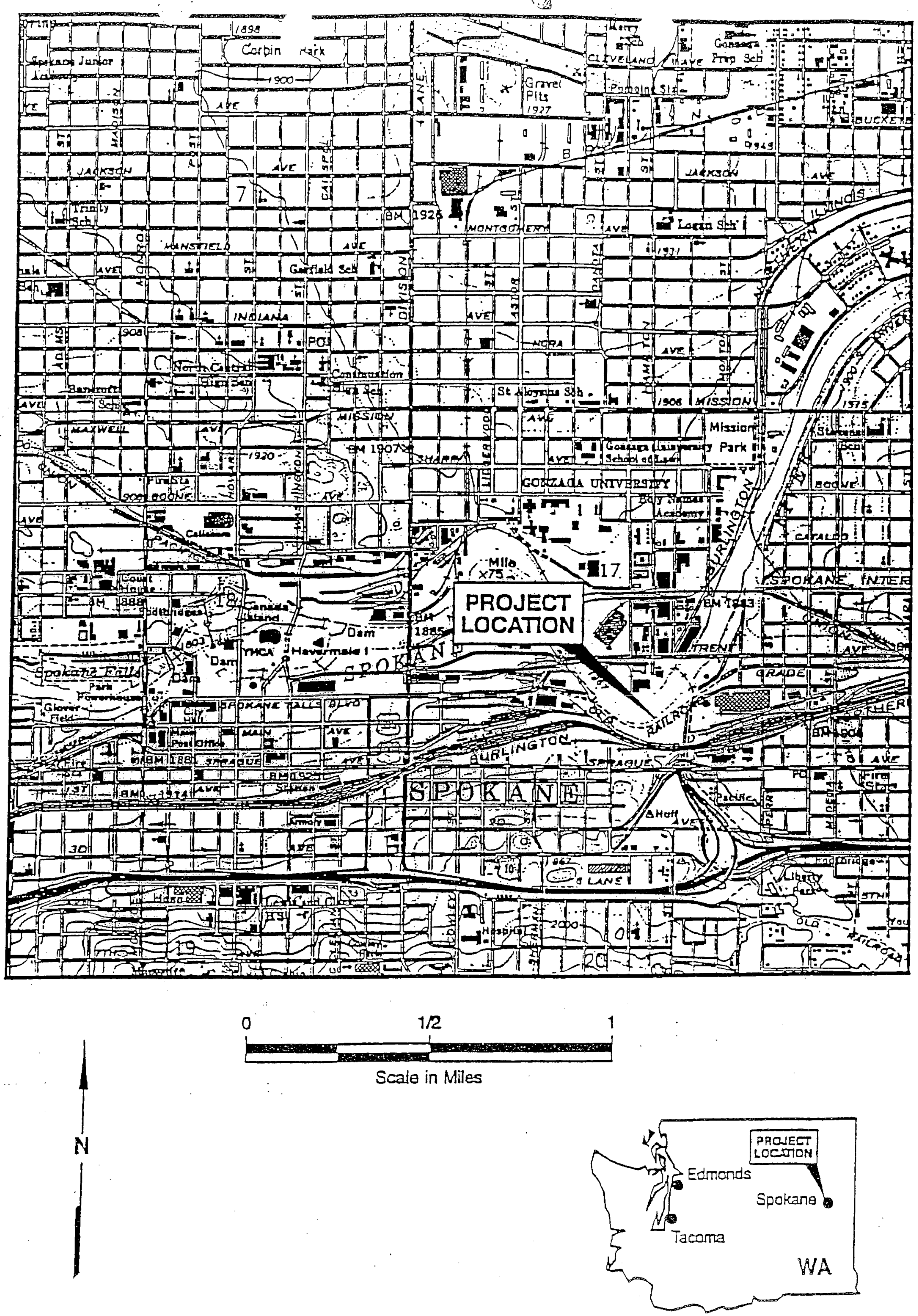


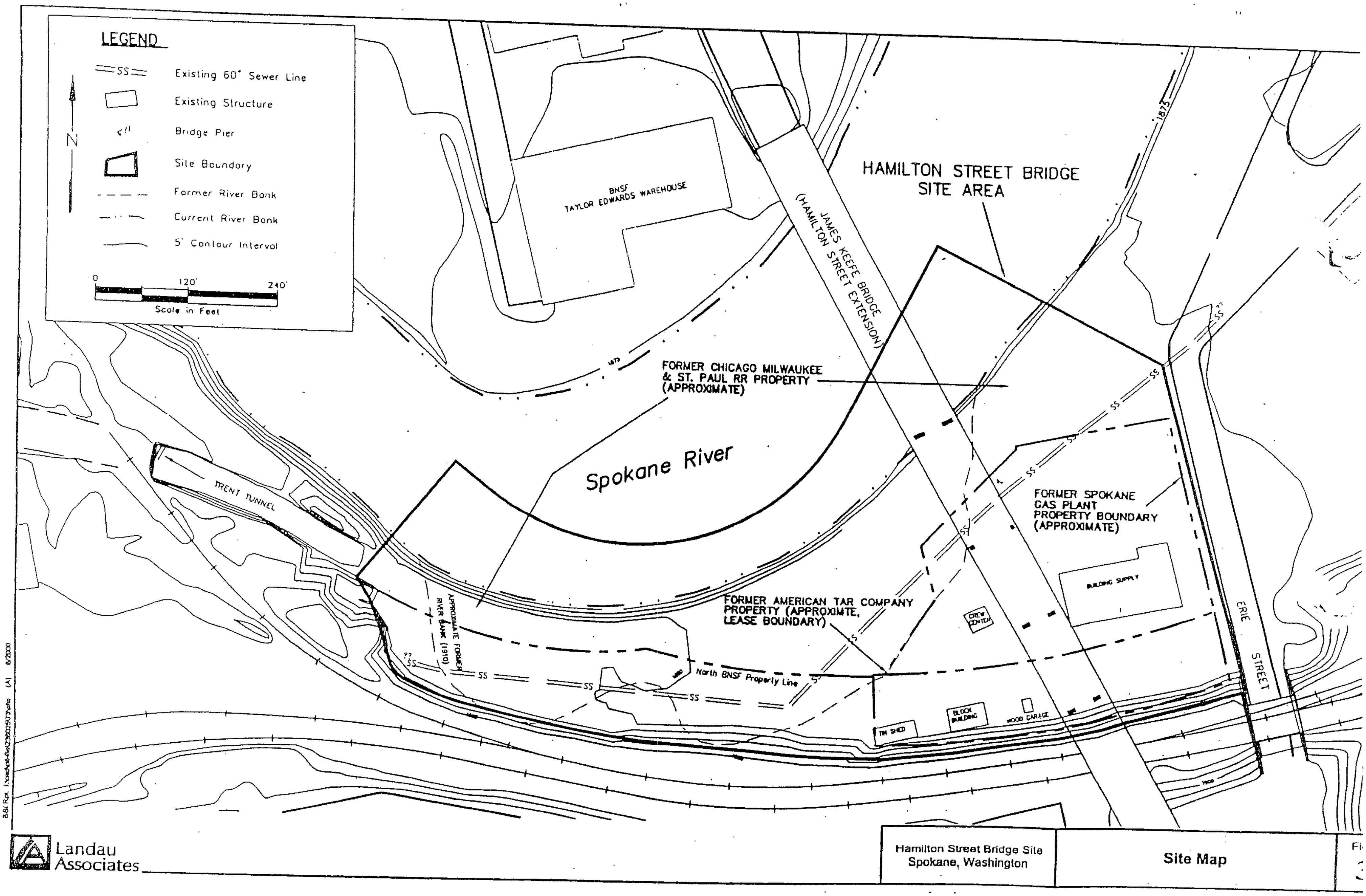
FIGURE 1

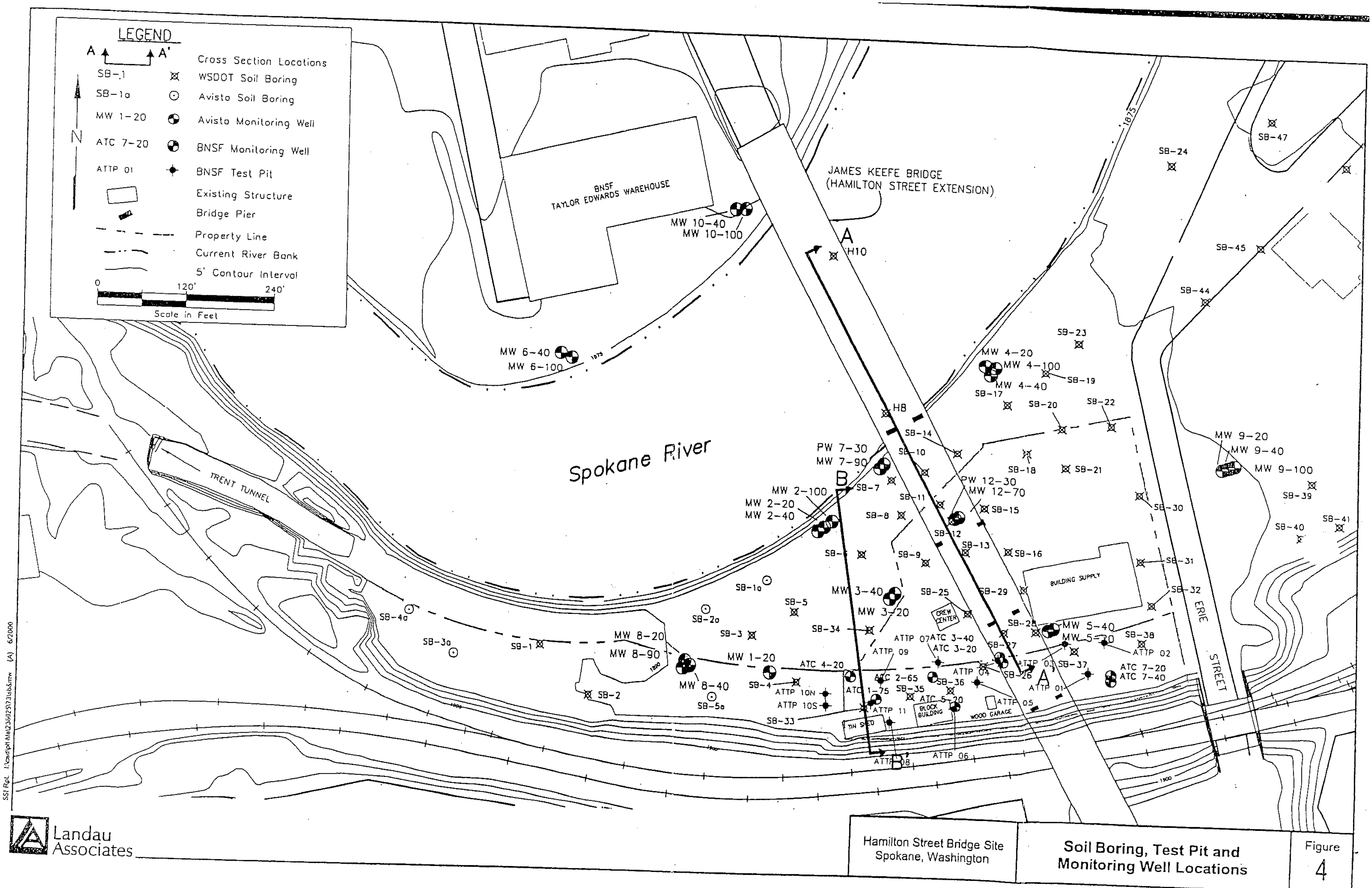
Documents required under Model Toxics Control Act (Chapter 173-304 WAC).



Vicinity Map

Figure 2


LEGEND
SS Existing 60" Sewer Line
Existing Structure
Bridge Pier
Site Boundary
Former River Bank
Current River Bank
5' Contour Interval
N
0
120'
240'
Scale in Feet
BNSF
TAYLOR EDWARDS WAREHOUSE
JAMES KEEFE BRIDGE
(HAMILTON STREET EXTENSION)
HAMILTON STREET BRIDGE
SITE AREA
FORMER CHICAGO MILWAUKEE
& ST. PAUL RR PROPERTY
(APPROXIMATE)
Spokane River
TRENT TUNNEL
FORMER SPOKANE
GAS PLANT
PROPERTY BOUNDARY
(APPROXIMATE)
BUILDING SUPPLY
CREW CENTER
FORMER AMERICAN TAR COMPANY
PROPERTY (APPROXIMTE,
LEASE BOUNDARY)
APPROXIMATE FORMER
RIVER BANK (1910)
North BNSF Property Line
TIN SHED
BLOCK BUILDING
WOOD GARAGE
ERIE STREET
SS
1873
Landau
Associates
Hamilton Street Bridge Site
Spokane, Washington
Site Map


LEGEND
Cross Section Locations
WSDOT Soil Boring
Avista Soil Boring
Avista Monitoring Well
BNSF Monitoring Well
BNSF Test Pit
Existing Structure
Bridge Pier
Property Line
Current River Bank
5' Contour Interval
Scale in Feet
0
120'
240'
N
BNSF
TAYLOR EDWARDS WAREHOUSE
JAMES KEEFE BRIDGE
(HAMILTON STREET EXTENSION)
Spokane River
TRENT TUNNEL
ERIE STREET
BUILDING SUPPLY
CREW CENTER
BLOCK BUILDING
WOOD GARAGE
TIN SHED
MW 10-40
MW 10-100
MW 6-40
MW 6-100
MW 4-20
MW 4-100
MW 4-40
MW 9-20
MW 9-40
MW 9-100
PW 7-30
MW 7-90
PW 12-30
MW 12-70
MW 2-100
MW 2-20
MW 2-40
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MW 3-20
MW 5-40
MW 5-20
MW 8-20
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MW 1-20
ATC 7-20
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ATC 5-20
ATTP 01
ATTP 02
ATTP 03
ATTP 04
ATTP 05
ATTP 06
ATTP 07
ATTP 08
ATTP 09
ATTP 10N
ATTP 10S
ATTP 11
H8
H10
A
A'
B
B'
SB-1
SB-2
SB-4
SB-5
SB-6
SB-7
SB-8
SB-9
SB-10
SB-11
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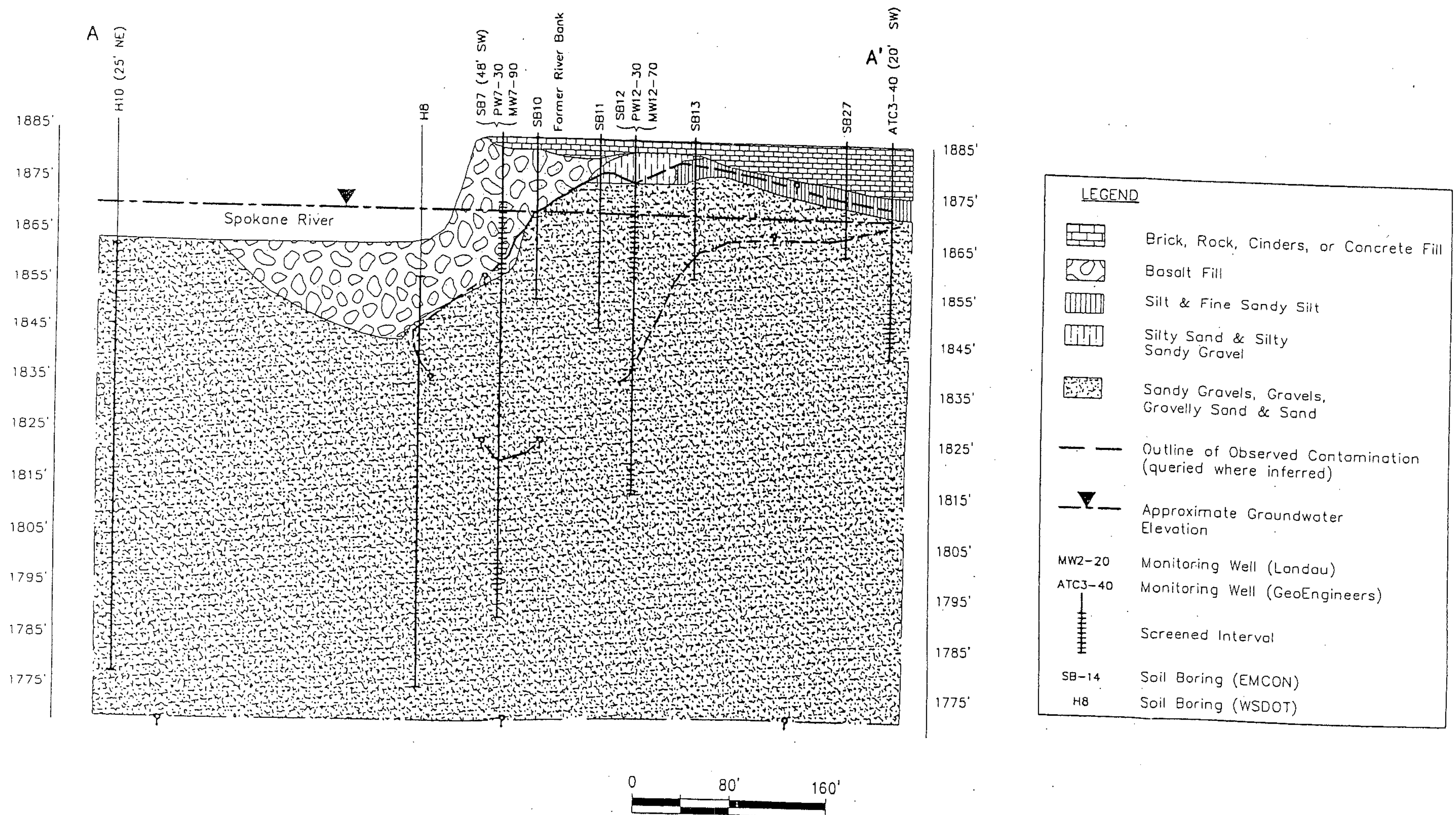
SB-21
SB-22
SB-23
SB-24
SB-25
SB-26
SB-27
SB-28
SB-29
SB-30
SB-31
SB-32
SB-33
SB-34
SB-35
SB-36
SB-37
SB-38
SB-39
SB-40
SB-41
SB-44
SB-45
SB-47
SB-1a
SB-2a
SB-3a
SB-4a
SB-5a
SB-3
1875
1900

Landau Associates
Hamilton Street Bridge Site
Spokane, Washington
Soil Boring, Test Pit and Monitoring Well Locations
Figure 4

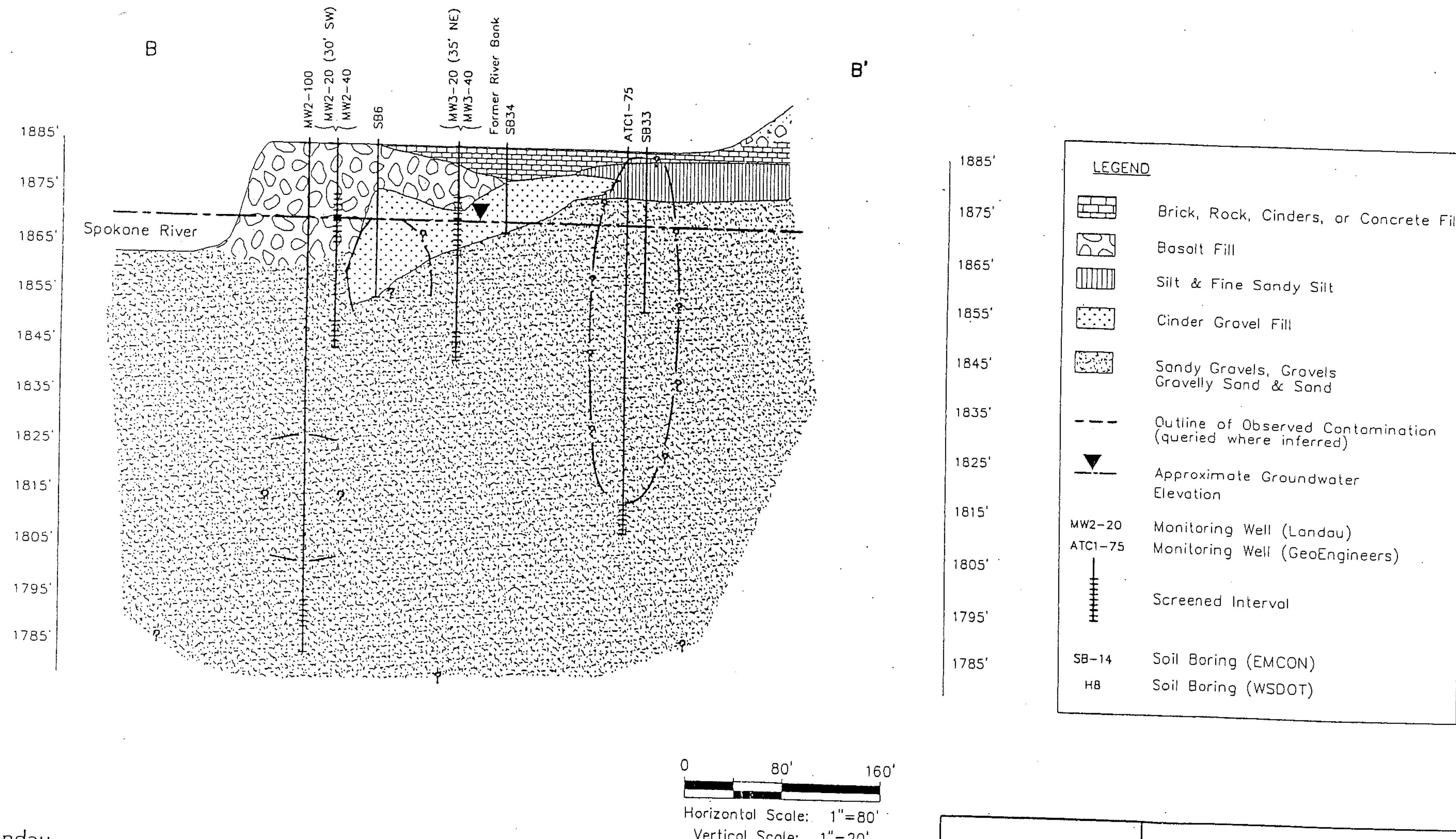


Landau Associates

Hamilton Street Bridge Site
Spokane, Washington

Cross-Section A-A'

Figure 5

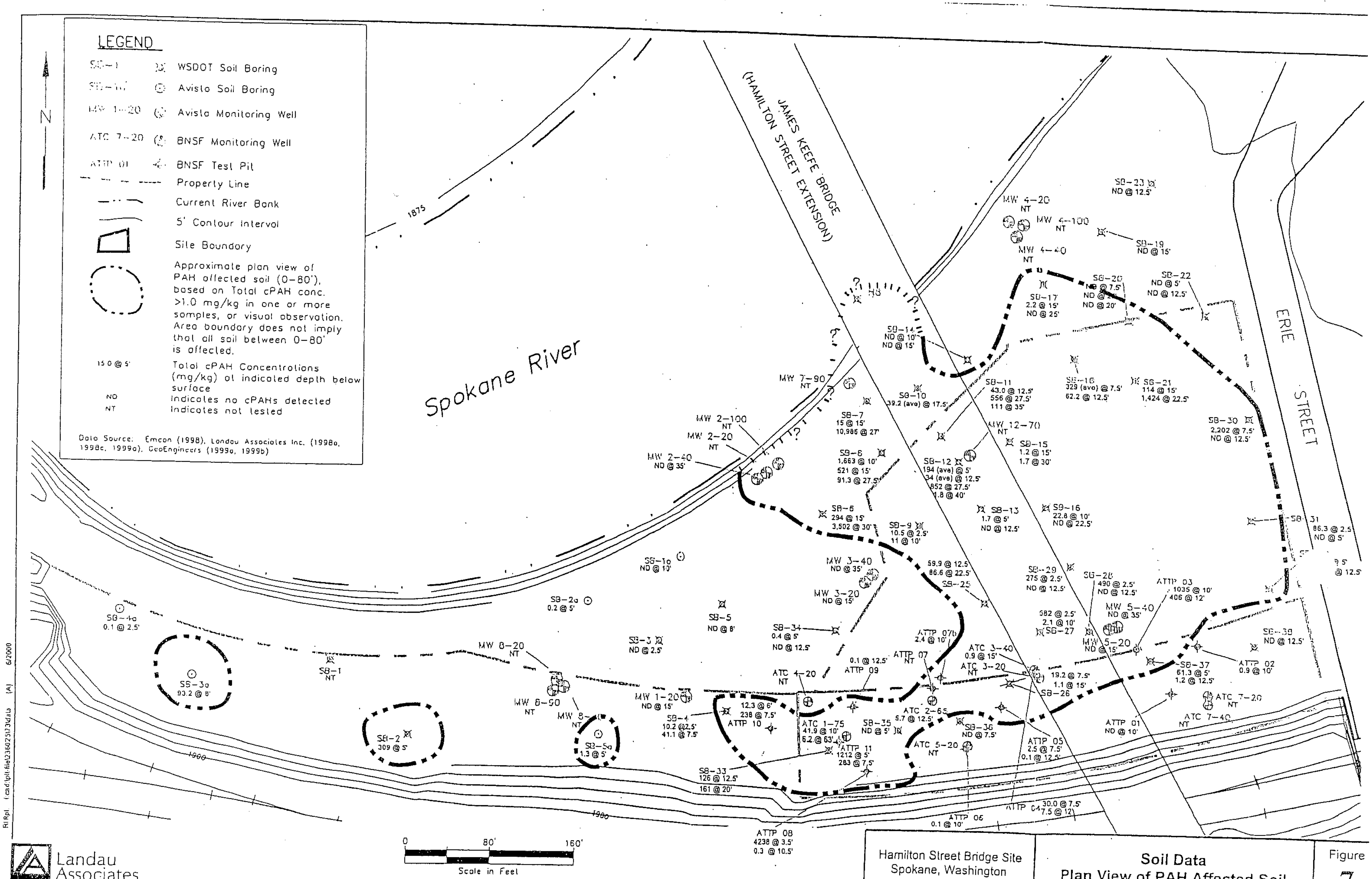


Landau Associates

Hamilton Street Bridge Site
Spokane, Washington

Cross-Section B-B'

Figure 6



Hamilton Street Bridge Site
Spokane, Washington

Soil Data
Plan View of PAH Affected Soil

Figure 7

TABLES

TABLE 1. GROUND/SURFACE WATER CLEANUP LEVELS CRITERIA

CONTAMINANT	GROUND WATER							SURFACE WATER				Back-ground	Preliminary Method B Cleanup Level, ug/L	PQL
	ARAR			MTCA Method A, ug/L	Basis	MTCA Method B Formula, ug/L	Basis	MTCA Method B Formula ug/L	Chapter 173-201A, AWQC, or NTR Freshwater, ug/L					
	MCL, ug/L	Cancer Risk	Hazard Quotient						Acute	Chronic	Human Health			
TPH														
TPH				**1000**	aesthetics								1000	
Non-cPAHs														
acenaphthene						960	NCAR	**643**			1200		643	0.1
acenapthylene														
anthracene						**4800**	NCAR	25900			9600		4800	0.1
fluoranthene						640	NCAR	**90.2**			300		90.2	0.3
fluorene						**640**	NCAR	3460			1300		640	0.1
2-methylnaphthalene														0.1
naphthalene						**320**	NCAR	9880					320	0.3
phenanthrene														0.1
pyrene						**480**	NCAR	2590			960		480	0.3
cPAHs														
benzo(a)anthracene						0.012	CAR	0.0296			**0.0028**		0.0028	0.1
benzo(a)pyrene	0.2	1.67E-05				0.012	CAR	0.0296			**0.0028**		0.0028	0.1
benzo(b)fluoranthene						0.012	CAR	0.0296			**0.0028**		0.0028	0.1
benzo(k)fluoranthene						0.012	CAR	0.0296			**0.0028**		0.0028	0.1
benzo(ghi)perylene														0.1
chrysene						0.012	CAR	0.0296			**0.0028**		0.0028	0.1
dibenzo(ah)anthracene						0.012	CAR	0.0296			**0.0028**		0.0028	0.1
indeno(123-cd)pyrene						0.012	CAR	0.0296			**0.0028**		0.0028	0.1
Total cPAHs				0.1										0.1
VOCs														
acetone						**800**	NCAR						800	10
benzene	5	3.31E-06		5	ARAR	1.51	CAR	43			**1.2**		1.2	0.5
ethylbenzene	**700**		0.875	30	ARAR, aesthetics	800	NCAR	6910			3100		700	0.5

CAR - Carcinogen
NCAR - Noncarcinogen

TABLE 1. GROUND/SURFACE WATER CLEANUP LEVELS CRITERIA

CONTAMINANT	GROUND WATER: ARAR: MCL, ug/L	GROUND WATER: ARAR: Cancer Risk	GROUND WATER: ARAR: Hazard Quotient	GROUND WATER: MTCA Method A, ug/L	GROUND WATER: Basis	GROUND WATER: MTCA Method B Formula, ug/L	GROUND WATER: Basis	SURFACE WATER: MTCA Method B Formula ug/L	SURFACE WATER: Chapter 173-201A, AWQC, or NTR Freshwater, ug/L: Acute	SURFACE WATER: Chapter 173-201A, AWQC, or NTR Freshwater, ug/L: Chronic	SURFACE WATER: Chapter 173-201A, AWQC, or NTR Freshwater, ug/L: Human Health	Back-ground	Preliminary Method B Cleanup Level, ug/L	PQL
toluene	**1000**		0.625	40	ARAR, aesthetics	1600	NCAR	48500			6800		1000	0.5
xylene, total	**10000**		0.625	20	ARAR, aesthetics	16000	NCAR						10000	1
n-butylbenzene														
sec-butylbenzene														
tert-butylbenzene														
isopropylbenzene														
p-isopropylbenzene														
n-propylbenzene														
styrene	100	6.86E-05	0.0625			**1.46**	CAR						1.46	1
1,2,3-trichloropropane						**0.00625**	CAR						0.00625	1
1,3,5-trimethylbenzene														
1,4,5-trimethylbenzene														
1,2,4-trimethylbenzene														
SVOCs														
aniline						**15.4**	CAR						15.4	10
bis(2-ethylhexyl)phthalate	6	9.60E-07	0.0187			6.25	CAR	3.56			**1.8**		1.8	10
butyl benzyl phthalate						3200	NCAR	**1250**			3000		1250	5
carbazole						**4.37**	CAR						4.37	10
dibenzofuran														
di-n-octylphthalate						**320**	NCAR						320	5
2,4-dimethylphenol						**320**	NCAR	553			540		320	10
2-methylphenol														
3&4-methylphenol														
N-nitrosodiphenylamine						17.9	CAR	9.73			**5**		5	10
phenol						**9600**	NCAR	1110000			21000		9600	10
Metals														

CAR - Carcinogen
NCAR - Noncarcinogen

TABLE 1. GROUND/SURFACE WATER CLEANUP LEVELS CRITERIA

CONTAMINANT	GROUND WATER							SURFACE WATER					
	ARAR			MTCA Method A, ug/L	Basis	MTCA Method B Formula, ug/L	Basis	MTCA Method B Formula ug/L	Chapter 173-201A, AWQC, or NTR Freshwater, ug/L			Back-ground	Preliminary Method B Cleanup Level, ug/L	PQL
	MCL, ug/L	Cancer Risk	Hazard Quotient						Acute	Chronic	Human Health			
antimony											**14**		14	10
arsenic	50	8.57E-04	10.4	5	background	0.0583	CAR	0.0982	360	190	0.018	**6**	6	1
barium	2000		1.79			**1120**	NCAR		EPA recommends 1 mg/L for drinking water				1120	2
beryllium	4	1.97E-04	0.005			**0.023**	CAR	0.0793					0.0203	3
cadmium	5		0.625	5		8	NCAR	20.3	2.73	**1**		0.03	1	1
chromium (total)	100					80(hex)	NCAR	810(hex)	15(hex)	**10(hex)**		4.71	10	1
copper	1300**					592	NCAR	2660	17	**11**	1300	4	11	2
lead	15**								65	**2.5**		0.8	2.5	1
manganese						**2240**	NCAR						2240	10
mercury	2		0.417			4.8	NCAR		2.1	**0.012**	0.14		0.012	0.2
nickel	**100(s)**		0.312			320	NCAR	1100	1400	160	610		100	2
selenium	50		0.63			80	NCAR		20	**5**	170		5	1
silver*						80	NCAR	25900	**3.4**				3.4	1
thallium	2					**1.12**	NCAR	1.56			1.7		1.12	1
zinc						4800	NCAR	16500	110	**100**	9100	82	100	5
Conventionals														
cyanide	200		0.625			320	NCAR	51900	22	**5.2**	700		5.2	10
nitrate as nitrogen	**10000**		0.391			25600	NCAR						10000	100
PCBs						0.00114	CAR	**2.70E-05**			**2.70E-05**		2.70E-05	0.65

CAR - Carcinogen
NCAR - Noncarcinogen

TABLE 2. SOILS CLEANUP LEVELS CRITERIA

Constituent	Method A, mg/Kg	Method B, mg/Kg	Basis	100 x GW (Method B), mg/Kg (from Table 1)	Background	**Preliminary Method B Cleanup Level, mg/Kg**	Basis	PQL
TPH								
TPH-Diesel	200					200	A	6
TPH-Oil	200					200	A	
TPH-Other	200					200	A	12
non-cPAHs								
Acenaphthene		4800	NCAR	64.3		64.3	GW	0.072
Acenaphthylene								
Anthracene		24000	NCAR	480		480	GW	0.073
Fluoranthene		3200	NCAR	9.02		9.02	GW	0.073
Fluorene		3200	NCAR	64		64	GW	0.059
2-Methylnaphthalene								
Naphthalene		3200	NCAR	32		32	GW	0.01
Phenanthrene								
Pyrene*		2400	NCAR	48		48	GW	0.073
c-PAHs								
Benzo(a)anthracene		0.137	CAR	0.00028		0.00028	GW	0.073
Benzo(b)fluoranthene		0.137	CAR	0.00028		0.00028	GW	0.073
Benzo(k)fluoranthene		0.137	CAR	0.00028		0.00028	GW	0.073
Benzo(ghi)perylene								
Benzo(a)pyrene		0.137	CAR	0.00028		0.00028	GW	0.073
Chrysene		0.137	CAR	0.00028		0.00028	GW	0.073
Dibenzo(ah)anthracene		0.137	CAR	0.00028		0.00028	GW	0.073
Indeno(1,2,3-cd)pyrene		0.137	CAR	0.00028		0.00028	GW	0.073
Total cPAHs	1		CAR			1	A	0.073
VOCs								
Benzene	0.5	34.5	CAR	0.12		0.12	GW	0.002
Toluene	40	16000	NCAR	100		100	GW	0.002
Ethylbenzene	20	8000	NCAR	70		70	GW	0.002
Xylenes	20	160000	NCAR	1000		1000	GW	0.002
Acetone		8000	NCAR	80		80	GW	0.006
n-Butylbenzene								0.002

A - Method A
CAR - Carcinogen
GW - Ground Water
NCAR - Noncarcinogen

TABLE 2. SOILS CLEANUP LEVELS CRITERIA

Constituent	Method A, mg/Kg	Method B, mg/Kg	Basis	100 x GW (Method B), mg/Kg (from Table 1)	Background	Preliminary Method B Cleanup Level, mg/Kg	Basis	PQL
sec-butylbenzene								0.001
tert-Butylbenzene								0.001
Isopropylbenzene								0.001
Styrene		33.3	CAR	0.146		0.146	GW	0.001
1,2,3-Trichloropropane		0.143	CAR	6.00E-04		6.00E-04	GW	0.002
1,2,4-Trimethylbenzene								0.001
1,3,5-Trimethylbenzene								0.001
SVOCs								
Aniline		175	CAR	1.54		1.54	GW	0.1
Carbazole		50	CAR	0.437		0.437	GW	0.1
Dibenzofuran								0.1
2,4-Dimethylphenol		1600	NCAR	32		32	GW	0.1
2-Methylnaphthalene								0.1
3 & 4-Methylphenol								0.1
N-Nitrosodiphenylamine		204	CAR	0.5		0.5	GW	0.1
Phenol		48000	NCAR	960		960	GW	0.1
CYANIDE		1600	NCAR	0.52		0.52	GW	0.24
METALS								
Antimony								0.1
Arsenic	20	1.67	CAR	0.6	7	7	Background	2.07
Barium		5600	NCAR	112		112	GW	0.313
Beryllium		0.233	CAR	0.0023	2	2	Background	0.6
Cadmium	2	80	NCAR	0.1	1	1	Background	0.352
Chromium	100		NCAR	1	42	42	Background	0.378
Copper		2960	NCAR	1.1	36	36	Background	0.2
Lead	250			0.25	17	17	Background	0.2
Mercury	1	24	NCAR	0.0012	0.07	0.07	Background	0.058
Nickel		1600	NCAR	10	38	38	Background	1
Selenium		400	NCAR	0.5		0.5	GW	0.92
Silver		400	NCAR	0.34		0.34	GW	1.4

A - Method A
CAR - Carcinogen
GW - Ground Water
NCAR - Noncarcinogen

TABLE 2. SOILS CLEANUP LEVELS CRITERIA

Constituent	Method A, mg/Kg	Method B, mg/Kg	Basis	100 x GW (Method B), mg/Kg (from Table 1)	Background	**Preliminary Method B Cleanup Level, mg/Kg**	Basis	PQL
Thallium		5.6	NCAR	0.112		0.112	GW	0.6
Zinc		24000	NCAR	10	86	86	Background	0.5

A - Method A
CAR - Carcinogen
GW - Ground Water
NCAR - Noncarcinogen

TABLE 3. SCREENING FOR SOIL INDICATOR SUBSTANCES

Chemical	Number Detected	Number Analyzed	Frequency of Detection	Maximum Concentration Detected	Cancer Risk	Per cent cancer risk	Hazard Quotient	Per cent Hazard Quotient	Preliminary Method B Cleanup Level (from Table 2)	Basis	Per Cent Excee-dances	Comments
TPH												
TPH-Diesel	48	108	0.44	216,000					200	A	15	INDICATOR
TPH-Oil	40	108	0.37	663,000					200	A	11	INDICATOR
TPH-Other	38	108	0.35	396,000					200	A	31	INDICATOR
non-cPAHs												
Acenaphthene	52	106	0.49	1320			0.275	1.371	64.3	GW	15	INDICATOR
Acenaphthylene	61	106	0.58	7610					NA			
Anthracene	71	106	0.67	23800			0.992	4.943	480	GW	5	INDICATOR
Fluoranthene	76	106	0.72	6570			2.053	10.234	9.02	GW	42	INDICATOR
Fluorene	62	106	0.58	5270			1.647	8.209	64	GW	15	INDICATOR
2-Methylnaphthalene	41	116	0.35	9640					NA			
Naphthalene	73	143	0.51	31000			9.688	48.286	32	GW	23	INDICATOR
Phenanthrene	75	106	0.71	23900					NA			
Pyrene	75	106	0.71	7780			3.242	16.158	48	GW	25	INDICATOR
							Per cent HQ =	89.200				
cPAHs												
Benzo(a)anthracene	73	106	0.69	2510	0.018	20.640			0.00028	GW	64	INDICATOR
Benzo(b)fluoranthene	72	106	0.68	1560	0.011	12.828			0.00028	GW	62	INDICATOR
Benzo(k)fluoranthene	64	107	0.60	596	0.004	4.901			0.00028	GW	57	INDICATOR
Benzo(ghi)perylene	65	106	0.61	1160	0.008	9.539			NA			
Benzo(a)pyrene	70	106	0.66	2010	0.015	16.529			0.00028	GW	60	INDICATOR
Chrysene	71	106	0.67	2900	0.021	23.847			0.00028	GW	62	INDICATOR
Dibenzo(ah)anthracene	49	106	0.46	260	0.002	2.138			0.00028	GW	42	INDICATOR
Indeno(1,2,3-cd)pyrene	67	106	0.63	1150	0.008	9.457			0.00028	GW	61	INDICATOR
Total cPAHs	73	106	0.69	10986					0.1	A		INDICATOR
				Per cent cancer risk =		99.879						
VOCs												
Benzene	4	62	0.06	34.6	0.000	0.001			0.12	GW	6	close to 5% frequency
Toluene	8	62	0.13	70.8			0.004	0.022	100	GW	0	< cleanup level
Ethylbenzene	14	62	0.23	49.3			0.006	0.031	70	GW	0	< cleanup level

TABLE 3. SCREENING FOR SOIL INDICATOR SUBSTANCES

Chemical	Number Detected	Number Analyzed	Frequency of Detection	Maximum Concentration Detected	Cancer Risk	Per cent cancer risk	Hazard Quotient	Per cent Hazard Quotient	Preliminary Method B Cleanup Level (from Table 2)	Basis	Per Cent Excee-dances	Comments
Xylenes	15	62	0.24	297			0.002	0.009	1000	GW	0	< cleanup level
Acetone	3	36	0.08	0.0068			0.000	0.000	80	GW	0	< cleanup level
n-butylbenzene												
sec-butylbenzene												
tert-butylbenzene												
isopropylbenzene												
Styrene	2	36	0.06	59.5	0.000	0.002	0.004	0.019	0.146	GW	6	close to 5% frequency
1,2,3-Trichloropropane	1	36	0.03	0.353	0.000	0.003	0.001	0.004	6.00E-04	GW	3	<5% frequency
1,2,4-Trimethylbenzene												
1,3,5-Trimethylbenzene												
				Per cent cancer risk =		0.006						
							Per cent HQ =	0.084				
SVOCs												
Aniline	2	88	0.02	11					1.54	GW	2	< 5% frequency
Carbazole	23	98	0.23	2270	0.000	0.051			0.437	GW	23	INDICATOR
Dibenzofuran												
2,4-Dimethylphenol	2	94	0.02	81.6			0.051	0.254	32	GW	1	< 5 % frequency
2-Methylnaphthalene												
3&4-Methylphenol												
N-Nitrosodiphenylamine	6	98	0.06	179	0.000	0.001			0.5	GW	5	close to 5% frequency
Phenol	2	94	0.02	2.17			0.000	0.000	960	GW	0	< 5% frequency, < cleanup level
				Per cent cancer risk =		0.052						
							Per cent HQ =	0.254				
CYANIDE	27	56	0.48	172			0.108	0.536	0.52	GW	46	INDICATOR
							Per cent HQ =	0.536				
METALS												
Antimony	3	6	0.50	0.4						NA		
Arsenic	51	83	0.61	74.2	0.000	0.050	1.237	6.164	7	Background	39	INDICATOR
Barium	72	77	0.94	670			0.120	0.596	112	GW	21	INDICATOR
Beryllium	5	6	0.83	2.6	0.000	0.013	0.007	0.032	2	Background	0	Only 6 samples with 1 > cleanup level

TABLE 3. SCREENING FOR SOIL INDICATOR SUBSTANCES

Chemical	Number Detected	Number Analyzed	Frequency of Detection	Maximum Concentration Detected	Cancer Risk	Per cent cancer risk	Hazard Quotient	Per cent Hazard Quotient	Preliminary Method B Cleanup Level (from Table 2)	Basis	Per Cent Excee-dances	Comments
Cadmium	11	83	0.13	6.91			0.086	0.431	1	Background	4	Only 4 % exceedance (l sample around 6.91 and 2 samples at 2.74 and 2.24 mg/Kg)
Chromium	79	83	0.95	30			0.075	0.374	42	Background	0	< cleanup level
Copper	6	6	1.00	93.9			0.235	1.170	36	Background	17	Only 6 samples with 1 > cleanup level
Lead	80	83	0.96	427					17	Background	36	INDICATOR
Mercury	31	82	0.38	0.637			0.027	0.132	0.07	Background	15	INDICATOR
Nickel	6	6	1.00	52			0.033	0.162	38	Background	17	Only 6 samples with 1 > cleanup level
Selenium	18	83	0.22	16.3			0.041	0.203	0.5	GW	20	INDICATOR
Silver	0	83					0.000	0.000	0.34	GW	0	0 detection
Thallium	2	6	0.33	0.7			0.125	0.623	0.112	GW	0	Only 6 samples
Zinc	6	6	1.00	183			0.008	0.038	86	Background	17	Only 6 samples with 1 > cleanup level
				Per cent cancer risk =		0.063						
						Per cent quotient =		9.926				
				Total =	0.089	100.000	20.063	100.000				

TABLE 4. GROUND WATER RESULTS

Constituent	Number Detected	Number Analyzed	Frequency of Detection	Maximum Concentration Detected	Preliminary Method B Cleanup Level (from Table 1)	Basis	PQL	Soil Indicator?
ORGANIC COMPOUNDS								
TPH(mg/L)								
TPH-Diesel	2	27	0.07	0.52				
TPH-Oil	0	27	0.00					
TPH - Total	2	27	0.07	0.52	1	A	0.1	SOIL INDICATOR
Non-cPAHs(ug/L)								
Acenaphthene	11	127	0.09	104	643	B(SW)	0.1	SOIL INDICATOR
Acenaphthylene	6	119	0.05	140	NA			
Anthracene	6	119	0.05	2	4800	B(GW)	0.1	SOIL INDICATOR
Dibenzofuran	5	45	0.11	51.1	NA			
Fluoranthene	6	119	0.05	1.1	90.2	B(SW)	0.3	SOIL INDICATOR
Fluorene	8	127	0.06	38.9	640	B(GW)	0.1	SOIL INDICATOR
2-Methylnaphthalene	2	45	0.04	33.2	NA			
Naphthalene	6	147	0.04	400	320	B(GW)	0.3	SOIL INDICATOR
Phenanthrene	7	127	0.06	25				
Pyrene	5	119	0.04	1	480	B(GW)	0.3	SOIL INDICATOR
cPAHs (ug/L)								
benzo(a) anthracene	0	119	0.00		0.0028	NTR-HH	0.1	SOIL INDICATOR
benzo(a)pyrene	0	119	0.00		0.0028	NTR-HH	0.1	SOIL INDICATOR
benzo(b)fluoranthene	0	119	0.00		0.0028	NTR-HH	0.1	SOIL INDICATOR
benzo(k)fluoranthene	0	119	0.00		0.0028	NTR-HH	0.1	SOIL INDICATOR
benzo(ghi)perylene	1	119	0.01	0.12				
chrysene	0	119	0.00		0.0028	NTR-HH	0.1	SOIL INDICATOR
dibenzo(ah)anthracene	0	119	0.00		0.0028	NTR-HH	0.1	SOIL INDICATOR
indeno(123-cd)pyrene	1	119	0.01	0.12	0.0028	NTR-HH	0.1	SOIL INDICATOR
total cPAHs	1	119	0.01	0.12			0.1	SOIL INDICATOR
VOCs (ug/L)								
Ethylbenzene	2	108	0.02	3.85	700	MCL	0.5	No

A - Method A
B(GW) - Method B, Surface Water
B(SW) - Method B, Ground Water
NTR-HH - National Toxics Rule-
Human Health
MCL - Maximum Contaminant Limit

TABLE 4. GROUND WATER RESULTS

Constituent	Number Detected	Number Analyzed	Frequency of Detection	Maximum Concentration Detected	Preliminary Method B Cleanup Level (from Table 1)	Basis	PQL	Soil Indicator?
Toluene	4	108	0.04	1.17	1000	MCL	0.5	No
xylenes	3	108	0.03	11.3	10000	MCL	1	No
1,3,5-Trimethylbenzene	1	21	0.05	1.6	NA			No
1,2,4-Trimethylbenzene	1	21	0.05	3.6	NA			No
SVOCs(ug/L)								
Carbazole					4.37	B	10	SOIL INDICATOR
Bis(2-ethylhexyl) phthalate	4	35	0.11	60.5	1.8	NTR - HH	10	No
Butylbenzylphthalate	1	35	0.03	5.58	1250	B(SW)	10	No
INORGANIC COMPOUNDS								
Metals (ug/L)								
Arsenic	93	111	0.84	9.1	6	Background	1	SOIL INDICATOR
Barium	100	100	1.00	117	1120	B(GW)	2	SOIL INDICATOR
Cadmium	9	111	0.08	0.4	1	WAC 173-201A	1	No
Chromium	10	100	0.10	2.2	10	WAC 173-201A	1	No
Copper	7	11	0.64	11.8	11	WAC 173-201A	2	No
Lead	19	111	0.17	161	2.5	WAC 173-201A	1	SOIL INDICATOR
Mercury	6	111	0.05	0.23	0.012	WAC 173-201A	0.2	SOIL INDICATOR
Nickel	2	11	0.18	3.3	160	WAC 173-201A	2	No
Selenium	7	100	0.07	1.29	5	WAC 173-201A	1	SOIL INDICATOR
Silver	0	111	0.00		3.4		1	No
Zinc	11	11	1.00	93.3	100	WAC 173-201A	5	No
CYANIDE	24	118	0.20	0.0576	5.2	WAC 173-201A	10	SOIL INDICATOR

A - Method A
B(GW) - Method B, Surface Water
B(SW) - Method B, Ground Water
NTR-HH - National Toxics Rule-
Human Health
MCL - Maximum Contaminant Limit

TABLE 5. SURFACE WATER/SEDIMENT INDICATOR SCREENING								
	SURFACE WATER				SEDIMENT			
Constituent	Number Analyzed	Number Detected	Maximum Concentration Detected (ug/L)	Preliminary Method B Cleanup Level, (ug/L), from Table 1	Number Analyzed	Number Detected	Maximum Concentration Detected	Washington State FSQV
SVOCs								
Butylbenzylphthalate	3	1	0.14	1250				
Dibenzofuran	5	0			5	1	0.0235	NA
Di-n-octylphthalate	3	2	8	320	3	1	0.146	NA
1-Methyl-7-(methylethyl) phenanthrene					3		0.256	NA
LPAHs								
Acenaphthene	5	0			2	0		3.5
Acenaphthylene	5	0			2	0		1.9
Anthracene	5	0			2	0		2.1
Fluorene	5	0			2	0		3.6
2-Methylnaphthalene	5	2	0.82	NA	5	1	0.106	NA
Naphthalene	5	1	0.82	320	5	1	0.0594	37
Phenanthrene	5	1	0.18	NA	5	2	0.14	5.7
TOTAL LPAH					5	2	0.14	27
HPAHs								
Benzo(a)anthracene	5	0			2	0		5
Benzo(b)fluoranthene	5	0						
Benzo(k)fluoranthene	5	0						
Benzo(b+k)fluoranthene					2	0		11
Benzo(g,h,i)perylene					2	0		1.2
Benzo(a)pyrene	5	0			2	0		7
Chrysene	5	0			5	1	0.0118	7.4
Dibenzo(a,h)anthracene	5	0			2	0		0.23
Fluoranthene					5	3	0.18	11
Indeno(1,2,3-cd)pyrene	5	0			2	0		
Pyrene					5	3	0.1	9.6
TOTAL HPAH					5	3	0.28	36
Cyanide	2	0		5.2				
PCBs	3	0		2.70E-05				
Metals								
Antimony					3	1	10.4	NA
Arsenic	3	1	2.6	6	3	3	9.3	57
Barium	3	3	19.5	1120	3	3	65.2	NA
Beryllium	3	3	0.47	0.0203	3	3	0.48	NA
Cadmium					3	3	2.5	NA
Chromium	3	1	3.4	10	3	3	10.9	260
Cobalt					3	3	5.5	NA
Copper					3	3	12.9	390
Lead	3	3	4.4	2.5	3	3	82.2	450
Manganese	3	3	21.1	2240	3	3	323	NA
Nickel					3	3	9.6	NA
Selenium					3	3	0.52	NA
Thallium					3	3	2.5	NA
Vanadium					3	2	13.4	NA

TABLE 6. RISK/HAZARD INDEX CALCULATIONS

INDICATOR	Effect	Preliminary Method B Cleanup Level	Basis	Cancer Risk	Hazard Quotient								
					Hepato-toxicity	Nephro-toxicity	Hemo-toxicity	Weight	Other	Neuro-toxicity	Thyroid	Cardiovascular Toxicity	Clinical Selenosis
SOILS													
TPH													
TPH-Diesel		200	A	not calculated	not calculated								
TPH-Oil		200	A	not calculated	not calculated								
TPH-Other		200	A	not calculated	not calculated								
Non-cPAHs													
Acenaphthene	NC	64.3	GW		0.0133958								
Anthracene	NC	480	GW						0.0200				
Fluoranthene	NC	9.02	GW		0.0028188	0.002819	0.002819						
Fluorene	NC	64	GW				0.02000						
Naphthalene	NC	32	GW					0.01000					
Pyrene	NC	48	GW			0.02000							
cPAHs													
Benzo(a)anthracene	C	0.00028	GW	2.0438E-09									
Benzo(a)pyrene	C	0.00028	GW	2.0438E-09									
Benzo(b)fluoranthene	C	0.00028	GW	2.0438E-09									
Benzo(k)fluoranthene	C	0.00028	GW	2.0438E-09									
Chrysene	C	0.00028	GW	2.0438E-09									
Dibenzo(ah)anthracene	C	0.00028	GW	2.0438E-09									
Indeno(123-cd)pyrene	C	0.00028	GW	2.0438E-09									
total cPAHs	C	0.1	A										
SVOCs													
Carbazole	C	0.437	GW	8.74E-09									
CYANIDE	NC	0.52	GW					0.000325		0.00033	0.00033		

A - Method A
AWQC - Ambient Water Quality Criteria
B - Method B
B(SW) - Method B, Surface Water

NTR- HH - National Toxics Rule - Human Health

TABLE 6. RISK/HAZARD INDEX CALCULATIONS

INDICATOR	Effect	Preliminary Method B Cleanup Level	Basis	Cancer Risk	Hazard Quotient								
					Hepato-toxicity	Nephro-toxicity	Hemo-toxicity	Weight	Other	Neuro-toxicity	Thyroid	Cardiovascular Toxicity	Clinical Selenosis
METALS													
Arsenic	C-NC	7	Background	not calculated					not calculated				
Barium	NC	112	GW									0.02000	
Lead		17	Background	not calculated					not calculated				
Mercury	NC	0.07	Background						not calculated				
Selenium	NC	0.5	GW										0.00125
Total Soil Cancer Risk and Hazard Quotients =				2.30466E-08	0.0162146	0.022819	0.022819	0.010325	0.02	0.00033	0.00033	0.02	0.00125
GROUND WATER													
TPH													
TPH -Total		1000	A	not calculated					not calculated				
Non-cPAHs													
Acenapthene	NC	643	B(SW)		0.6697917								
Anthracene	NC	4800	B						1				
Fluoranthene	NC	90.2	B(SW)		0.1409375	0.140938	0.140938						
Fluorene	NC	640	B				1						
Naphthalene	NC	320	B					1					
Pyrene	NC	480	B			1							
cPAHs													
Benzo(a)anthracene	C	0.0028	NTR-HH	2.33333E-07									
Benzo(a)fluoranthene	C	0.0028	NTR-HH	2.33333E-07									
Benzo(k)fluoranthene	C	0.0028	NTR-HH	2.33333E-07									
Benzo(a)pyrene	C	0.0028	NTR-HH	2.33333E-07									
Chrysene	C	0.0028	NTR-HH	2.33333E-07									

A - Method A
AWQC - Ambient Water Quality Criteria
B - Method B
B(SW) - Method B, Surface Water

NTR- HH - National Toxics Rule - Human Health

TABLE 6. RISK/HAZARD INDEX CALCULATIONS

INDICATOR	Effect	Preliminary Method B Cleanup Level	Basis	Cancer Risk	Hazard Quotient								
					Hepato-toxicity	Nephro-toxicity	Hemo-toxicity	Weight	Other	Neuro-toxicity	Thyroid	Cardiovascular Toxicity	Clinical Selenosis
Dibenzo(ah)anthracene	C	0.0028	NTR-HH	2.33333E-07									
Indeno(1,2,3-cd)pyrene	C	0.0028	NTR-HH	2.33333E-07									
SVOCs													
Carbazole	C	4.37	B	0.000001									
CYANIDE	NC	5.2	AWQC					0.01625		0.01625	0.01625		
METALS													
Arsenic	C-NC	6	Background	not calculated	not calculated								
Barium	NC	1120	B									1	
Lead		2.5	AWQC	can not be calculated									
Mercury	NC	0.012	AWQC			0.0025				0.0025			
Selenium	NC	5	AWQC										0.0625
Total ground water cancer risk and hazard Indices =				2.63333E-06	0.8107292	1.143438	1.140938	1.01625	1	0.01875	0.01625	1	0.0625
TOTAL SITE CANCER RISK/HAZARD INDICES =				2.65638E-06	0.8269438	1.166256	1.163756	1.026575	1.02	1.00033	0.01658	1.02	0.06375

A - Method A
AWQC - Ambient Water Quality Criteria
B - Method B
B(SW) - Method B, Surface Water

NTR- HH - National Toxics Rule - Human Health

TABLE 7. FINAL SITE CLEANUP LEVELS

	GROUND WATER (ug/L)			SOILS (mg/Kg)		
INDICATOR	PRELIMINARY METHOD B CLEANUP LEVEL	PQL	**FINAL METHOD B CLEANUP LEVEL**	PRELIMINARY METHOD B CLEANUP LEVEL	PQL	**FINAL METHOD B CLEANUP LEVEL**
TPH						
TPH-Diesel				200	6	**200**
TPH-Oil				200		**200**
TPH-Other				200	12	**200**
TPH-total	1000		**1000**			
Non-cPAHs						
Acenaphthene	643	0.1	**643**	64.3	0.072	**64.3**
Anthracene	4800	0.1	**4800**	480	0.073	**480**
Fluoranthene	90.2	0.3	**90.2**	9	0.073	**9**
Fluorene	640	0.1	**640**	64	0.059	**64**
Naphthalene	320	0.3	**320**	32	0.01	**32**
Pyrene	480	0.3	**480**	48	0.073	**48**
cPAHs						
benzo(a)anthracene	0.0028	0.1		0.00028	0.073	
benzo(a)pyrene	0.0028	0.1		0.00028	0.073	
benzo(b)fluoranthene	0.0028	0.1		0.00028	0.073	
benzo(k)fluoranthene	0.0028	0.1		0.00028	0.073	
chrysene	0.0028	0.1		0.00028	0.073	
dibenzo(ah)anthracene	0.0028	0.1		0.00028	0.073	
indeno(123-cd)pyrene	0.0028	0.1		0.00028	0.073	
Total cPAHs		0.1	**0.1(A)**		0.073	**1(A)**
SVOCs						
Carbazole	4.37	10	**10**	0.437	0.1	**0.437**
CYANIDE	5.2	10	**10**	0.52	0.24	**0.52**
METALS						
Arsenic	6	1	**6**	7	2.07	**7**
Barium	1120	2	**1120**	112	0.313	**112**
Lead	2.5	1	**2.5**	17	0.2	**17**
Mercury	0.012	0.2	**0.2**	0.07	0.058	**0.07**
Selenium	5	1	**5**	0.5	0.92	**0.92**

TABLE 8. COMPARISON OF CLEANUP ALTERNATIVES WITH PERMANENT SOLUTION CRITERIA [WAC 173-340-360(5)]					
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Alternative E**
Overall Protection	3	5	8	5	5
Long-term Effectiveness	3	6	8	4	4
Short-term Effectiveness	9	8	5	8	8
Reduction in Toxicity, Mobility, and Volume	2	4	7	4	4
[Total Environmental Benefit]	**17**	**23**	**28**	**21**	**21**
Implementability	9	8	5	7	7
Cost	10	6	1	8	9
Total Points	**36**	**37**	**34**	**36**	**37**

TABLE 9. EVALUATION OF ALTERNATIVES TO MEET RAOS

Remedial Action Objectives	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
	Limited Soil Capping; Natural Attenuation; Ground Water Monitoring; Institutional Controls	**Low Permeability Cap (with stormwater controls); Natural Attenuation; Ground Water Monitoring; Institutional Controls**	**Shallow Excavation of Soils; Filling of 15 Feet Over the Site; Natural Attenuation; Ground Water Monitoring; Institutional Controls**	**Shallow Barrier Wall Between Site and River; Limited Soil Capping; Natural Attenuation; Ground Water Monitoring; Institutional Controls**	**Streambank Bioengineering; Limited Soil Capping; Natural Attenuation; Ground Water Monitoring; Institutional Controls**
Prevent human exposure to contaminated soils	Limited soil capping; institutional controls	Low permeability cover; institutional controls	Shallow excavation of soil, filling to 15 feet	Limited soil capping; institutional controls	Limited soil capping; institutional controls
Prevent impacted soil from being released to the Spokane River by erosion				Shallow barrier wall	Streambank Bioengineering
Minimize the potential for leaching of contaminants from soils to ground water		Low permeability cover, stormwater management	Shallow soil excavation		
Prevent human ingestion and exposures to contaminated ground water	Institutional controls	Institutional controls	Institutional Controls	Institutional Controls	Institutional Controls
Prevent changes in hydrogeologic conditions that will likely cause migration of contamination	Institutional controls	Institutional controls	Institutional Controls	Institutional Controls	Institutional Controls
Ensure that the Spokane River is not impacted by any future significant increase in mass flux of contaminants through storm water migration.	Institutional controls	Stormater management, Institutional Controls	Institutional Controls	Institutional Controls	Institutional Controls
Ensure that contaminated ground water with concentrations levels above the standards does not migrate beyond the contaminated soil area	Natural attenuation; ground water monitoring	Natural attenuation; ground water monitoring	Natural attenuation; ground water monitoring	Natural attenuation; ground water monitoring	Natural attenuation; ground water monitoring
Ensure that NAPL is not mobilized	Institutional Controls	Institutional Controls	Institutional Controls	Institutional Controls	Institutional Controls

TABLE 10. ESTIMATED COSTS

ALTERNATIVE	ESTIMATED COST ($)			
	Capital	Annual Monitoring	Net Present Value*	Total Capital and Monitoring Cost
A - Limited Soil Capping; Natural Attenuation; Ground Water Monitoring; and Institutional Controls	195,312	48,605	603,137	798,449
B -Low Permeability Cap; Natural Attenuation, Ground Water Monitoring; and Institutional Controls	2,702,694	78,165	969,953	3,672,647
C - Shallow Excavation of Soils and Filling to 15 Feet over the Site; Natural Attenuation; Groundwater Monitoring, and Limited Institutional Controls	13,088,980	48,000	595,632	13,684,612
D - Shallow Barrier Wall Installed Between the Site and River; Limited Soil Capping; Natural Attenuation; Ground Water Monitoring; and Institutional Controls	1,225,056	48,605	603,193	1,828,193
E - Streambank Bioengineering; Limited Soil Capping; Natural Attenuation, Ground Water Monitoring; and Institutional Controls	345,300	43,504	647,809	993,109

* Present value is based on 7% discount rate with a term of 30 years.

TABLE 11. FEDERAL AND STATE LAWS AND REGULATIONS APPLICABLE OR RELEVANT AND APPROPRIATE TO THE SELECTED CLEANUP ACTION		
ACTION	CITATION	COMMENT
Cleanup Action Construction	29 CFR 1910	Occupational Safety and Health Act
	Ch. 43.21 RCW WAC 197-11	State Environmental Policy Act
	Ch. 296-155 WAC	Safety Standards for Construction Work
	Ch. 173-340	Model Toxics Control Act
	16 U.S.C. 1451 et. Seq. 15 C.F.R. Parts 923-930	U.S. Coastal Management Act
	Ch. 75.20 RCW	Construction Projects in State Waters
	WAC 220-110	Hydraulic Code Rules
	Ch. 173-14	Shoreline Management Act
Cleanup Standards	Ch. 70.105D RCW WAC 173-340	Model Toxics Control Act
	90.48 RCW WAC 173-201A	Water Quality Standards for Surface Waters of the State of Washington
	42 USC 300 40 CFR 141 and 143	Safe Water Drinking Act
	33 USC 1251	Clean Water Act
	Ch. 246-290 WAC	Safe Drinking Water Act for Public Water Supplies
Ground Water Monitoring	Ch. 174-50 WAC	Accreditation of Environmental Laboratories
	Ch. 173-160 WAC	Minimum Standards for Construction and Maintenance of Wells

APPENDIX A

RESTRICTIVE COVENANT

APPENDIX A

RESTRICTIVE COVENANT

The property that is the subject of this Restrictive Covenant is the subject of remedial action under Chapter 70.105D.RCW. The work that will be done to clean up the property and conduct long-term operation and maintenance (hereafter the "Cleanup Action") is described in [Agreed Order or Consent Decree No.] and in attachments to the [Order or Decree] and in documents referenced in the [Order or Decree]. This Restrictive Covenant is required by the Department of Ecology under Ecology's rule WAC 173-340-440 because the Cleanup Action on the Site will result in residual soil and ground water concentrations of Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAHs), Carbazole, Cyanide, Arsenic, Barium, Lead, and Selenium which exceed Method A or Method B residential cleanup levels.

The undersigned, [NAME OF PROPERTY OWNER], is the fee owner of real property (hereafter "the Property") in the [COUNTY], State of Washington, that is subject to this Restrictive Covenant. The Property is legally described in Attachment A of this Restrictive Covenant and incorporated herein by reference.

[NAME OF PROPERTY OWNER] makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

<u>Section 1</u>. No groundwater may be taken for domestic, commercial, industrial, or any other purposes from the Property unless the groundwater removal is part of monitoring activities associated with an Ecology approved compliance monitoring plan. No production well will be installed within the Property.

<u>Section 2</u>. Any activity on the Property that may result in the release or exposure to the environment of the contaminated soil or ground water that was contained as part of the Cleanup Action, or create a new exposure pathway, is prohibited without prior written approval by the Department of Ecology.

a. Excavation of contaminated soil is prohibited, unless approved by Ecology, for the following exceptions:

Excavation performed to repair, maintain, service or remove underground utility components, conduits, installations or channels.

Drilling, driving, of boring to install pilings for allowable and approved constructions.

b. All contaminated soils and or/ground water to be generated from approved excavation activities must be treated or disposed of according to all state, federal, and local regulations.

c. Workers conducting approved excavations must use appropriate personal protective equipment as required by the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA).

Section 3. The Owner of the Property shall adhere to the requirements of the Consent Decree and Cleanup Action Plan (CAP) issued by the Washington State Department of Ecology for the Property. Any activity on the Property that may interfere with the integrity of the Cleanup Action and continued protection of human health and the environment is prohibited. Examples of activities that are prohibited include:

a. Activities that would disturb the cap or cover of the contaminated soils, like drilling, digging, placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability, piercing the surface with a rod, spike, or similar item; bulldozing or earthwork.

b. Activities that would disturb or overload the stormwater system.

c. Excessive application of water for purposes such as irrigation, washing/rinse down pad, etc.

d. Use or storage of chemicals (e.g., solvents, detergents or other surfactants, etc.) that would result in the mobilization of contaminants in soils or ground water contained on Site.

This restriction recognizes that maintenance or construction activities at the Property conducted in accordance with the CAP requirements shall not constitute activities that interfere with the Cleanup Action.

Section 4. No activity is allowed that may change the hydrogeologic conditions and that would cause the movement of contaminated ground water to areas outside the impacted soil area.

Section 5. Any construction over the Site (i. e., buildings and concrete surfaces, pavement, etc.) must address and mitigate, as necessary, potential vapor build-up due to the contamination left on Site.

Section 6. The Owner of the Property must provide access and allow authorized persons to conduct ground water monitoring and cover monitoring as required in the Cleanup Action.

Section 7. The Owner of the Property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Cleanup Action on the Property.

Section 8. The Owner must restrict leases to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions herein on the use of the Property.

Section 9. The Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 10. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Cleanup Action; to take samples, to inspect Cleanup Actions conducted at the Property, and to inspect records that are related to the Cleanup Action.

Section 11. The Owner of the Property reserves the right under WAC 173-340-440 to record a1n instrument that provides that this Restrictive Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only if Ecology or a successor agency, after public notice and comment, consents in writing.

____________________________ ________________________

[NAME OF PROPERTY OWNER] [DATE SIGNED]

STATE OF WASHINGTON	)	
	)	ss.
COUNTY OF	)	

On this day, _________________________, personally appeared before me, known to me to be the person who appeared before me, and said person acknowledged that he/she signed this instrument and acknowledged it to be his/her free and voluntary act for the uses and purposes mentioned in this instrument.

GIVEN UNDER MY HAND and official seal this _____ day of __________, 2001.

____
Notary Public
My commission Expires:_______________