CLEANUP ACTION PLAN
CASCADE NATURAL GAS CORPORATION
Sunnyside, Washington

I. INTRODUCTION

Chapter 173-340 WAC, the Model Toxics Control Act ("MTCA"), specifies the criteria for approving cleanup at sites contaminated with hazardous materials. The MTCA requires that contaminated sites be investigated and Cleanup Action Plans be written and available for public review and comment prior to implementation. This Cleanup Action Plan ("CAP") provides for the remediation and monitoring of contaminated groundwater at the Cascade Natural Gas Facility ("Site") at Sunnyside Washington. The Site is located around and within 512 Decatur Avenue in Sunnyside, Washington. Soils and groundwater at the site were found to be contaminated during the closure and removal of underground storage tanks.

Ecology has identified two potentially liable parties ("PLP") at the Site; Cascade Natural Gas Corporation ("CNG") and Yakima County ("County").

Independent actions taken during underground storage tank removal at the Cascade Natural Gas property have substantially reduced the amount of contamination available which may reach groundwater. In addition, a Remedial Investigation/Feasibility Study (RI/FS) has been conducted, under Agreed Order No. DE 94TC-C165 and amendments thereto, at the Site to provide data used in determining if additional cleanup actions are needed at the Site. The completed RI/FS identified long-term groundwater monitoring and intrinsic bioremediation as the preferred alternative for additional cleanup. Ecology has selected this cleanup action based on data provided in the RI/FS.

The remediation activities described in this CAP include: long-term groundwater monitoring, intrinsic bioremediation, and implementing institutional controls to protect utility, maintenance, and construction workers from exposure to groundwater and soils that may be impacted by any residual contamination left at the site.

Statutory requirements (WAC 173-340-360) for cleanup actions at contaminated sites require: the protection of public health and the environment through compliance with cleanup standards established in WAC 173-340-700 and 760, compliance with applicable state and federal laws and provide for compliance monitoring. In addition, the law requires permanent solutions to the maximum extent practicable, to provide for a reasonable restoration time frame, and consideration of any concerns raised during public comment on the draft cleanup action plan.

Conditional points of compliance and cleanup levels have been established for the facility in accordance with WAC 173-340-360. Figure 1 shows conditional points of compliance for the facility and Table 1 shows the groundwater baseline monitoring levels for the contaminants found on site. These conditional points of compliance are necessary to show that the contaminate plume, contained in the groundwater, is being remediated and is not migrating or threatening public health and the environment.

II. BACKGROUND

A. Site History

Beginning around 1936, two to four underground storage tanks ("USTs") were located on this Site. Yakima County operated the property as a county shop and installed and operated at least two, and perhaps three, of these USTs, one for gasoline and one or two for diesel fuel; the County's ownership and operation of these USTs continued until 1956. When it vacated the Site in 1956, the County left all of its USTs buried at the Site. It is unclear whether one, two, or three USTs were still in operation when the County left the Site.

From 1956 to 1969 two automobile sales and service operations ("Dealers") occupied the Site. It is unclear as to which, if any, of the USTs were utilized by the Dealers. From the mid-1950s until the mid-1960s, one or two of the USTs may have been used to store fuel to heat the on-site buildings. The building was then converted to gas and electric heat. In 1960, a fourth UST, for gasoline, was installed near the three older USTs. By the mid-1960s, it is certain that all other USTs had ceased to be used, but all remained at the Site. In the mid-to-late 1960s the Site was wholly covered with asphalt, leaving only the dispenser for the newest gasoline UST visible. Each Dealer ultimately left the Site, and all, apparently, have ceased to exist.

In 1969 CNG began leasing the Site. Then in 1979 CNG purchased the Site. CNG staff have submitted statements that diesel fuel was never used at the Site. CNG did use the new gasoline UST from 1969 until 1988. In 1990, to comply with Washington's new UST regulations, CNG retained a contractor to excavate the one UST of which CNG was aware. At that point CNG discovered the remaining three other USTs, and also learned, for the first time, that both soil and groundwater beneath the Site contained gasoline, diesel, volatile, and semi-volatile organic compounds at levels above those that require remedial action under Washington's applicable regulations.

CNG has voluntarily undertaken activities to investigate and remediate the contamination. CNG has removed and remediated contaminated soil at the site. In addition, CNG has investigated potential diesel, gasoline, and volatile organic compounds contaminating the groundwater at the Site through the installation of monitoring wells and storm drain and sewer line monitoring.

In 1995 CNG completed a Remedial Investigation/Feasibility Study (RI/FS) at the site in order to assess potential threats attributable to the contamination. The conclusion, from the analysis of data collected during the RI/FS, is that long-term groundwater monitoring and natural attenuation and degradation will be sufficient to protect human health and the environment, and is the preferred alternative for cleanup.

B. Contaminants of Concern

Contaminants found in the groundwater and soil at the facility include: TPH-Gasoline, TPH-Diesel, BTEX, Naphthalene, 1,2-Dichloroethane, 2-Methylnaphtalene and Pentachlorophenol, Acetone and

TABLE 1
CASCADE NATURAL GAS SUNNYSIDE
Groundwater and County Drain Baseline Concentrations

WELL	BENZENE	ETHYL-BENZENE	TOLUENE	XYLENES	1,2-DICHLORO-ETHANE	TPH-G	TPH-D
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-2	<1.0	<20	<20	<10	<10	<50	<250
MW-3	2900	330	240	280	460	5200	7900
MW-4	120	59	95	65	27	4100	1200
MW-5	78	26	180	240	To be determined	5700	1100
MW-6	<0.50	<0.50	<0.50	<1.0	To be determined	<50	<250
MW-7	<0.50	<0.50	<0.50	<1.0	To be determined	<50	<250
MW-8	<0.50	<0.50	<0.50	<1.0	To be determined	<50	<250
MW-9	<1.0	<20	<20	<10	10	75	5100
MW-11	<1.0	<20	<20	<10	11	<50	<250
CD-E	<2.0	<5.0	0.73	<5.0	<2.0	<50	<250
CD-W	30	18	1.2	<5.0	<2.0	<50	< 250
Cleanup levels are shown in Table 2.							

< values are not detected at the shown reporting limit.

Methylene Chloride. Of these contaminants TPH-Gasoline, TPH-Diesel, BTEX, Naphthalene, 2-Methylnaphtalene and 1,2-Dichloroethane have been found in the groundwater beneath the site.

Groundwater Contaminants

Several petroleum hydrocarbon constituents have been detected at concentrations in excess of the cleanup levels established for the site. Because natural attenuation and intrinsic bioremediation processes occur over time, it is normal for one or more of the monitoring wells to exhibit concentrations of some petroleum hydrocarbon constituents in excess of the established cleanup level.

The Dichloroethane has been found in the upgradient wells in concentrations that are lower than those found in the downgradient wells. This groundwater data, and data collected during soil removal at the site, indicates that there may be offsite and onsite sources for the Dichloroethane. Soil analysis during the construction of the monitoring wells has failed to reveal a source for this contamination. The onsite source may have been removed during the removal of the tanks or the source is still present and its location has not been detected during soil sampling activities.

Naphthalene and 2-Methylnapthalene are constituents of both gasoline and diesel and have been found in the groundwater at the Site. These constituents are commonly detected during extended BTEX runs on a gas chromatograph and are included in the TPH-G and TPH-D analysis. Since they can be effectively monitored through the TPH detection methods additional monitoring for these constituents will not be required.

Gasoline and Diesel, TPH-G and TPH-D, have been found in the groundwater beneath the site. These contaminants are found in concentrations above the MTCA Method-A cleanup levels.

Benzene, toluene, ethylbenzene, and xylene (BTEX) are common constituents of gasoline and have been found in the groundwater beneath the Site. This CAP establishes drinking water maximum contaminant levels (MCLs), and MTCA Method A and Method B cleanup levels, at the Site, for these contaminants. The MTCA Method A cleanup levels (WAC 173-340-720 Table 1) for ethylbenzene, toluene, and xylene were established to prevent adverse aesthetic characteristics to groundwater. Although the groundwater beneath the site is not a drinking water source nor is it a potential drinking water source WAC 173-340-710 requires that all cleanup actions comply with applicable state and federal laws.

Soil Contaminants

The petroleum contaminants TPH-G, TPH-D, and BTEX were detected at concentrations above the MTCA Method A cleanup levels during the removal of the underground storage tanks. During the interim action this soil was removed from the Site and remediated at an off-site location. Contaminated soil was collected in the tank pit from below the water table during the interim action. This soil had contamination above MTCA Method A cleanup levels. Technical difficulties in handling and transporting saturated soils prevented the removal of this soil. The pit was subsequently backfilled with clean fill material.

Pentachlorophenol("penta") was detected in the soil stockpiled from the interim action excavation and in the soils in monitoring well MW-9. The soil removed from the excavation was removed from the site to an approved landfill. Penta was detected in the soil (5.2 mg/kg) at the 4.5 to 5.0 feet interval in MW-9. It was not detected below that level in the boring. This indicates that the penta is not mobile. The penta was detected in concentrations below the MTCA Method B cleanup level (8.3 mg/kg). Penta has not been detected in the groundwater at the site. The possibility of mobilizing the penta through meteoric water percolating through the vadose zone is unlikely since the area where it was detected is paved with an asphaltic surface.

Acetone and Methylene Chloride were detected in the excavated soils which were stockpiled at the site. The compounds were detected in the samples for analysis and in the laboratory method blank. Since the analytes were detected in similar concentrations in the method blanks the contamination is suspected to be a result of laboratory contamination. Both of these compounds are common laboratory reagents. These contaminants were not detected in any of the soil samples collected during the construction of monitoring wells. The soils stockpiled on site have been removed to a permitted landfill.

No free liquid phase hydrocarbons have been detected in any of the monitoring wells that have been installed at the site.

C. Site Hydrogeology

The City of Sunnyside and the CNG Site are located within the Yakima fold belt of the Columbia Plateau Physiographic region. The fold belt is composed of east-west trending anticlinal ridges and synclinal basins. The site is located in a basin formed by the Snipes Mountain Anticline on the south and the Rattlesnake Hills Anticline on the north. The basin is underlain by downwarped Miocene flood basalt of the Columbia River Basalt Group, and filled with the lacustrine and fluvial sediments of the Pliocene Ellensburg Formation, Quaternary flood deposits from the Spokane Floods, loess deposits and Recent alluvium from stream valleys.

Cores taken at the site revealed that Quaternary or Recent stratified silts, sands and clays underlie the site to a depth of approximately 20 feet. These findings are consistent with other sites investigated within Sunnyside. The permeability at the site is estimated to be from $1X10^{-6}$ to $1X10^{-1}$ ft/min increasing in permeability with depth. Groundwater at the site fluctuates seasonally by approximately one foot with the groundwater high corresponding to the spring runoff. The groundwater flow direction is to the south and southwest toward underground drains installed by the city and county. The drains were installed to lower the groundwater in the vicinity of the site and to provide for surface water runoff. The drains are accessible, via manholes, and have been tested to determine the amount of contamination present. The test results show that contamination, similar to the contamination found in the on-site groundwater, is present in the drains. The downgradient drain, CD-West, has a higher contaminant concentration than CD-East. However, Method A and B levels for the contaminants of concern for surface water have not been exceeded. These drains effectively provide a barrier that prevents the contamination from spreading south of the site. This has been confirmed by the placement of monitoring wells on each side of the drain.

III. REGULATORY REQUIREMENTS

The criteria for selection of a cleanup alternative at a contaminated site is addressed in WAC 173-340-360. This regulation requires that the cleanup criteria chosen: shall protect health and the environment, shall comply with cleanup standards established in WAC 173-340-700 and 760, shall comply with applicable state and federal laws and shall provide for compliance monitoring. The cleanup action conducted shall: use permanent solution as much as possible, provide for a reasonable time line for cleanup and address any public concerns about the cleanup.

A. Applicable State and Federal Laws

WAC 173-340-710 requires that cleanup actions comply with all relevant and applicable state laws. The law which is applicable to this cleanup is the State Environmental Protection Act (SEPA). SEPA notification must be completed prior to cleanup at this site.

B. Cleanup Standards

Cleanup standards are a combination of cleanup levels which protect public health and the environment and points of compliance (locations where these cleanup levels must be attained).

Cleanup standards are identified for the particular hazardous substances at a site and the specific areas or pathways where humans and the environment can become exposed to these substances (WAC 173-340-700(2)(a)). Contaminants of concern have been identified at the Site. Pathways identified in the RI/FS include contaminated groundwater entering the established storm drains constructed under Decatur Street and construction workers who may dig beneath the site and come in contact with contaminated groundwater or residual contamination, if any, left in the soil.

Since the contamination is confined at depth in the soil or dissolved in the groundwater, casual contact with the contamination is not possible. Only under unusual circumstances such as major building construction or excavation to repair or replace underground utilities will the contaminated soil or groundwater be exposed.

The shallow groundwater at the site is not utilized as a drinking water supply nor is it anticipated to be a future drinking water supply, therefore there is no chance for casual or continuous ingestion of or contact with the groundwater. Groundwater entering the underground drains has not exceeded the Method B cleanup criteria for surface water. Institutional controls implemented through the restrictive covenant will prevent the withdrawal of groundwater at the Site without the direct approval of Ecology.

Cleanup standards for the site have been established which will protect public health and the environment. These standards are in accordance with WAC 173-340-360.

C. Cleanup Levels

Cleanup levels established for the site are Federal Maximum Contaminant Levels (MCLs) and the MTCA Method A and Method B cleanup levels as appropriate. In accordance with 173-340-700 and 705, MCLs and Method B are the applicable cleanup level for all sites in Washington State. When MCL and appropriate Method B cleanup levels, whichever is most stringent, (as shown on Table 2) have been achieved cleanup will be considered complete and no further cleanup action will be necessary when Method A cleanup levels (as shown on Table 2) have been achieved. The Method A cleanup levels for groundwater are specified in WAC 173-340-720 and are periodically published by Ecology in the MTCA Cleanup Levels and Risk Calculation (CLARC II) Updates. In addition, Method B cleanup levels also allow the use of Method A tabular values from WAC 173-340-720 and Practical Quantitation Limits (PQLs) as appropriate. Method B cleanup criteria for soil are specified in WAC 173-340-740 and are also published in CLARC II. Method B cleanup criteria for surface water are specified in WAC 173-340-730 and are also published in CLARC II. The selected cleanup levels for various media at the CNG Site are presented in Table 2 below. The use of PQLs as cleanup levels is discussed in Ecology's November 24, 1995 Implementation Memo No. 3.

TABLE 2

Constituent	Groundwater Cleanup Level (mg/l) ug/L	Soil Cleanup Level (mg/kg)	Surface Water Cleanup Level (mg/l) ug/L
TPH-g	1,000 (Method A)	100 (Method A)	NA
TPH-d	1,000 (Method A)	200 (Method A)	NA
Benzene	5 (Method A)	0.5 (Method A)	43 (Method B)
Toluene	1,600 (Method B)	160 (Method B-Groundwater Protection)[1]	48,500 (Method B)
Ethyl Benzene	800 (Method B)	80 (Method B-Groundwater Protection)	6,910 (Method B)
Xylenes	16,000 (Method B)	1,600 (Method B-Groundwater Protection)	NA
1,2-Dichloroethane	5 (Method A)	0.005[2]	59.4 (Method A)

1 Model Toxics Control Act Cleanup Regulation WAC 173-340-740(3)(a)(ii)(A)and Model Toxics Control Act Cleanup Levels and Risk Calculation (CLARC II) Update August 31, 1994. Soil cleanup level is equal to 100 times the Method B groundwater cleanup level.

2 PQL for 1,2-Dichloroethane.

D. Points of Compliance

The points of compliance for the facility shall be the contaminated area, including soil and groundwater, in its entirety. Monitoring points, consisting of monitoring wells, have been installed around the facility to insure that contamination does not increase with time or migrate toward potential receptors.

E. Protection of Public Health and the Environment

Site specific data collected during the RI/FS indicates that there are no receptors utilizing the shallow groundwater affected by the contamination at CNG. Monitoring wells have been installed, for groundwater sampling, around the perimeter of the site. Contaminant concentration baseline limits have been established, shown in Table 1, for groundwater at the perimeter wells. By establishing baseline limits and data it is possible to monitor the continued intrinsic biodegradation of the contamination. If there are exceedences of the baseline limits additional sampling or remediation may be required at the site. Actions to be taken in the event of exceedences are described in the Monitoring Well Network section of this Plan.

F. Institutional Controls

Institutional controls shall be established for the facility. The controls shall consist of a deed restriction which shall restrict the use of the land to commercial uses until the established cleanup levels are attained at the site. The restrictions shall require additional soil cleanup or removal if, at any time during the life of the site, there is construction which exposes any contaminated soils which may have been left on site. The contaminated soils exposed by such construction shall be remediated or removed from the site. Soil testing to quantify the amount of contamination present and conformational testing to insure all contamination has been removed shall be conducted during any additional cleanup activities. Any contaminated soils removed from the site shall be disposed of in a manner consistent with all applicable laws and regulations.

In addition, the covenant will restrict future use of groundwater which may be withdrawn at the site.

The deed restriction, attached to the Consent Decree as Exhibit 3, must be notarized and filed with Yakima County within 120 days of the effective date of the Decree.

G. Selection of Cleanup Actions

The Model Toxics Control Act 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 (WAC 173-340-360(1)(a)). Cleanup technologies at contaminated sites have been prioritized to minimize the amount of untreated hazardous substances remaining at a site. The priority of treating hazardous substances are, in descending order of preference: Reuse or recycling, destruction or detoxification; separation or volume reduction followed by reuse, recycling, destruction or detoxification of the

residual hazardous substance; immobilization of hazardous substances; on-site or off-site disposal at an engineered facility designed to minimize the future release of hazardous substances and in accordance with applicable state and federal laws; isolation or containment with attendant engineering controls; and institutional controls and monitoring.

Remedial Technologies Soils

Interim actions at the facility included the removal and treatment of the petroleum contaminated soil. During the tank removal the majority of the contaminated soil was removed for off site treatment. The excavated soil was treated by landfarming to reduce the toxicity and then reused as cover material in a permitted solid waste landfill. Soil sampling during the removal revealed that an unknown quantity of residual contaminated soil was left on site beneath the water table. It was not feasible to remove this soil due to technical problems associated with the removal and disposal of saturated material. These problems include the transportation and disposal of the saturated soil without spillage, endangerment along the transportation route, and runoff and infiltration during treatment.

The residual contaminated soil left in the upper saturated zone pose no threat to public health and the environment. The soil will continue to slowly release contamination into an aquifer which is not a drinking water source. Points of compliance have been established which will detect any movement of the contamination beyond the facility boundary.

Vapor Extraction System (VES)

Vapor extraction tests were performed at the Manhole 34 site, located approximately four city blocks north of the CNG Site, to determine the feasibility of using VES for soils and groundwater remediation. The soil and hydrogeology of the Manhole 34 site are virtually identical to the CNG site. Data generated from the tests indicated that VES is not a feasible method of site remediation.

Soil borings from the CNG site show that the soils are composed of deposits of stratified silt, clay and sand. Although the gross permeability of the deposits appear to be sufficient for an effective VES, the fact that the lower permeability sands are less contaminated than the intercalated silts and clays decreases extraction effectiveness by allowing preferential air flow in the sands rather than through the less permeable silt and clay.

The site is paved which enhances the effectiveness of VES, however it also prevents soil drying. The presence of water within the pores of the fine grained soil reduces the intrinsic permeability of the formation, reducing the effectiveness of the VES.

The RI/FS identified that VES will not work at the site due to the low intrinsic permeability and soil stratification. Monitoring and institutional controls will protect public health and the environment at this site.

Remedial Technologies Groundwater

Pump and treat for groundwater

The aquifer beneath the site is composed of silt, sand and clay. These deposits generally yield water readily from the sandy strata and very slowly, if at all, from the silty or clay units.

The area affected by the contamination is served by the City of Sunnyside municipal water wells and it is unlikely that any new single domestic wells will be installed in the affected area in order to provide a potable water source.

The City of Sunnyside municipal wells are not at risk if contamination migrates. They are completed to depths which will prevent the possibility of contamination and are crossgradient to the site.

Groundwater monitoring at the site revealed that there may be an on-site source of 1,2-Dichloroethane at the Site. This solvent is more dense than water therefore it migrates downward through the water column until an impervious strata is reached. It does not readily sorb to soil surfaces except where organic carbon is present. This property allows the material to pass rapidly through the soil column and enter the groundwater where it is dissolved and transported in the groundwater.

The source for the dichloroethane was not detected during soil sampling and monitoring well construction. Finding a small point source release would mean constructing additional wells or soil borings. The additional cost of this sampling and the subsequent removal and disposal of contaminated soils, if the source could be found, would afford no greater protection of public health and the environment than leaving the soil in place with institutional controls and conducting monitoring to insure the contamination does not migrate.

The hydrogeologic conditions at the site as discussed above show that the site is unacceptable for groundwater remediation through a pump and treat system.

G. Permanent Solutions

During excavation for tank removal contaminated soil was removed for off-site treatment. Additional contaminated soil was removed prior to filling the excavation. Soil sampling during these removals revealed that soils contaminated with petroleum products above MTCA Method A levels were removed. In addition to the soil removal at the site, the majority of the site is paved, preventing the mobilization of any residual contamination through meteoric water infiltration.

Source control, the interim action, has been a permanent solution for preventing continued groundwater contamination at the site.

No additional soil removal or treatment is expected unless there are site disturbances, such as construction, or there is an increase in contamination in the downgradient wells.

H. Restoration Timeframe

Ecology has evaluated all available data for determining a restoration time frame at the CNG site. The following were considered in determining the reasonableness of the chosen cleanup action.

1. The potential risks to human health and the environment are periodic exposure by workers repairing or installing underground utilities at the site and groundwater discharging to surface water via underground drains south of the site. The RI/FS data indicates that the residual contamination on and off site is limited to those dissolved in groundwater. Institutional controls are proposed which will be protective to these workers.

2. WAC 173-340-360(6) allows a longer restoration time frame for a site, to achieve cleanup levels at the point of compliance, if higher preference cleanup technologies are used. The proposed cleanup method will result in the complete destruction of the contamination through bioremediation rather than a media transfer such as that which occurs in a pump and treat system where the contamination is removed through carbon filtering. Ecology generally expects a site to be remediated within a generation (20 years) however, due to the site hydrogeology and the method of remediation, a longer restoration is anticipated at this site. Ecology has determined that a period of 30 years should be adequate to remediate this site.

3. The site is currently a commercial site within the city limits of Sunnyside, Washington. It is bounded on the south and east by commercial businesses. To the west is a mobile home park and to the north is a single family residence. There is no groundwater use in the area; all city residences utilize city water. The groundwater flow is from the northeast toward the southwest. Residences to the north and west of site could not be affected due to the flow direction. Stormwater drains to the west and south of the site will intercept the contamination before it enters the adjacent properties. Ecology has promulgated laws and regulations which will adequately prevent the placement of an improperly constructed water supply well within influence of the contaminated vicinity.

   Groundwater discharging to the underground stormwater drains have been tested and will continued be tested to insure MTCA surface water standards are not exceeded.

4. Potential future uses of the site and the surrounding area are not expected to change.

5. Groundwater from the shallow aquifer in the city of Sunnyside is not a source of drinking water. The city requires that residences and businesses use city-provided water.

6. The institutional controls at the site include physical measures, the site is paved to prevent contact with the groundwater contamination, and a deed restriction which will be filed and notarized.

7. A deed restriction will prevent groundwater withdrawal wells from being placed on the site. In addition, RCW 90.54.020(7) The Water Resources Act of 1971, encourages the establishment of public and privately owned water supply systems. Chapter 18.104 RCW requires Ecology be notified prior to a well being constructed within the state. WAC 173-160-205(2) prevents a water withdrawal well from being located within minimum distances of sources of contamination without Ecology providing a variance prior to construction of the well. It is Ecology's policy to prohibit the construction of individual water supply wells if there is a public water supply system available. Since the site is located within minimum distances of pollution sources a variance would be required prior to the construction of any domestic use well. These laws and regulations will adequately prevent domestic water supplies from being installed in the vicinity of the contaminated site.

8. Contamination migrating from the site can be effectively monitored through the network of monitoring wells established at the site. The periodic monitoring of the groundwater from these wells will insure that the remediation is progressing and the groundwater will not pose a threat to human health and the environment.

9. The toxicity of the hazardous substance at the site were considered when choosing this cleanup alternative. Due to the low probability of exposure and the institutional controls which will be placed upon the site Ecology determined that the chosen alternative is protective of human health and the environment.

10. The contaminants found at this site are well documented to be readily remediated at sites with similar conditions. Therefore intrinsic bioremediation will be an effective cleanup alternative at the site.

V. REMEDIAL TECHNOLOGIES

Cleanup technology selected for the site is intrinsic bioremediation in conjunction with institutional controls and monitoring of the groundwater. This technology was chosen because, do to site specific conditions, it will provide an overall protectiveness of human health and the environment.

VII. PUBLIC COMMENT

This draft document will be available for public comment, and comments will be incorporated into the final Cleanup Action as appropriate. The Draft RI/FS for Cascade Natural Gas was circulated for pubic comment. The document was available at the Sunnyside Library and Ecology's Central Regional Office in Yakima Washington. The availability was published in a legal advertisement in the Yakima Herald Republic on January 1, 1995, and in the Sunnyside Daily Sun News on

January 5, 1995. Focus Sheets were sent to concerned citizens and local governmental agencies in the Sunnyside area. No comments were received on the draft RI/FS.

VIII. CONCLUSIONS

Site specific data collected and evaluated in the RI/FS and this CAP identified no receptors utilizing groundwater at or around the site. Only under unusual circumstances would there be exposure to the residual contamination left at the site. The hydrogeologic conditions found at the site are not favorable to constructing a groundwater pump and treat system or a vapor extraction system. Ecology has determined that the proposed cleanup action, consisting of intrinsic bioremediation, long-term groundwater monitoring and institutional controls, is in compliance with the threshold requirements of Chapter 173-340 WAC.

IX. WORK TO BE PERFORMED

Field sampling will consist of the following:

1. Obtaining water level measurements in each well accurate to one one-hundredth of a foot (.01 foot).

2. Utilizing an oil-water interface meter to determine if free petroleum products are present in the well.

3. Obtaining representative water samples from wells for analytical testing.

4. Analytes to be tested include WTPH-G, WTPH-D, BTEX compounds and 1,2-Dichloroethane. Reporting limits will be analytical detection limits.

5. All analytical results will be reported in units of micrograms per Liter and in graphs with concentration over time and as tables.

6. A water table contour map shall be prepared and submitted showing groundwater elevations and flow directions after each sampling event.

7. Wells to be sampled are: MW-3, MW-4, MW-5, MW-6, MW-7 and MW-8, MW-9. See Figure 1 for locations. With the exception of well MW-3, which has historically exhibited the highest concentration of the chemicals of concern, these wells are located on the downgradient periphery of the contiguous contaminated area. These wells are strategically located to monitor potential migration of chemicals in groundwater downgradient of the CNG Site and the subsurface county drains.

   Samples of water from the county drain at locations CD-West and CD-East have not exceeded EPA or MTCA Method B surface water criteria for the chemicals of concerns. Continued monitoring of the county drain will be required if a significant

increase above the baseline concentration of a chemical of concern is identified in well MW-3 which is located nearby, and upgradient of, the county drain. In the event of a potential significant increase in well MW-3 (a significant increase for MW-3 is a 1% increase in the contamination from baseline as shown in Table 1), water samples will be collected from the county drain at location CD-West and CD-East (as shown on Figure 1) when well MW-3 is resampled in accordance with the requirements specified below in the Monitoring Network section of this plan. No further remedial action regarding the county drain will be necessary if the concentrations of the chemicals of concern do not exceed MTCA Method B surface water criteria shown on Table 1.

8. The wells shall be sampled once every three months (quarterly). The frequency of sampling shall be evaluated by Ecology on a yearly basis and may be reduced or maintained depending upon the results of previous analytical results. In addition, if after a five-year period the monitored wells exhibit a trend of decreasing concentrations of the chemicals of concern, then the monitoring program will be reevaluated by Ecology to assess the potential to terminate the program. The decision process to evaluate the monitoring frequency is discussed below in the Monitoring Network section of this plan. The schedule for sampling these wells is included in Appendix A.

9. All monitoring wells constructed at the Site shall be maintained in good condition as per the standards established in WAC 173-160. The wells shall be maintained to allow opportunity sampling by Ecology or Cascade Natural Gas.

X. REPORTING REQUIREMENTS

All analytical results shall be reported in the following manner:

1. Copies of all data sheets received from the laboratory will be submitted to Ecology. This includes all chromatographs and data showing any QA/QC analysis run by the laboratory.

2. All data will be presented in tables and graphically showing concentration over time.

3. The most recent sampling and analysis shall be presented as received from the lab as stand alone documents.

4. A brief report explaining the procedures used, anything unusual noted during sampling, the condition of each well and a discussion of the data will be submitted within 45 days of each sampling event.

5. All wells shall be surveyed to determine the latitude and longitude which shall be reported to Ecology in the first quarterly report.

6. The Ecology Site Manager shall be notified within 5 working days should free liquid petroleum products be discovered in any of the monitoring wells.

XI. FIELD SAMPLING AND QA/QC PLANS

A Field Sampling and QA/QC Plan shall be developed by CNG in accordance with the schedule in Consent Decree No. _____. If a QA/QC plan has been developed for other Site work it may be modified and submitted for Ecology review to reflect the current sampling activities.

XII. MONITORING NETWORK

Groundwater contamination above MTCA cleanup levels has been detected in several off-site and on-site wells. To effectively evaluate contaminant degradation over time, baseline levels of contamination have been, or will be, established for each well to be sampled. Table 1 identifies each well to be sampled and the maximum, or baseline, concentrations which have been detected in that well during 1993 and 1994 sampling events. If these baseline concentrations are exceeded, there is a possibility that additional contamination is moving off or onto the site.

With intrinsic biodegradation, the contaminant concentration at the point of compliance should decrease rather than increase over time. If, after the first year of sampling and review, contaminant concentrations do not show a significant increase (i.e., 1 percent or more above the base line concentrations shown on Table 1) in any of the monitored wells, the frequency of sampling may be reduced to a semiannual (twice yearly) basis with monitoring events to be completed during the periods of historically low and high groundwater levels. The absence of any significant increases and the maintenance or decrease of chemical concentrations in all wells after the second year review may result in an additional reduction of sampling frequency or the number of wells to be sampled. The modified sampling schedules will be established at the mutual agreement of the Ecology Site Manager and CNG.
Since 1,2-Dichloroethane has not been tested in water samples from MW-6, MW-7 and MW-8, the baseline concentration will be established after the first round of sampling.

The Ecology Site Manager will be notified within 10 days of PLP's receipt of final written analytical results which show that an agreed upon baseline level has been exceeded. If the baseline level has been exceeded by 1% or greater the PLPs may be required to submit an exceedance report to the Ecology Site Manager within 60 days. The exceedance report will assess the cause and significance of the exceedance and will propose a response. The Ecology Site Manager may specify responses to be implemented by the PLPs.