STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

In the Matter of Remedial Action by:	)	EMERGENCY ENFORCEMENT ORDER
Dan Alexander	)	No. DE 98TC-C138
TO: Dan Alexander 619 Winslow Way West Bainbridge Island, WA 98110	)	

I.

Jurisdiction

This Order is issued pursuant to the authority of Revised Code of Washington (RCW) 70.105D.050(1).

II.

Statement of Facts

1. On April 15, 1998, Ecology received a complaint concerning contaminated groundwater from a domestic well located at 179301 West King Tull Road near Grandview, Washington. Ecology responded to the complaint. On April 22, 1998, the well water at the site, which had a distinct yellow color to it, was sampled, analyzed, and found to contain the banned herbicide Dinoseb. Dinoseb, which is a phenolic based herbicide commonly used before 1986, was detected in the groundwater at a concentration of approximately 300 micrograms per liter (µg/l). The State of Washington Model Toxics Control Act (MTCA) method B cleanup level for Dinoseb in groundwater is 16 micrograms per liter (µg/l). The U.S. EPA federal drinking water standard is 7 micrograms per liter (µg/l). The sale and use of Dinoseb was banned by the U.S. Environmental Protection Agency by emergency order in 1986.

2. Additional investigation of an adjacent property at 179101 West King Tull Road revealed that the ground surface near the contaminated well was stained yellow, a color commonly associated with the herbicide Dinoseb. A soil sample of the ground surface was obtained at the adjacent property with the permission of the tenant and analyzed for Dinoseb. The

analysis of this soil sample showed Dinoseb at a concentration exceeding 400 milligrams per kilogram (µg/kg). The MTCA Method B cleanup levels for soil, protective of groundwater, is 1.6 milligrams per kilogram (µg/kg). The contaminated soils are located approximately 75 feet from the well described above in 1. The contaminated well was being used as a source of drinking water for the 179301 West King Tull Road residence.

3. Mr. Dan Alexander ("Defendant"), of 6912 Winslow Way West, Bainbridge Island, Washington, is the current owner of the property located at 179101 West King Tull Road where the Dinoseb contaminated soil is located. According to Mr. Alexander, he has owned the property since 1978. Mr. Alexander has leased the property to the owner of a well drilling company, from 1991 to the present. Mr. Alexander was also the former owner of the home located at 179301 West King Tull Road which is adjacent to the 179101 West King Tull Road property. Mr. Alexander sold this home in 1992 to the current residents. Mr. Alexander has a real estate contract with these persons and holds the title to the property.

4. On April 22, 1998, while sampling the Alexander groundwater and soils, Ecology investigators received another complaint about "yellow colored" well water in a domestic well located at a residence at 4902 North Hicks Road, approximately 1.25 miles south of the Alexander West King Tull Road property. This well was sampled on April 23, 1998, and found to also contain Dinoseb. The Dinoseb concentration in this well was measured to be approximately 100 micrograms per liter (µg/l).

5. Upon inspection of a Sunnyside Valley Irrigation District (SVID) irrigation water distribution map, an inlet for a southerly flowing irrigation water lateral was shown to be located adjacent to the Alexander West King Tull Road property (SVID diversion 49.90). It was further determined from the map, and confirmed by Don Schramm of the SVID, that the terminus of lateral 49.90 is located at 4902 North Hicks Road at the southern residence (SVID turnout No. 17 from diversion 49.90). A vicinity map and the potentially affected area are shown in Figure 1. A soil sample collected at 4902 North Hicks Road, SVID 49.90 terminus, on May 1, 1998, (adjacent to the irrigation weir box) was analyzed and found to contain approximately 20 milligrams per kilogram (µg/kg) Dinoseb.

III.

Ecology Determinations

1. Mr. Dan Alexander is an "owner or operator" as defined in RCW 70.105D.020(11) of a "facility" as defined in RCW 70.105D.020(4).

2. The facility is known as the **Alexander Farms** facility. The Alexander Farms facility includes all areas where Dinoseb has contaminated soil and groundwater at the West King

Tull Road site including the residence at 179301 West King Tull Road, the parcel 179101 West King Tull Road, the site located at 4902 North Hicks Road, and any additional properties served by the SVID diversion 49.90, near Grandview, Washington.

3. The substances found at the facility as described above are "hazardous substances" as defined at RCW 70.105D.020(7).

4. Based on the presence of these hazardous substances at the facility and all factors known to the Department, there is a release or threatened release of hazardous substances from the facility, as defined at RCW 70.105D.020(19).

5. By letter dated May 6, 1998, Ecology notified Dan Alexander of his status as a "potentially liable person" under RCW 70.105D.040 in accordance with WAC 173-340-540.

6. Pursuant to RCW 70.105D.030(1) and 70.105D.050, the Department may require potentially liable persons to investigate or conduct other remedial actions with respect to the release or threatened release of hazardous substances, whenever it believes such action to be in the public interest.

7. Based on the foregoing facts, Ecology believes the remedial action required by this Order is in the public interest.

8. This Enforcement Order is being issued on an emergency basis.

IV.

Work to be Performed

Based on the foregoing Facts and Determinations, it is hereby ordered that Dan Alexander take the following remedial actions and that these actions be conducted in accordance with Chapter 173-340 of the Washington Administrative Code (WAC) unless otherwise specifically provided for herein. These actions shall be completed by the dates specified in Attachment "C" "Schedule for Interim Action and Remedial Investigation/Feasibility Study Deliverables." Attachment "C" is hereby incorporated into this Order by reference and is an integral and enforceable part of the order.

1. The Defendant shall take immediate action to provide site security to control access to the 179101 West King Tull Road site.

2. The defendant shall immediately manage the waste soils that were excavated at the facility on April 26, 1998, designating and disposing of them in accordance with WAC 173-303 (Washington State Dangerous Waste Regulations).

3. The defendant shall inventory and arrange for the disposal of any and all banned or discontinued pesticides that may be stored at the West King Tull Road site.

4. The defendant shall immediately provide for alternative drinking, bathing, washing, and stock water sources for those individuals within the facility boundaries whose well water tests to contain greater than 7 micrograms per liter (µg/l) Dinoseb. For all other individuals within the facility boundaries, either provide an alternate potable water supply or conduct well sampling for said individuals, on a weekly basis until further notice.

5. Within seven (7) days of the receipt of this order the Defendant shall hire and provide Ecology the name of an environmental engineering contractor experienced in the remediation, designation, and disposal of pesticide contaminated soil and groundwater.

6. The defendant shall, within fifteen (15) days, provide to Ecology a written work plan for an interim action (IA) emergency soil removal and emergency groundwater monitoring within the boundaries of the facility. The IA work plan shall include: an excavation and removal plan for all soils within the boundaries of the facility that exceed 1.6 milligrams per kilogram (ppm); a sampling and analysis plan designed to define the horizontal and vertical extent of the excavation; a Quality Assurance/Quality Control plan written in accordance with Ecology's "Guidelines and Specifications for Preparing Quality Assurance Projects Plans" per WAC 173-340-820; a plan for the designation and disposal of waste contaminated soils generated during the excavation consistent with WAC 173-303; a site safety plan that addresses all potential exposure pathways for those conducting the facility cleanup and those living near the cleanup site in accordance with WAC 173-340-810; and a groundwater monitoring plan that includes the construction of six (6) or more groundwater monitoring wells at the West King Tull Road site and six (6) or more groundwater monitoring wells at the North Hicks Road site. The number and location of the wells shall be sufficient to determine the horizontal and vertical extent of groundwater contamination at each and any other site within the facility boundary. Groundwater monitoring well construction and water quality monitoring shall begin as specified in Attachment "C". Groundwater samples shall be collected and analyzed in accordance with the approved sampling plan weekly for the first two weeks, bi-weekly for the next four weeks, monthly until October 30, 1998, and quarterly until further notice.

7. In addition to the emergency interim action soil removal and emergency groundwater monitoring, the Defendant shall, by the dates specified in Attachment "C", provide Ecology with a written workplan for a Remedial Investigation/Feasibility Study (RI/FS) as

described in Attachment "A" "Scope of Work for RI/FS Work Plans under Chapter 173-340 WAC". Attachment "A" is hereby incorporated into this Order by reference and is an integral and enforceable part of the Order.

8. In accordance with WAC 173-340-840(5), all IA and RI/FS groundwater sampling data shall be submitted according to Attachment "B": GROUNDWATER SAMPLING DATA SUBMITTAL REQUIREMENTS. These submittals shall be provided to Ecology on paper and in electronic format no more than ten (10) days after each groundwater sampling event. Attachment "B" is hereby incorporated into this Order by reference and is an integral and enforceable part of the Order. The results and analyses from the IA and RI/FS shall be submitted to Ecology for acceptance in accordance with "Schedule for Interim Action and Remedial Investigation/Feasibility Study Deliverables" in Attachment "C".

9. The Defendant shall provide, to the Ecology project coordinator, written status reports of activities pertaining to work or progress toward providing work plans for work at the site weekly. Status reports shall be submitted on the Monday following the week summarized in the report.

V.

Terms and Conditions of Order

1. Definitions Unless otherwise specified, the definitions set forth in ch. 70.105D RCW and ch. 173-340 WAC shall control the meanings of the terms used in this Order.

2. Public Notice RCW 70.105D.030(2)(a) requires that, at a minimum, this Order be subject to concurrent public notice. Ecology shall be responsible for providing such public notice and reserves the right to modify or withdraw any provisions of this Order should public comment disclose facts or considerations which indicate to Ecology that the Order is inadequate or improper in any respect.

3. Remedial Action Costs Dan Alexander shall pay to Ecology costs incurred by Ecology pursuant to this Order. These costs shall include work performed by Ecology or its contractors for the initial investigations undertaken prior to the issuance of this order, any remaining investigations, remedial actions, and Order preparation, oversight and administration. Ecology costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). Dan Alexander shall pay the required amount within ninety (90) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general description of

work performed will be provided upon request. Itemized statements shall be prepared quarterly. Failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges.

4. Designated Project Coordinators The project coordinator for Ecology is:

Name: Thomas L. Mackie
Address: 15 West Yakima Ave., Suite 200
Yakima, Washington 98902
Phone (509) 454-7834

The project coordinator(s) shall be responsible for overseeing the implementation of this Order. To the maximum extent possible, communications between Ecology and the Defendant, and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order, shall be directed through the project coordinator(s). Should Ecology or the Defendant change project coordinator(s), written notification shall be provided to Ecology or the Defendant at least ten (10) calendar days prior to the change.

5. Performance All work performed pursuant to this Order shall be under the direction and supervision, as necessary, of a professional engineer or hydrogeologist, or similar expert, with appropriate training, experience, and expertise in hazardous waste site investigation and cleanup. The Defendant shall notify Ecology as to the identity of such engineer(s) or hydrogeologist(s), and of any contractors and subcontractors to be used in carrying out the terms of this Order, in advance of their involvement at the Site. The Defendant shall provide a copy of this Order to all agents, contractors and subcontractors retained to perform work required by this Order and shall ensure that all work undertaken by such agents, contractors and subcontractors will be in compliance with this Order.

Except when necessary to abate an emergency situation, the Defendant shall not perform any remedial actions at the Alexander Farms Facility outside that required by this Order unless Ecology concurs, in writing, with such additional remedial actions.

WAC 173-340-400(7)(b)(i) requires that "construction" performed on the Site must be under the supervision of a professional engineer registered in Washington.

6. Access Ecology or any Ecology authorized representative shall have the authority to enter and freely move about all property at the Site at all reasonable times for the purposes of, inter alia: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing the progress in carrying out the terms of this Order; conducting such tests or collecting samples as Ecology or the project coordinator

may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by the Defendant. When entering the Site under ch. 70.105D RCW, Ecology shall provide reasonable notice prior to entering the Site unless an emergency prevents notice. Ecology shall allow split or replicate samples to be taken by the Defendant during an inspection unless doing so would interfere with Ecology's sampling. The Defendant shall allow split or replicate samples to be taken by Ecology and shall provide Ecology seven (7) days notice before any sampling activity.

7. Public Participation The Defendant shall prepare and/or update a public participation plan for the Site. Ecology shall maintain the responsibility for public participation at the Site. The Defendant shall help coordinate and implement public participation for the Site.

8. Retention of Records The Defendant shall preserve in a readily retrievable fashion, during the pendency of this Order and for ten (10) years from the date of completion of the work performed pursuant to this Order, all records, reports, documents, and underlying data in its possession relevant to this Order. Should any portion of the work performed hereunder be undertaken through contractors or agents of the Defendant, a record retention requirement meeting the terms of this paragraph shall be required of such contractors and/or agents.

9. Dispute Resolution The Defendant may request Ecology to resolve factual or technical disputes which may arise during the implementation of this Order. Such request shall be in writing and directed to the signatory, or his/her successor(s), of this Order. Ecology resolution of the dispute shall be binding and final. The Defendant is not relieved of any requirement of this Order during the pendency of the dispute and remains responsible for timely compliance with the terms of the Order unless otherwise provided by Ecology in writing.

10. Reservation of Rights Ecology reserves all rights to issue additional orders or take any action authorized by law in the event or upon the discovery of a release or threatened release of hazardous substances not addressed by this Order, upon discovery of any factors not known at the time of issuance of this Order, in order to abate an emergency, or under any other circumstances deemed appropriate by Ecology.

Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances from the Alexander Farms Site.

In the event Ecology determines that conditions at the Site are creating or have the potential to create a danger to the health or welfare of the people on the Site or in the

surrounding area or to the environment, Ecology may order Dan Alexander to stop further implementation of this Order for such period of time as needed to abate the danger.

11. Transference of Property No voluntary or involuntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by Dan Alexander without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to transfer of any legal or equitable interest Dan Alexander may have in the Site or any portions thereof, Dan Alexander shall serve a copy of this Order upon any prospective purchaser, lessee, transferee, assignee, or other successor in such interest. At least thirty (30) days prior to finalization of any transfer, Dan Alexander shall notify Ecology of the contemplated transfer.

12. Compliance With Other Applicable Laws

A. All actions carried out by Dan Alexander pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits. Pursuant to RCW 70.105D.090(l), the substantive 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 for the remedial action under this Order that are applicable shall be included in the workplan and are binding and enforceable requirements of the Order.

Dan Alexander has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(l) would otherwise be required for the remedial action under this Order. In the event Dan Alexander determines that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, he shall promptly notify Ecology of this determination. Ecology shall determine whether Ecology or Dan Alexander shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, Dan Alexander shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by Dan Alexander and on how Dan Alexander must meet those requirements. Ecology shall inform Dan Alexander in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this

Order. Dan Alexander shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

Ecology shall ensure that notice and opportunity for comment is provided to the public and appropriate agencies prior to establishing the substantive requirements under this section.

B. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(l) would result in the loss of approval from a federal agency which is necessary for the State to administer any federal law, the exemption shall not apply and Dan Alexander shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(l), including any requirements to obtain permits.

VI.

Satisfaction of this Order

The provisions of this Order shall be deemed satisfied upon Dan Alexander's receipt of written notification from Ecology that Dan Alexander has completed the remedial activity required by this Order, as amended by any modifications, and that all other provisions of this Order have been complied with.

VII.

Enforcement

1. Pursuant to RCW 70.105D.050, this Order may be enforced as follows:
   A. The Attorney General may bring an action to enforce this Order in a state or federal court.
   B. The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the Site.
   C. In the event Dan Alexander refuses, without sufficient cause, to comply with any term of this Order, Dan Alexander will be liable for:
      (1) up to three times the amount of any costs incurred by the state of Washington as a result of its refusal to comply; and
      (2) civil penalties of up to $25,000 per day for each day he refuses to comply.
   D. This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under RCW 70.105D.060.

Effective date of this Order: **MAY 7, 1998**

Donald W. Abbott
Section Manager
Toxics Cleanup Program
Central Regional Office

Attachment A

Scope of Work for RI/FS Work Plans under Chapter 173-340 WAC

SCOPE OF WORK FOR RI/FS WORK PLANS UNDER CHAPTER 173-340 WAC
DRAFT DOCUMENT February 18, 1998

The Work Plans shall include a plan to conduct a Remedial Investigation and Feasibility Study (as described under WAC 173-340-350). A remedial investigation/feasibility study (RI/FS) defines the extent of the problems at the site and evaluates alternative cleanup actions. The Department of Ecology (Ecology) will use the completed RI/FS to develop a Cleanup Action Plan. The minimum components of the RI/FS are detailed below:

I. REMEDIAL INVESTIGATION

The purpose of the Remedial Investigation is to determine the nature and extent of releases of hazardous substances (as defined by RCW 70.105D.020(5)) from the Facility (as defined in RCW 70.105D.020(3)), and to gather all necessary data to support the Feasibility Study. The Potentially Liable Party(s) (PLP, as defined under RCW 70.105D.020(8)) shall furnish all personnel, materials, and services necessary for, or incidental to, performing the Remedial Investigation at the Facility.

The Remedial Investigation (RI) will consist of the following six tasks:

RI Task I:Description of Current Conditions (Site History Report)

The PLP shall submit for Ecology approval a site history report providing the background information pertinent to the facility, contamination and emergency or interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data shall be included.

A: Facility Background

The site history report shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility. The site history report shall include:

1. Maps (as specified by WAC 173-340-840(4)) depicting the following:

   a. General geographic location;

   b. Property lines, with the owners of all adjacent property clearly indicated;

   c. Topography and surface drainage (with a contour interval of one foot or less and a scale of 1 inch = 50 feet, unless otherwise approved by Ecology) depicting all waterways, wetlands, floodplains, water features, drainage patterns, and surface water containment areas;

   d. All above ground and underground tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;

   e. All past and present known or suspected hazardous substance treatment, storage or disposal areas;

   f. All past or present product and waste underground tanks and piping;

g. A series of all aerial photographs that may be obtained from public sources;

h. Surrounding land uses (residential, commercial, agricultural, recreational); and

i. The location of all groundwater supply and monitoring wells within a one mile radius. These wells shall be clearly labeled and ground and top of casing elevations and construction details included. Older wells may not have been reported to state agencies so oral interviews with local residents and business owners to identify such wells shall be required.

All maps shall be of sufficient detail and accuracy to locate and report all current and future work performed at the site;

2. A history and description of ownership and operation, waste generation, treatment, storage and disposal activities at the facility, including interviews with former employees and local residents;

3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted including any inspection reports or technical reports generated as a result of the response; including reports required under the Uniform Fire Code.

B: Nature and Extent of Contamination

The site history report shall describe the existing information on the nature and extent of contamination.

1. The site history report shall summarize all possible source areas of contamination. This at a minimum should include all waste disposal areas, spill areas, and other suspected source areas of contamination. For each area, the site history report shall identify the following:

a. Location of area (which shall be depicted on a Facility map);

b. Quantities of hazardous substances;

c. Hazardous substances, to the extent known;

d. Identification of areas where additional information is necessary; and

e. Location of free petroleum product above or below ground.

2. The site history report shall include an assessment and description of the existing degree and extent of contamination. This should include:

a. Available monitoring data and qualitative information on locations and levels of contamination at the Facility;

b. All potential migration pathways including information on geology, hydrogeology, pedology, physiography, hydrology, water quality, meteorology, air quality; and

c. The potential impact(s) on human health and the environment, including demography, groundwater and surface water use, and land use.

C: Implementation of Interim or Emergency Measures

The site history report shall document interim or emergency measures which were or are being undertaken at the Facility. This shall include:

1. Objectives of the interim or emergency measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the Facility;

2. Design, construction, operation, and maintenance requirements;

3. Schedules for design, construction and monitoring; and

4. Schedule for progress reports.

RI Task II: Pre-investigation Screening of Cleanup Action Alternatives Report

Prior to starting the Facility Investigation, the PLP shall submit to Ecology, for review and approval, a screening of cleanup action alternatives report that identifies the potential cleanup action technologies that may be used on-site or off-site, including remediation, treatment, containment, and/or disposal of contamination. All criteria used to screen the potential cleanup alternatives must be stated in this report. This report shall also identify any field data that must be collected in the RI to facilitate the evaluation and selection of the final Cleanup Action or Actions.

The screening of cleanup alternatives report allows the PLP to support subsequent decisions to direct RI/FS data gathering efforts and site specific studies onto those cleanup alternatives likely to be used at the site. The report will help direct expenditures of resources away from unlikely cleanup alternatives.

RI Task III: Facility Investigation Report

The PLP shall conduct those investigations necessary to characterize the Facility and actual or potential contaminant migration pathways (Environmental Setting and Pathway Characterization); define the source (Source Characterization); define the degree and extent of contamination (Contaminant Characterization); identify actual or potential receptors (Receptor Identification); and an assessment of risks posed to receptors by the Facility (Risk Assessment). The results of these investigations shall be reported to Ecology in the Facility Investigation Report.

The investigations should result in data consistent with the Quality Assurance/Quality Control Plan and of sufficient technical quality to support the development and evaluation of the cleanup action alternative or alternatives during the Feasibility Study. All sampling and analysis shall be conducted in accordance with the Sampling and Analysis Plan (WAC 173-340-820). All sampling locations shall be documented in a log and identified on a detailed site map, which shall be presented in an Appendix to the Facility Investigation Report.

A: Environmental Setting and Pathway Characterization

The PLP shall collect information to supplement and verify existing information on the environmental setting and potential contaminant migration pathways at the facility. The PLP shall characterize the following:

1. Hydrogeology

The PLP shall conduct a program to evaluate hydrogeologic conditions at the Facility. This program shall provide the following information:

a. A description of the regional and facility specific geologic and hydrogeologic characteristics affecting ground water flow beneath the facility, including:

i) Regional and facility specific stratigraphy;

ii) Structural geology;

iii) Depositional history;

iv) Identification and characterization of areas and amounts of recharge and discharge;

v) Regional and facility specific groundwater flow patterns; and

vi) Characterization of seasonal variations in the groundwater flow regime.

b. An analysis of any topographic features that might influence the groundwater flow system.

c. Based on field data, tests, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (including saturated and unsaturated units), including:

i) Hydraulic conductivity, porosity, effective porosity, pore water velocity, and Darcy velocity;

ii) Lithology, grain size, sorting, degree of cementation;

iii) An interpretation of the degree of interconnections between saturated zones; and

iv) The contaminant solute attenuation capacity and mechanisms of the natural earth materials.

d. Based on field studies and cores, structural geology and hydrogeological cross sections and fence diagrams showing the extent (depth, thickness,

lateral extent) of hydrogeological units which may be part of the migration pathways identifying:

i) Sand and gravel layers in unconsolidated deposits;

ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits;

iii) Zones of higher permeability or lower permeability that might direct and restrict the flow of contaminants;

iv) The uppermost aquifer: geologic formation or group of formations that are capable of yielding a significant amount of groundwater to wells and springs; and

v) Water bearing zones above the first confining layer that may serve as a pathway for contaminant migration including perched zones of saturation.

e. Based on data obtained from groundwater monitoring wells and/or piezometers installed upgradient and downgradient from the potential contaminant sources, a representative description of water level or fluid pressure monitoring including:

i) Water level contour and/or potentiometric maps (displayed legibly, superimposed on Facility maps);

ii) Hydrologic cross sections showing vertical gradients;

iii) The flow system including the vertical and horizontal components of flow; and

iv) Any temporal changes in hydraulic gradients.

f. A description of manmade influences that may affect the hydrogeology of the site (schedules and volumes of production for local water supply wells, pipelines, drains, ditches, septic tanks, utility trenches, asphalt seals, etc.).

2. Soils

The PLP shall conduct a program to characterize the soil and rock units above the water table in the vicinity of the Facility. Such characterization shall include, but not be limited to, the following information:

a. SCS soil classification;
b. Surface soil distribution;
c. Hydraulic conductivity (saturated and unsaturated);
d. Bulk density;
e. Porosity;
f. Soil sorptive capacity;
g. Soil organic content;

h. Soil pH;
i. Particle size distribution;
j. Moisture content, specific capacity, infiltration rate;
k. Soil stratification effect on unsaturated flow; and
l. Mineral content.

3. Surface Water and Sediment

The PLP shall conduct a program to characterize the surface water bodies in the vicinity of the Facility. Such characterization shall include but not be limited to the following activities and information:

a. Description of the water bodies including:

i) For streams and rivers: location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e. 10, 50, 100 and 500 year flood events); and

ii) Drainage patterns.

b. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, BOD, COD, alkalinity, conductivity, dissolved oxygen profiles, nutrients, total organic carbon, specific contaminant concentrations, etc.

c. Description of the sediment characteristics including:

i) Deposition area;

ii) Thickness profile;

iii) Physical and chemical parameters (e.g., grain size, density, organic content, pH, contaminant concentration, etc.).

4. Air

The PLP shall provide information characterizing the climate and meteorology in the vicinity of the Facility. Such information shall include but not be limited to:

a. General meteorological data including: annual and monthly rainfall averages, monthly temperature averages, wind speed and direction, relative humidity and dew point, pressure variations, evaporation rates, development of inversions, and climatic extremes that have occurred in the vicinity of the Facility (including frequency of occurrence).

b. A description of topographic and manmade features which affect air flow and emission patterns.

B: Source Characterization

The PLP shall collect analytical data to completely characterize and designate the wastes and areas where wastes have been placed, collected or removed including: type; quantity; physical form; disposition; and facility characteristics affecting release. This shall include quantification of the following specific characteristics at each source area:

1. Disposal area characteristics including: location, design features, operating practices, period of operation, age of area, and general physical conditions.

2. Waste characteristics

   a. Type, quantity and chemical composition of wastes placed in the area, including degradation and reaction by products.

   b. Physical and chemical characteristics of the waste.

   c. Migration and dispersal characteristics of the waste including: sorption, biodegradability, hydrolysis rates and chemical transformations.

C: Contamination Characterization

The PLP shall collect analytical data on background conditions and contamination in groundwater, soils, surface water, sediment, and subsurface gas in the vicinity of the facility. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminants. Data shall include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individuals performing the sampling and analysis. The PLP shall address the following types of contamination at the facility:

1. Groundwater contamination including: the horizontal and vertical extent of groundwater contamination, direction of hazardous substance (contaminant) movement, velocity of contaminant movement, horizontal and vertical concentration of the indicator parameters of all possible hazardous and dangerous waste constituents, evaluation of factors affecting contaminant movement, and extrapolation of future contaminant movement.

2. Soil contamination including: vertical and horizontal extent of contamination, contaminant concentrations, velocity and direction of contaminant movement, and a description of the contaminant and soil chemical properties and interaction.

3. Surface water and sediment contamination including: the horizontal and vertical extent of contamination, direction of contaminant movement, velocity of contaminant movement, horizontal and vertical concentration contaminants, evaluation of factors affecting contaminant movement, description of the chemistry of the contaminant and surface water or sediment properties and interaction, and extrapolation of future contaminant movement.

4. Subsurface gas contamination including: vertical and horizontal extent of contamination, gas concentrations, gas composition, physical and chemical description of the gases.

D: Potential Receptor Identification

The PLP shall collect data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. The following characteristics shall be identified:

1. Local uses and possible future uses of groundwater within one mile of the facility.

2. Local uses and possible future uses of surface waters within three miles of the facility.

3. Human use of or access to the facility and adjacent lands including: recreation, hunting, residential, commercial, zoning, and relationship between population locations and prevailing wind directions.

4. A description of the biota in surface water bodies adjacent to the facility.

5. A description of any endangered or threatened species near the facility.

E. Risk Assessment

The PLP shall prepare a Risk Assessment Report characterizing the current and potential threats to human health and the environment that may be posed by hazardous substances and physical hazards at the Facility. This assessment may not be required when Ecology determines that proposed cleanup standards are obvious and undisputed and allow an adequate margin of safety for protection of human health and the environment. The Risk Assessment shall include:

1. Hazardous substance identification;

2. Exposure assessment;

3. Toxicity assessment; and

4. Risk characterization, to include discussion of applicable standards.

Risk assessment procedures use several factors for defining cleanup levels for carcinogens and noncarcinogens. The individual factors and procedures for modifying these factors based on new scientific information are specified in WAC 173-340-708 and 173-340-720 through 173-340-750. WAC 173-340-708 also provides rules for use of indicator hazardous substances.

The PLP shall prepare a Sampling and Analysis Plan (in accordance with WAC 173-340-820) for use during all Facility characterization studies. The Sampling and Analysis Plan shall be prepared for all sampling activities which are part of investigation and remedial actions unless otherwise directed by the Ecology and except for emergencies. The level of detail required in the sampling and analysis plan may vary with the scope and purpose of the sampling activity. Sampling and Analysis Plans prepared under an order or decree shall be submitted to the department for review and approval and shall include:

A. A sampling plan including:

1. Objectives;

2. Schedules and task assignments;

3. Access;

4. Quality Assurance Project Plan (see: *Guidelines and Specifications for Preparing Quality Assurance Project Plans, May, 1991, Washington Department of Ecology, Environmental Investigations and Laboratory Services Program, Quality Assurance Section, P.O. Box 488, Manchester, WA, 98353*), including:

   a. Field quality assurance/quality control (QA/QC) methods:

      (1) Standard operating procedure for field sampling methods (reference SOP and describe briefly);

      (2) Field documentation methods;

      (3) Frequency of QA/QC samples:

         (a) duplicates;
         (b) rinsate;
         (c) blank.

      (4) Field instrument calibration;

   b. Chain of custody procedures;

   c. Decontamination procedures, including:

      (1) entry and exit controls;
      (2) disposal of wastes from sampling effort; and
      (3) equipment and personnel decontamination.

   d. Laboratory QA/QC program:

      (1) laboratory identification and accreditation;
      (2) sample custody;
      (3) analytical turn-around time;
      (4) calibration procedures and frequency;
      (5) data reduction, validation, and reporting;
      (6) internal quality control checks;
      (7) performance system and audits; and
      (8) specific procedures for routine assessment of data precision, accuracy and completeness.

5. Samples, including:

   a. Sampling methods;

b. Locations and ID numbers (located legibly on a Facility map);

c. Order of sample collection;

d. Sample media and objectives;

(1) samples to determine nature and extent of contamination; and
(2) samples to develop possible remedial actions.

e. QA/QC samples;

f. Shipping and handling arrangements;

g. Split sampling opportunity; and

h. Analytical parameters, including:

(1) justifications for choice of analyses;
(2) laboratory and analytical method identification, including detection limits;
(3) sample containers preservation and holding times; and
(4) laboratory-generated QA/QC samples.

6. List of supplies and equipment; and

7. Monitoring well construction and development standards.

The PLP shall prepare a Facility Safety and Health Plan, for undertaking RI/FS activities and Cleanup Actions under WAC 173-340. The Safety and Health Plan shall be submitted for Ecology's review and comment. The safety and health plan must be consistent with chapter 49.17 RCW and regulations promulgated pursuant thereto. At a minimum the plan must include the following:

1. Level of protection;

2. Hazard evaluation;

3. Waste characteristics;

4. Special site considerations; and

5. Emergency information.

Task IV: Remedial Investigation Report

The PLP shall prepare a Remedial Investigation Report, consistent with WAC 173-340-840, that presents an analysis and summary of all Task II and Task III facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality and quantity to describe the nature and extent of contamination, potential threat to human health and the environment and to support a Feasibility Study.

A: Data Analysis

The PLP shall analyze all facility investigation data outlined in Task III and prepare a report on the type and extent of contamination at the facility including sources and migration pathways.

B. Protection Standards

The PLP shall provide Facility and hazardous substance information to support development and selection of clean-up standards for all Hazardous Substances found at the Facility.

C. Appendices to the report will be prepared by the PLP containing full documentation of investigative activities and analytical results. These appendices shall include:

1. General field observations, including:

   a. Ground water characterization, including potentiometric maps and data related to all hydraulic testing;

   b. Location of nearby wells and well log information;

   c. Soil conditions including locations, descriptions and photographs of test pits;

   d. Surface water characterization; and

   e. Well driller and hydrogeologist logs and observations.

2. Changes in sample collections from sample plan, including:

   a. Opportunity samples; and

   b. Other changes.

3. Sample location map, legibly superimposed on a Facility map, including:

   a. Sample media; and

   b. Sample numbers.

4. Table of principal facts related to sampling and analysis results;

5. Maps, legibly superimposed on the Facility map, identifying contaminant concentrations, including field sampling results;

6. Discussion of results, including:

   a. Nature of the contamination;

   b. Extent of the contamination, including volume of material needing remediation;

c. The pathways by which contamination reached or can reach the media; and

d. Known or potential hazards and risks to the public health, welfare, and the environment, including physical hazards.

7. Quality assurance, data validation, which includes detailed evaluation of data according to approved QAPP;

8. Full data package as appendix including QA/QC information and field logs with date, time and activity information;

9. Analysis of data in relation to possible cleanup action alternatives and recommendations of cleanup action alternatives to be investigated; and

10. Recommendations for further study, if necessary.

RI Task V: Treatability Investigations (Bench or Pilot Scale Studies)

The PLP shall conduct bench and /or pilot scale studies to determine the applicability of a Cleanup Action technology or technologies to the Facility conditions. This shall include: development of a testing plan identifying the type(s) and goal(s) of the study(ies), the procedures to be used for data management and interpretation, evaluation of the test results with respect to site specific conditions, and preparation of a report summarizing the testing program and its results.

RI Task VI: Reporting

A Remedial Investigation Report shall be prepared at the completion of the remedial investigation. Additionally, Ecology may require reports to be submitted following discrete elements of the remedial investigation. Reports prepared under this section and under an order or decree shall be submitted to Ecology for review and approval. These reports shall include:

A. Monthly reports summarizing sampling activities and analytical results. The PLP shall attach to the monthly reports the results of significant phases of the Remedial Investigation that were completed since the previous monthly report (i.e. report on soils when the soils study is complete); and

B. Consistency with WAC 173-340-840.

II. FEASIBILITY STUDY

The PLP will conduct a Feasibility Study and will prepare a Feasibility Study Report. The PLP shall furnish all personnel, materials, and services necessary for, or incidental to, performing the Feasibility Study of the Facility.

The feasibility study will serve to evaluate the feasibility and effectiveness of implementing alternative cleanup actions (as required by WAC 173-340-360). It shall include:

A. Detailed identification of contamination to be remediated and physical hazards to be removed;

B. Identification of cleanup action alternatives that will protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route, shall be required. The number and types of alternatives to be evaluated shall take into account the characteristics and complexity of the facility. A phased approach for evaluation of alternatives may be required for certain facilities, including an initial screening of alternatives to reduce the number of potential remedies for the final detailed evaluation. The final evaluation of cleanup action alternatives that pass the initial screening shall be evaluated for compliance with the requirements in WAC 173-340-360. Specifically each alternative must be assessed for its' ability to:

1. Adequately protect public health, welfare, safety and the environment;

2. Reduce the toxicity, mobility, and volume through treatment;

3. Eliminate or remove all physical hazards;

4. Meet all federal and state laws and rules designated to be applicable or relevant and appropriate by Ecology; and

5. Be a permanent remedial action for the site.

C. A requirement to conduct additional sampling and/or laboratory testing necessary to evaluate remedial alternatives;

D. An evaluation of alternatives based on cost, technical feasibility, environmental effects, and effectiveness in accomplishing the five requirements specified above [II.B(1-5)];

E. Recommendation of a preferred cleanup action plan for Ecology approval;

F. Schedule for implementation of a preferred cleanup action plan.

A Feasibility Study Report shall be prepared at the completion of the feasibility study. Additionally, Ecology may require reports to be submitted following discrete elements of the feasibility study. Reports prepared under this section and under an order or decree shall be submitted to Ecology for review and approval.

Attachment B

GROUNDWATER SAMPLING DATA SUBMITTAL REQUIREMENTS

January 27, 1993

TO: Persons Collecting Ground Water and Other Data at MTCA Sites

FROM: Carol Fleskes, Program Manager
Toxics Cleanup Program

SUBJECT: Cleanup Information No. 91-1: Ground Water, Soil, Sludge, and Sediment Data (Environmental Data)

Purpose

The purpose of this memorandum is to establish consistency and procedures for organizing, reporting, transmitting, and storing and retrieving surface water, ground water, soil, sludge, and sediment data (environmental data). These procedures will improve Ecology's ability to cleanup contaminated sites by making meaningful data readily available to the public, legislature, management, project managers, and site workers.

Applicability

These procedures apply to all environmental data collection activities required by the Model Toxics Control Act and Regulations. Exceptions may be made for low risk sites as determined by the Ecology project manager.

Background

Currently, very little of the environmental data collected for the state at toxic cleanup sites is available in a readily usable form. With only a few exceptions, these data are submitted to the department in the form of voluminous paper reports. This form precludes the staff from performing rapid, accurate and many times meaningful analysis of spatial and temporal trends of the data. In addition, the evaluation of environmental data cannot always be effective because of missing and/or improper pertinent information.

This procedure establishes appropriate methods to ensure that data submitted to Ecology is encoded, stored, and presented in a magnetic media format (diskette) so that data can be consistently used by our staff. This procedure will reduce data analysis time when compared to using laborious, time consuming hand methods of the past. Today, at most of the larger sites and many of the smaller sites, these data are processed using computers by the PLP's and consultants. This procedure will generally require the data be rearranged and in some cases additional data items collected.

The results of receiving digital data in a consistent manner will allow exchange of environmental data with EPA and between Ecology programs. This format is a super set of that developed by EPA. It is being used by other Ecology Programs.

Standardization of the data will mean that a broad range of computational, statistical, graphical and modeling software will be readily available to summarize and analyze the data. Standardized report will be available for the first time in the program.

Responsibilities

The attached procedures shall be required for all of the environmental data collection activities as follows:

- o Directly by TCP
- o By any contractors or consultants tasked by TCP
- o By "potentially liable parties" acting under terms of a consent decree or order

Implementation of the procedures shall be by incorporation of the appropriate language into contracts, work plans, orders, consent decrees or other appropriate documents by the site project manager or contract officer.

Data shall be entered into the Ecology data base by a data administrator. There is an inter-program team that established new parameters. At this time, Bill Myers at headquarters is acting in this capacity and as the TCP representative to the team.

Depending on the availability of a wide area network, the data would be directly or indirectly available to staff and other data users. At this time, the Site Cleanup Section is developing links from the present data base program to other statistical, graphical and analytical software packages.

Also attached is a model letter which is sent, along with a diskette, to anyone using our format to submit environmental data. These diskettes are also available to staff. To obtain a copy call Bill at the telephone number shown on the letter.

KC:
Attachments

SITE DESCRIPTION AND SAMPLE DATA SUBMITTAL REQUIREMENTS

1. Media

Required data must be submitted on MS-DOS[1](version 5) or compatibly formatted diskettes. The diskettes may be 5 1/4 inch (or 3 1/2 inch) either: double sided, double density; or double sided, high density.

2. Data Formats

The SITE DESCRIPTION FILE, FIELD SAMPLE FILE and the LABORATORY SAMPLE FILE are quote, comma delimited ASCII files used as the standard format for transferring sample data to and from Ecology (LOTUS WK1 files and Ashton Tate DBF files may be substituted for ASCII files). The files will include the fields in the format and order listed (C-Character, N-Numeric, D-date(Character may be substituted in non DBF or WK1 format)).

The following Appendices are attached to standardize information entered into required files (see following appendices):

A. Matrix Codes

B. Sample Source Codes

C. Collection Method Codes

D. Chemical Data Dictionary (Standardizes Spelling, STORET P-codes., etc entered into the SAMPLE ANALYSIS FILE.

E. Laboratory Qualifiers

F. State Plane Zones (N or S)
(NOTE: Copy of RCW 58.20 provided for reference)

G: County Fips Codes

H. Hydrologic Unit Map

3. Submittal

Computer diskettes containing the SITE DESCRIPTION FILE, FIELD SAMPLE FILE and/or the LABORATORY SAMPLE FILE, clearly labeled for Project and Originator shall be submitted in duplicate, along with a backup hardcopy of the diskette contents.

[1] Trademark of the Microsoft Corporation

FIELD DEFINITIONS FOR SITE DESCRIPTION FILE

*Wells and Borings must include all Fields except as noted optional. Underlined Fields are required for all stations.

FIELD	TYPE	WIDTH	DEFINITION
REP_DATE	D	10	Reporting date (mm/dd/yyyy).
REP_NAME	C	48	Reporting entity, data submitted by.
PRJ_NAME	C	48	Project, site, or facility name.
STA_TYPE	C	12	Station type (Ground water, Surface wtr, Sediment, Soil, Sludge, Biological or Air).
STA_USE	C	1	Well use (USGS codes) O-observation, W-water withdrawal, X-waste disposal, D-drain, T-test hole, E-geothermal, P-oil/gas, U-unused, R-recharge, Z-destroyed.
WTR_USE	C	1	Water use (USGS codes) W-water quality/level monitoring, D-dewatering, N-industrial, S-stock supply, B-bottling, I-irrigation, Q-aquaculture, U-unused, C-commercial supply, H-domestic supply P-public supply, J-industrial cooling, F-fire protection, Z-other.
DATA_REL	C	1	Data Reliability (USGS codes) C-field checked, L-poor location, U-unchecked.
STA_ID	C	12	Well ID number.
PRI_STA	C	15	Ecology primary station code. To be obtained from Ecology TCP.
SEC_STA1	C	12	Additional station code (previous well numbers, alternate or other well designations).
SEC_STA2	C	12	Additional station code (if any).
SEC_STA3	C	12	Additional station code (if any).
STATE_FIPS	C	2	State FIPS code (WA=53).

SITE DESCRIPTION FILE CONTINUED...

FIELD	TYPE	WIDTH	DEFINITION
COUNTYFIPS	C	3	County FIPS code (use state county code, Appendix F).
STATE CHAR	C	2	State (WA).
COUNTYCHAR	C	16	County.
OWN NAME	C	30	Monitoring well owner name.
OWN DT	D	8	Date of ownership of well (mm/dd/yyyy).
OWN ADD	C	60	Address of owner.
DRILLER	C	30	Name of Driller.
STA DESC	C	48	Activity Site, Sample location, or Well location description (for example: "East of Bldg. 2" or "SE. corner, intersection 6th & Seneca").
LOC METHD	C	48	Method of determination of station location coordinates (Note: survey to known horizontal datum is required).
LAT	N	8	Latitude OPTIONAL (degrees-minutes-seconds-tenths).
LONG	N	9	Longitude OPTIONAL (degrees-minutes-seconds-tenths).
STPCO NORT	N	12	Northerly state plane coordinates REQUIRED (nearest ft).
STPCO EAST	N	12	Easterly state plane coordinates REQUIRED (nearest ft).
STPCO ZONE	C	1	State plane coordinates: state plane zone REQUIRED (N or S).
LAND_NET	C	20	Land net location of well (Township, Range, Section, 1/4-1/4 Sec.) Use USGS 1/4-1/4 section alphabetic designator A through R OPTIONAL.

SITE DESCRIPTION FILE CONTINUED...

FIELD	TYPE	WIDTH	DEFINITION
UTM_NORTH	N	9	UTM grid system coordinates: North (meters) OPTIONAL.
UTM_EAST	N	8	UTM grid system coordinates: East (meters) OPTIONAL.
UTM_ZONE	C	2	UTM grid zone.
MAP_NAME	C	24	Name of USGS map and scale covering the sampling location(e.g., Yakima 100K, 1977).
BORE_DEP	N	8	Depth of original hole drilled if applicable (nearest 0.01 ft).
WELL_DEP	N	8	Well depth (nearest 0.01 ft).
WTR_ELEV1	N	8	Water level elevation at time of installation (nearest 0.01 ft).
WLEV_DAT1	D	10	Date of water level elevation measurement (mm/dd/yyyy).
MEAS_ELEV	N	8	Measuring point (reference point) elevation (nearest 0.01 ft).
MEAS_DESC	C	48	Measuring point description.
DATUM	C	48	Measuring point datum (The source of the altitude used to survey in the sampling location altitude i.e. City of Tacoma Sewer Survey 1921).
LEV_COMM	C	240	Comments, depth and water level data.
ALTITUDE	N	8	Approximate land surface elevation XXXXX.XX (ft) at the Station Location.
DEPTOWTR1	N	8	Water depth at time of install. (nearest 0.01 ft).
CONST_DT	D	10	Date of installation (mm/dd/yyyy).
MOREINT	C	1	More than one open interval (Y/N).

SITE DESCRIPTION FILE CONTINUED...

FIELD	TYPE	WIDTH	DEFINITION
UP_DEPTH	N	8	Depth to top of open interval (ft below measuring point).
LOW_DEPTH	N	8	Depth to bottom of open interval (ft below measuring point).
CONST_COMM	C	240	Comments, construction details.
MTD_CON	C	1	Method of construction (USGS WATSTORE codes) A-air rotary, B-bored/augured, C-cable tool, D-dug, H-hydraulic rotary, J-jetted, P-air percussion, T-trenching, V-driven, W-drive wash, R-reverse rotary, X-mud rotary, Z-other.
FILT_LEN	N	5	Length of filter pack (nearest 0.01 ft).
FILT_MAT	C	48	Type of filter pack material and size of material (e.g., Sand 200 mesh).
DIA_BOR	N	8	Boring diameter (in).
DIA_CAS	N	8	Casing diameter (in).
CAS_MAT	C	1	Casing material (USGS WATSTORE codes) B-brick, C-concrete, D-copper, F-teflon/fluorocarbon, G-galvanized iron, I-wrought iron, M-other metal, P-pvc/plastics, R-rock/stone, S-steel, T-tile, W-wood, U-coated steel, Z-other.
DIA_OPN	N	6	Diameter of open interval (in).
LEN_OPN	N	6	Length of open interval (nearest 0.01 ft).
TYP_OPN	C	1	Type of open interval (USGS WATSTORE codes) P-perforated/slotted screen, L-louvered/shuttered screen, S-screen (unknown type), F-fracture, R-wire wound, M-mesh, T-sand point, W-walled, X-open hole, Z-other.

SITE DESCRIPTION FILE CONTINUED...

FIELD	TYPE	WIDTH	DEFINITION
TYP_OMT	C	1	Material type, open interval (USGS WATSTORE codes) R-stainless steel, F-teflon/fluorocarbon, G-galvanized iron, P-pvc/plastic, B-brass/bronze, W-wrought iron, S-steel, T-tile, C-concrete, M-other metal, Z-other.
INT_COMM	C	240	Comments, open interval.
LOG_AVAIL	C	1	Well log data available? (Y/N).
TYP_LOG	C	10	Type of well log (USGS WATSTORE codes) A-time, B-collar, C-caliper, D-driller, E-electric, F-fluid conduction, G-geologist, H-magnetic, I-induction, J-gamma ray, K-dip meter, L-lateral log, M-microlog, N-neucron, O-microlateral log, P-photo/video, Q-radioactive, S-sonic, T-temperature, U-gamma gamma, V-fluid velocity, X-core, Z-other.
LOG_DOC	C	240	Log data source documents (e.g. Remedial Investigation Report).
OTHER_DOC	C	240	Other data source documents.
LOG_LOC	C	60	Location of well log (e.g. Ecology Southwest Regional Office).
AQUI_TEST	C	1	Aquifer testing performed (Y/N).
PUMP_DATA	C	240	Pump data such as: Type, Manufacturer, Horsepower, and depth set .
ANDAT_AVAL	C	1	Analytical or Statistical data available (Y/N).
PROGRAM	C	9	Ecology program (TCP, WQFA, WQ, other).
GEN_COMM	C	240	General comments.
HUCODE	C	8	See US Geological Survey Hydrologic Unit Map 1974-Washington.
AGN_USE	C	1	Agency use (USGS codes) A-Active, I-inactive, O-inventory only.

*** END OF SITE DESCRIPTION FILE ***

FIELD DEFINITIONS FOR FIELD SAMPLE FILE

*All Fields Required

FIELD	TYPE	WIDTH	DEFINITION
PRI_STA	C	15	Ecology Monitoring Well No. will be assigned by Ecology TCP Program.
STA_ID	C	12	Site well ID no. or other designation.
X_LOCATION	C	12	Surveyed coordinates reported in the State Plane Coordinates (to the nearest foot).
Y_LOCATION	C	12	
STPLNZONE	C	1	N = North; S = South.
LO_DAT_U	C	5	Year of Reference datum either 1929 or 1983 and which system L Lat Long or S for State Plane Coordinate System.
LOC_DATUM	C	48	Reference datum from Map or survey e.g., 1983 North American Datum. (see Appendix F, RCW 58.20)
DEPT_WATER	N	8	Depth to water (in 0.01 ft) at time of sampling.
UP_DEPTH	N	7	Depth (nearest 0.01 ft) to the top of the interval sampled (e.g. Top of well screen or core interval).
LOW_DEPTH	N	7	Depth (nearest 0.01 ft) to the bottom of the interval sampled (e.g. Bottom of well screen or core interval).
WTR_ELEV	N	8	Water level elevation (in 0.01 ft) at the time of sampling.
AGENCY	C	8	Agency requesting sampling data.
SAMPLE_DAT	D	8	Date of well sampling (mm/dd/yyyy).
SAMP_TIME	C	4	Time of well sampling in military time.
SAMPLE_ID	C	8	Sample ID code or no.

FIELD SAMPLE FILE CONTINUED:

FIELD	TYPE	WIDTH	DEFINITION
FILTERED Yes(Y) or	L	1	Was the sample field filtered? No(N)
ANALYSIS_MTHOD	C	15	EPA Analysis method descriptions (i.e EPA Method 601).
MEAS_ELEV	N	8	Surveyed elevation of the measuring point used to determine water level depths and elevations. (nearest 0.01 ft).
MEAS_DESC	C	48	Description of the well measuring point used (e.g., top of casing, file mark on casing, etc.).
DATUM	C	48	Vertical datum used to reference elevations (e.g., MSL and source/date of information).
MATRIX	C	2	Type of sample: water, sediment, soil, other (from Appendix A).
SOURCE_COD	C	2	Physical environment sampled (from Appendix B).
COLLECTMET	C	2	Collection method code (from Appendix C).
FIELD_PH	N	5	The pH value taken at time of sampling (e.g. 11.67)
FIELD_COND	N	7	The conductivity value in umhos.
FIELD_TEMP in	N	5	The field temperature of the sample degrees celsius.
PURGE_METH	C	1	Purging method: B = Bail, P= Pump
PURGE_VOL	C	2	Number of boring volumes removed prior to sampling (liquid).
PRJ_NAME	C	48	Project, site, or facility name.

*** END OF FIELD SAMPLE FILE ***

FIELD DEFINITIONS FOR LABORATORY SAMPLE FILE

*All Fields Required

FIELD	TYPE	WIDTH	DEFINITION
PRI_STA	C	15	Ecology Monitoring Well No. will be assigned by Ecology TCP Program.
STA_ID	C	12	Site well ID no. or other designation.
SAMPLE_DAT	D	8	Date of well sampling (mm/dd/yyyy).
ANALYZ_DAT	D	8	Date the sample was analyzed (mm/dd/yyyy).
SAMPLE_ID	C	8	Sample ID code or no.
LAB_NAME	C	10	Laboratory performing analysis.
LABSAMP_ID	C	10	Sample number assigned by the laboratory.
CONSTITUEN	C	30	Chemical constituent names as defined in Ecology's Chemical Dictionary (see attached Appendix D)
CAS_ID	C	12	Chemical Abstract Systems ID (see Appendix D).
P_CODE	C	5	STORET Parameter Code (see Appendix D).
RESULT	N	12	Detected chemical concentration result.
UNITS	C	10	Units of measurement (e.g., µg/Kg).
QUAL	C	4	Contract Laboratory Program chemical data qualifiers (such as U, J, R, UJ, ecc.). Non-Contract Lab Program qualifiers, such as less-than signs ("<") orasterisks, are not acceptable (see Appendix E).
QA_QUAL	C	4	Qualifier associated with QA Review of Lab report (See Appendix E).
LIMIT	C	10	Lab instrument detection limit.

LABORATORY SAMPLE FILE CONTINUED:

FIELD	TYPE	WIDTH	DEFINITION
DILUTION	N	6	Amount the sample was reduced and diluted to accommodate analysis (i.e. 10X,20X).
FILTERED	L	1	Was the sample lab filtered? Yes(Y) or No(N)
ANALYSIS_MTHOD	C	15	EPA Analysis method descriptions (i.e EPA Method 601).
MATRIX	C	2	Type of sample; water, sediment, soil, other (from Appendix A).
PRJ_NAME	C	48	Project, site, or facility name.

*** END OF LABORATORY SAMPLE FILE ***

APPENDIX A: MATRIX CODES

10	Water-Total
11	Water-Dissolved
40	Sediment/Soil
45	Semi-Solid/Sludge
70	Sediment for EP Toxicity
80	Oil/Solvent
00	Other

APPENDIX B: SAMPLE SOURCE CODES AND DESCRIPTIONS

00	Unspecified source
01	Unknown liquid media (drum/tank)
02	Unknown liquid media (spill area)
03	Unknown liquid media (waste pond)
10	Water (general)
12	Ambient stream/river
13	Lake/reservoir
14	Estuary/ocean
15	Spring/seepage
16	Rain
17	Surface runoff/pond (general)
18	Irrigation canal/return flow
20	Well (general)
21	Well (industrial/agricultural)
22	Well (drinking water supply)
23	Well (test/observation/monitoring)
24	Drinking water intake
25	Drinking water (at tap)
30	Effluent wastewater (general)
31	Municipal effluent
32	Municipal inplant waters
33	Sewage runoff/leachate
34	Industrial effluent
35	Industrial inplant waters
36	Industrial surface runoff/pond
37	Industrial waste pond
38	Landfill runoff/pond/leachate
40	Sediment (general)
42	Bottom sediment of deposit
44	Sludge (general)
45	Sludge (waste pond)
46	Sludge (drum/tank)
48	Soil (general)
49	Soil (spill/contaminated area)
50	Bore hole material

Sample Source Codes and Descriptions
(continued)

60	Air (general)
61	Ambient air
62	Source of effluent air
63	Industrial or workroom air
64	Hi-vol filter
70	Tissue (general)
71	Fish tissue
72	Shellfish tissue
73	Bird tissue
74	Mammal tissue
75	Macroinvertebrate
76	Algae
77	Periphyton
78	Plant/vegetation
80	Oil/solvent (general)
81	Oil (transformer/capacitor)
82	Oil/solvent (drum/tank)
83	Oil/solvent (spill area)
84	Oil/solvent (waste pond)
90	Commercial product formulation
95	Well drill water
96	Well drill mud
97	Well sealing material
98	Gravel pack material

APPENDIX C: COLLECTION METHOD CODES

00	Unknown
10	Hand grab
11	Plastic bucket
12	Stainless steel bucket
13	Brass kemmerer
14	PVC kemmerer
15	D.O. dunker
16	DH 48/DH 49 Integrating sampler
17	Van Dorn bottle
18	Glass dip tube
19	Other
20	Automatic sampler (general)
21	ISCO auto sampler
22	Manning auto sampler
23	Hydrostar or similar pump
24	Submersible pump (electric)
25	Well point sampler (pump)
26	Stainless steel bailer (hand)
27	PVC bailer
28	Teflon bailer
29	Peristaltic pump
30	Dredge (unspecified)
31	Dredge (Peterson)
32	Dredge (Van Dorn)
33	Dredge (Van Veen)
34	Core
35	Freeze core
36	Bladder Pump
40	Macroinvertebrate (unspecified)
41	Picked by hand
42	Kick net
43	Surber
44	Modified Hess type sampler
45	Rock basket
46	Hester Dendy sampler
50	Fish (unspecified)
51	Fish (shocking)
52	Fish (netting)
53	Fish (hook & line)
54	Fish (poison)
60	Periphyton (unspecified)
61	Rock scraping
62	Glass slides

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
1,1,1,2-Tetrachloroethane	527.00	77562	630206	µg/L
1,1,1-Trichloroethane	1.00	34506	71556	µg/L
1,1,2,2-Tetrachloroethane	2.00	34516	79345	µg/L
1,1,2,2-Tetrachloroethene	75.05	34475	127184	µg/L
1,1,2-Trichloro2,2,1trifluoroethane	3.00	77652	76131	µg/L
1,1,2-Trichloroethane	4.00	34511	79005	µg/L
1,1-Dichloroethane	5.00	34496	75343	µg/L
1,1-Dichloroethene	6.00	34501	75354	µg/L
1,1-Dichloroethylene	6.01	34501	75354	µg/L
1,1-Dichloropropene	546.00	77168	563586	µg/L
1,2,3-Trichlorobenzene	534.00	77613	87616	µg/L
1,2,3-Trichloropropane	441.00	81610	96184	µg/L
1,2,3-Trinitrobenzene	85.00	73275	99354	µg/Kg
1,2,4-Trichlorobenzene	7.00	34551	120821	µg/L
1,2,4-Trimethylbenzene	536.00	77222	95636	µg/L
1,2,4-Trinitrobenzene	100.00			
1,2-Dibromoethane (EDB)	8.00	77651	106934	µg/L
1,2-Dichlorobenzene	9.00	34536	95501	µg/L
1,2-Dichloroethane	10.00	34531	107062	µg/L
1,2-Dichloromethane	68.01	34423	75092	µg/L
1,2-Dichloropropane	11.00	34541	78875	µg/L
1,2-Diethoxyethane	482.00	81527	629141	µg/L
1,2-Diethylbenzene	548.00	77340	135013	µg/L
1,2-Dimethylbenzene	77.02	77135	95476	µg/L
1,2-Dimethylhydrazine	582.00	73562	540738	µg/L
1,2-Diphenylhydrazine	84.00	34346	122667	µg/L
1,3,5-Trimethylbenzene	541.00	77226	108678	µg/L
1,3,5-Trinitrobenzene	156.00	73275	99354	µg/Kg
1,3-Dichlorobenzene	12.00	34566	541731	µg/L
1,3-Dichloropropene	544.00	34561	542756	µg/L
1,3-Diethylbenzene	549.00	77348	141935	µg/L
1,3-Dimethylbenzene	67.01	77134	108383	µg/L
1,4-Dichlorobenzene	13.00	34571	106467	µg/L
1,4-Diethylbenzene	550.00	77345	105055	µg/L
1,4-Dimethylbenzene	475.03	77133	106423	µg/L
1,4-Dioxane	563.00	82388	123911	mg/L
1-Methylethyl ester carbamic acid	574.00	73615	615532	µg/L
1-Methylnaphthalene	211.00	77418	90120	µg/L
2 Methoxy-5-nitroaniline	584.00	73622	99558	µg/L
2 Methylaniline	585.00	77142	95534	µg/L
2 Methylaniline hydrochloride	586.00	73649	636215	µg/L
2,2,4-Trimethylpentane	545.00		5408401	
2,2-Dichloropropane	547.00	77170	594207	µg/L
2,3,4,6-Tetrachlorophenol	1553.00	77767	4901513	µg/L
2,3,6-Trichloro benzeneacetic acid	575.00	85347		
2,3,7,8-TCDD	87.02	34675	1746016	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
2,3,7,8-Tetrachlorodibenzo-p-dioxin	87.00	34675	1746016	ug/L
2,3-Dichloropropylene	88.00	77168	78886	ug/L
2,4,5-T Methyl Ester	89.00	39740	93765	ug/L
2,4,5-TB	554.00	82650	93801	ug/Kg
2,4,5-TP (Silvex)	91.00	39760	93721	ug/L
2,4,5-TP Methyl Ester	90.00			
2,4,5-Trichlorophenol	14.00	77687	95954	ug/L
2,4,5-Trichlorophenoxyacetic acid	319.00	39740	93765	ug/L
2,4,6-Trichlorophenol	15.00	34621	88062	ug/L
2,4,6-Trimethyl-1-1,3,5-Trioxane	92.00	77322	123637	ug/L
2,4-D	93.00	39730	94757	ug/L
2,4-D Methyl Ester	93.01	39730	94757	ug/L
2,4-DB (Water, Total)	555.00	38745	94826	ug/L
2,4-Dichlorophenol	16.00	34601	120832	ug/L
2,4-Dichlorophenoxy butyric acid	235.00		94826	ug/L
2,4-Dimethylphenol	17.00	34606	105679	ug/L
2,4-Dinitrophenol	18.00	34616	51285	ug/L
2,4-Dinitrotoluene	19.00	34611	121142	ug/L
2,4-Toluenediamine	587.00	78888	95807	ug/L
2,5-Dinitrotoluene	94.00	77637	619158	ug/L
2,6-Dinitrotoluene	20.00	34626	606202	ug/L
2-Butanone	376.03	81595	78933	ug/L
2-Chloroethyl vinyl ether	22.00	34576	110758	ug/L
2-Chloronaphthalene	23.00	34581	91587	ug/L
2-Chlorophenol	24.00	34586	95578	ug/L
2-Chlorotoluene	535.00	38680	95498	ug/L
2-Cyclohexene-1-one	488.00	930697		
2-Ethyl hexanoic acid	196.00	82114	149575	ug/L
2-Hexanone	25.00	77103	591786	ug/L
2-Methyl-2H-benzotriazole	576.00	85813	29385431	ug/L
2-Methyl-4,6-dinitrophenol	96.00	34657	534521	ug/L
2-Methyl-4-chlorophenoxyacetic acid	387.02	39151	94746	ug/L
2-Methyl-4-pentanone	95.00	78133	108101	ug/L
2-Methyl-p-cresol	17.01	34606	105679	ug/L
2-Methylnaphthalene	26.00	77416	91576	ug/L
2-Methylphenol	27.00	77152	95487	ug/L
2-Nitroaniline	28.00	30195	88744	ug/L
2-Nitrophenol	29.00	34591	88755	ug/L
2-Pentanone	97.00	77060	107879	ug/L
2-chloro-1-hydroxybenzene	24.02	34586	95578	ug/L
3,3'-Dichlorobenzidine	98.00	34631	91941	ug/L
3,3-Dimethoxybenzidine	588.00		119904	ug/L
3,3-Dimethylbenzidine	589.00	73560	119937	ug/L
3,4-Benzofluoranthene	99.00	34230	205992	ug/L
3,4-Dichlorobenzyl N-methylcarbene +	571.00		1966581	ug/L
3,5-Dichlorobenzoic acid	240.00		51365	ug/L
3-Chloro octane	528.00			

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
	30.00	78300	99092	µg/L
3-Nitroaniline	208.01	39360	72548	µg/L
4,4'-DDD	209.01	39365	72559	µg/L
4,4'-DDE	210.01	39370	50293	µg/L
4,4'-DDT	592.00	101611		µg/L
4,4-Methylene bis(n,n-dimethyl) an +	96.01	34657	534521	µg/L
4,6-Dinitro-2-methylphenol	101.00	82226	88857	µg/L
4,6-Dinitrophenol	570.00			µg/L
4,7-Methanoisobenzofuran-1(3H) -one +	102.00			
4-Bromophenoxybenzene	103.00	34636	101553	µg/L
4-Bromophenyl phenyl ether	590.00		3165933	µg/L
4-Chloro-2-methyl aniline hydrochl +	591.00		95692	µg/L
4-Chloro-2-methyl aniline	31.00	34452	59507	µg/L
4-Chloro-3-methylphenol	31.01	34452	59507	µg/L
4-Chloro-m-cresol	464.00	78303	108478	mg/Kg
4-Chloroaniline	33.00	34641	7005723	µg/L
4-Chlorophenyl phenyl ether	540.00	77277	106434	µg/L
4-Chlorotoluene	34.00	78133	108101	µg/L
4-Methyl-2-pentanone	17.02	34606	105679	µg/L
4-Methyl-o-cresol	35.00	77146	106445	µg/L
4-Methylphenol	36.00	73278	100016	µg/Kg
4-Nitroaniline	37.00	34646	100027	µg/L
4-Nitrophenol	104.00			µg/L
5-Bromopyrimidine	256.00			µg/L
5-Hydroxy Dicamba	281.01	39033	1912249	µg/L
AAtrex	38.00	34205	83329	µg/L
Acenaphthene	39.00	34200	208968	µg/L
Acenaphthylene	385.02	81815	30560191	µg/L
Acephate	40.00	81552	67641	µg/L
Acetone	215.00	79193	6247659	µg/L
Acifluorfen	105.00	34210	107028	µg/L
Acrolein	593.00	38576	79061	µg/L
Acrylamide	106.00	34215	107131	µg/L
Acrylonitrile	273.00	77825	15972608	µg/L
Alachlor	273.01	77825	15972608	µg/L
Alanex	274.00	39053	116063	µg/L
Aldicarb	320.00	82587	1646884	µg/L
Aldicarb sulfone	318.00	82586	1646873	µg/L
Aldicarb sulfoxide	107.00	39330	309002	µg/L
Aldrin	463.00	00410	471341	mg/L
Alkalinity as CaCO3, Total	246.00	00410	471341	mg/L
Alkalinity, Total (CaCO3)	611.00	01519	12587461	pCi/L
Alpha Particle - Activity, gross	511.00	01106	7429905	µg/L
Aluminum, Dissolved	510.00	01105	7429905	µg/L
Aluminum, Total	108.00	01104	7429905	µg/L
Aluminum, Total Recoverable				

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Ametryn	275.00	82184	834128	µg/L
Amiben	276.00	82051	133904	µg/L
Aminocarb	277.00	38404	2032599	µg/L
Aminotriazole	278.00	73509	61825	µg/L
Amitrole	278.01	73509	61825	µg/L
Ammonia-N, Total as-N	109.00	00610	17778880	mg/L
Aniline	110.00	77089	62533	µg/L
Anion Balance	111.00			
Anthracene	112.00	34220	120127	µg/L
Antimony, Dissolved	524.00	01095	7440360	µg/L
Antimony, Total	113.00	01097	7440360	µg/L
Antimony, Total Recoverable	21.00	01268	7440360	µg/L
Aqualin	105.01	34210	107028	µg/L
Aramite	594.00		140578	µg/L
Aroclor 1016	114.00	34671	12674112	µg/L
Aroclor 1221	115.00	39488	1104282	µg/L
Aroclor 1232	116.00	39492	11141165	µg/L
Aroclor 1242	117.00	39496	53469219	µg/L
Aroclor 1248	118.00	39500	12672298	µg/L
Aroclor 1254	119.00	39504	11097691	µg/L
Aroclor 1260	120.00	39508	11096825	µg/L
Arsenic, Dissolved	322.00	01000	7440382	µg/L
Arsenic, Inorganic (dissolved)	121.00	01000	7440382	µg/L
Arsenic, Total	137.00	01002	7440382	µg/L
Arsenic, Total Recoverable	122.00	00978	7440382	µg/L
Asbestos	123.00	34225	1332214	µg/L
Atraton	280.00	82185	1610179	µg/L
Atrazine	281.00	39033	1912249	µg/L
Avadex	532.00	73388	2303164	mg/Kg
Avenge	330.01	78882	43222486	µg/L
Azinphos-Ethyl	282.00	81292	2642719	µg/L
Azinphos-Methyl (Guthion)	359.01	39580	86500	µg/L
Azobenzene	595.00	77625	103333	µg/L
Azodrin	383.01	81890	6923224	µg/L
BFB	469.00			%
BHC	132.00	81283	608731	µg/L
BOD	499.01	00310		mg/L
Bolan	283.00	39002	1861401	µg/L
Banvel	284.00	82052	1918009	µg/L
Barium, Dissolved	508.00	01005	7440393	µg/L
Barium, Total	509.00	01007	7440393	µg/L
Barium, Total Recoverable	124.00	01009	7440393	µg/L
Basagran	286.01	38710	25057890	µg/L
Basalin	354.01	79194	3324539	µg/L
Basanite	337.01	81287	88857	µg/L
Baygon	424.01	38537	114261	µg/L
Baymix	307.02	81293	56724	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Bavtex	351.01	38685	55389	µg/L
Benefin	283.01	39002	1861401	µg/L
Benfluralin	283.02	39002	1861401	µg/L
Benlate	285.01	38705	17804352	µg/L
Benomyl	285.00	38705	17804352	µg/L
Bensulide	288.01	82197	741582	µg/L
Bentazon	286.00	38710	25057890	µg/L
Benz(a)anthracene	130.01	34526	56553	µg/L
Benzene	41.00	34030	71432	µg/L
Benzene,	572.00			
1-chloro-4-(methylsulfony +	125.00	39120	92875	µg/L
Benzidine	130.00	34526	56553	µg/L
Benzo(a)anthracene	126.00	34247	50328	µg/L
Benzo(a)pyrene	127.00	34230	205992	µg/L
Benzo(b)fluoranthene	531.00	34242	207089	µg/L
Benzo(b/k)fluoranthene	128.00	34521	191242	µg/L
Benzo(g,h,i)perylene	128.01	34521	191242	µg/L
Benzo(ghi)perylene	129.00	34242	207089	µg/L
Benzo(k)fluoranthene	42.00	77247	65850	µg/L
Benzoic acid	41.01	34030	71432	µg/L
Benzol	596.00		98077	µg/L
Benzotrichloride	43.00	77147	100516	µg/L
Benzyl alcohol	597.00	73520	100447	µg/L
Benzyl chloride	515.00	01010	7440417	µg/L
Beryllium, Dissolved	514.00	01012	7440417	µg/L
Beryllium, Total	131.00	00998	7440417	µg/L
Beryllium, Total Recoverable	612.00	85817	12587472	pCi/L
Beta Particle Activity, gross	288.00	82197	741582	µg/L
Betasan	454.00	00425	471341	mg/L
Bicarbonate as CaCO3	133.00	00440	71523	mg/L
Bicarbonate as HCO3	328.01	38454	141662	µg/L
Bidrin	382.01	78883	42576023	µg/L
Bifenox	499.00	00310		mg/L
Biochemical Oxygen Demand	44.00	34278	111911	µg/L
Bis(2-chloroethoxy)methane	45.00	34273	111444	µg/L
Bis(2-chloroethyl)ether	46.00	34283	108601	µg/L
Bis(2-chloroisopropyl)ether	577.00	103321		
Bis(2-ethylhexyl) ester hexanedioi +	140.00	39100	117817	µg/L
Bis(2-ethylhexyl)phthalate	598.00	34268	542881	µg/L
Bis(chloromethyl)ether	465.01	34596	117840	µg/L
Bis(n-octyl)phthalate	134.00	01020	7440428	µg/L
Boron	313.02	70314	1897456	µg/L
Bravo	289.00	82198	314409	µg/L
Bromacil	386.01	38855	300765	µg/L
Bromex	135.00	82298	24959679	µg/L
Bromide(dissolved)	542.00	81555	108861	µg/L
Bromobenzene				

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Bromochloromethane	533.00	32105	124481	µg/L
Bromodichloromethane	47.00	32101	75274	µg/L
Bromoform	48.00	32104	75252	µg/L
Bromomethane	49.00	34413	74839	µg/L
Bromoxynil (Water, Whole)	556.00	70979	1689845	µg/L
Butachlor, Water/Whole/Recoverable	633.00	30235	23184669	µg/L
Butanone	376.02	81595	78933	µg/L
Butyl benzyl phthalate	136.00	34292	85687	µg/L
Butylate	290.00	81410	2008415	µg/L
Butylbenzenes, Total	292.01	45049		µg/L
C3-Alkylbenzenes, Total	291.00	45048		µg/L
C4-Alkylbenzenes, Total	292.00	45049		µg/L
CEC	161.01	81356		meq/100G
CIPC	305.01	81322	101213	µg/L
COD	492.01	81319		mg/L
Cadmium, Dissolved	406.00	01025	7440439	µg/L
Cadmium, Total	407.00	01027	7440439	µg/L
Cadmium, Total Recoverable	138.00	01113	7440439	µg/L
Calcium	521.00	00910	7440702	mg/L as CaCO3
Calcium, Dissolved	520.00	00915	7440702	mg/L
Calcium, Total	141.00	00916	7440702	mg/L
Camphor (ACN)	287.00	81324	76222	µg/L
Captan	293.00	39640	133062	µg/L
Carbaryl	294.00	77700	63252	µg/L
Carbazole	329.00	77571	86748	µg/L
Carbendazim	295.00	38735	10605217	µg/L
Carbofuran	296.00	81405	1563662	µg/L
Carbon disulfide	50.00	77041	75150	µg/L
Carbon tetrachloride	51.00	32102	56235	µg/L
Carbon, Total Organic	250.00	00680	7440440	µg/L
Carbonate as CO3	142.00	00445	3812328	mg/L
Carbonate as CaCO3	455.00	00430	471341	mg/L
Carbophenothion	297.00	39786	786196	µg/L
Carboxin	139.00	70987	5234684	µg/L
Cation Balance	143.00			
Cation Exchange Capacity	161.00	81356		meq/100G
Chemical Oxygen Demand	492.00	81319		mg/L
Chloramben	276.01	82051	133904	µg/L
Chlordane	144.00	39350	57749	µg/L
Chlordecon	298.00	81281	143500	µg/L
Chlordimeform	299.00	77953	6164983	µg/L
Chloride, Total	145.00	00940	16887006	mg/L
Chlorine, Total Residual	146.00	50060	7782505	mg/L
Chlorobenzene	52.00	34301	108907	µg/L
Chlorobenzilate	300.00	39480	510156	µg/L
Chlorocyclohexane	86.00	77217	542187	µg/L
Chlorodibromomethane	58.01	32105	124481	µg/L
Chloroethane	53.00	34311	75003	µg/L

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Chloroethene	82.03	39175	75014	µg/L
Chloroethylene	82.02	39175	75014	µg/L
Chloroform	54.00	32106	67663	µg/L
Chloromethane	55.00	34418	74873	µg/L
Chloroneb	301.00	38423	2675776	µg/L
Chloropicrin	303.00	77548	76062	µg/L
Chloropropham	305.00	81322	101213	µg/L
Chloropropylate	302.00	38429	5836102	µg/L
Chlorothalonil	313.01	70314	1897456	µg/L
Chlorpyrifos	304.00	77969	2921882	µg/L
Chlorthal	314.02	39770	1861321	µg/L
Chromium VI	506.01	01032	18540299	µg/L
Chromium, Dissolved	516.00	01030	7440473	µg/L
Chromium, Hexavalent	506.00	01032	18540299	µg/L
Chromium, Total	491.00	01034	7440473	µg/L
Chromium, Total Recoverable	147.00	01118	7440473	µg/L
Chrysene	148.00	34320	218019	µg/L
Cinnamene	74.03	77128	100425	µg/L
Clodrin	306.00	82565	7700176	µg/L
Co-Ral	307.01	81293	56724	µg/L
Cobalt	149.00	01037	7440484	µg/L
Coliform, Fecal	505.01	31616		#/100ml
Coliform, Total	150.00	31628		#/100ml
Color	599.00		00080	std. units
Conductivity	449.02		00094	µmhos/cm
Copper, Dissolved	408.00	01040	7440508	µg/L
Copper, Total	442.00	01042	7440508	µg/L
Copper, Total Recoverable	152.00	01119	7440508	µg/L
Corrosivity	600.00			std. units
Coumaphos	307.00	81293	56724	µg/L
Creosote	308.00	39140	8001589	µg/L
Crotoxyphos	306.01	82565	7700176	µg/L
Cumene	309.00	77223	98828	µg/L
Cyanazine	310.00	81757	21725462	µg/L
Cyanide	153.00	78248	57125	µg/L
Cyanide, Dissolved Std Method	279.00	00723	57125	µg/L
Cycloate	311.00	81892	1134232	µg/L
Cyclohexane	254.00	81570	110827	µg/L
D-D Mix	441.01	81610	96184	µg/L
DBCP	315.00	38761	96128	µg/L
DCNA	316.00	38447	99309	µg/L
DCOD	168.01	80116		mg/L
DCPA	314.01	39770	1861321	µg/L
DDD	208.00	39360	72548	µg/L
DDE	209.00	39365	72559	µg/L
DDT	210.00	39370	50293	µg/L
DDVP	317.00	73071	62737	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
OEF	324.00	81295	78488	µg/L
OMPA	336.00	81285	299854	µg/L
ONBP	337.00	81287	88857	µg/L
ONOC	338.00	34657	534521	µg/L
OO	169.01	00299	7782447	mg/L
Oxonil	313.00	70314	1897456	µg/L
Oxychlor	314.00	39770	1861321	µg/L
Oxydiazon	312.00	38432	75990	µg/L
Oxamyl	350.01	38684	115902	µg/L
Oxydemeton	325.00	39560	8065483	µg/L
Oxyfluorfen	387.01	79195	1529999	µg/L
Di-n-butylphthalate	155.00	39110	84742	µg/L
Di-n-octylphthalate	465.00	34596	117840	µg/L
Diallate	532.01	73386	2303164	mg/Kg
Diazinon	158.00	39570	333415	µg/L
Dibenz(a,h)anthracene	159.01	34556	53703	µg/L
Dibenz(a,h)anthracene-d	14557.00	79040	53703	mg/Kg
Dibenzo(a,h)anthracene	159.00	34556	53703	µg/L
Dibenzofuran	57.00	81302	132649	µg/L
Dibromochloromethane	58.00	32105	124481	µg/L
Dibromochloropropane	315.01	38761	96128	µg/L
Dibromodichloromethane	489.00	77779	594183	µg/L
Dibromomethane	160.00	81522	106934	µg/L
Dicamba	284.01	82052	1918009	µg/L
Dichloran	316.01	38447	99309	µg/L
Dichlorobromomethane	47.01	32101	75274	µg/L
Dichlorodifluoromethane	162.00	34668	75718	µg/L
Dichloromethane	68.02	34423	75092	µg/L
Dichloroprop	244.00	30190	120365	µg/L
Dichlorvos (DDVP)	317.01	73071	62737	µg/L
Dicofol	327.00	39780	115322	µg/L
Dicrotophos	328.00	38454	141662	µg/L
Dicyclopropyl methanone	579.00			µg/L
Dieldrin	164.00	39380	60571	µg/L
Diesel	472.00	78939	68476346	µg/L
Diethyl ether	165.00	81576	60297	µg/L
Diethylphthalate	59.00	34336	84662	µg/L
Diethylphthalate-d4	558.00			
Difenson	397.01	39022	80331	µg/L
Difenzoquat	330.00	78882	43222486	µg/L
Diisopropyl ether	154.00	81577	108203	µg/L
Dimecron	414.01	78881	13171216	µg/L
Dimethoate	331.00	46314	60515	µg/L
Dimethyl ketone	40.02	81552	67641	µg/L
Dimethyldisulfide	166.00	81580	624920	µg/L
Dimethylphthalate	60.00	34341	131113	µg/L
Dimethyltetrachlorophthalate	314.03	39770	1861321	µg/L
Dinitro-o-cresol	338.01	34657	534521	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Dinoseb	337.02	81287	88857	µg/L
Dioxathion	332.00	38783	78342	µg/L
Dioxin	87.01	34675	1746016	µg/L
Diphenamide	333.00	78004	957517	µg/L
Diphenoloxide	167.00	77587	101848	µg/L
Diquat	334.00	78885	85007	µg/L
Direct Black 38	601.00			µg/L
Direct Blue 6	602.00		2602462	µg/L
Direct Brown 95	603.00		16071866	µg/L
Dissolved COD	168.00		80116	mg/L
Dissolved Oxygen	169.00	00299	7782447	mg/L
Dissolved TOC	170.00	00679	7440440	kg/1000AL
Disulfoton sulfone	642.00			µg/L
Disulfoton (Di-Syston)	171.00	81888	298044	µg/L
Disulfoton sulfoxide	643.01	81030	2497076	µg/L
Dithane	365.01	38831	8018017	µg/L
Dithiocarbamate	446.01	38917	137304	µg/L
Diuron	335.00	39650	330541	µg/L
Dowpon	312.01	38432	75990	µg/L
Dursban	304.01	77969	2921882	µg/L
Dyfonate	339.00	81294	944229	µg/L
Dylox	340.00	39014	52686	µg/L
EC	449.01	00094		µmhos/cm
EDB	8.01	77651	106934	µg/L
EPN	344.00	81290	2104645	µg/L
EPTC	345.00	81894	759944	µg/L
Endosulfan	341.00	34361	959988	µg/L
Endosulfan I	341.01	34361	959988	µg/L
Endosulfan II	342.00	34356	33213659	µg/L
Endosulfan Sulfate	172.00	34351	1031078	µg/L
Endothall	343.00	38926	145733	µg/L
Endrin	174.00	39390	72208	µg/L
Endrin Aldehyde	173.00	34366	7421934	µg/L
Endrin Ketone	490.00	78008	53494705	µg/L
Enide	333.01	78004	957517	µg/L
Epichlorohydrin	604.00	106898		µg/L
Eptam	345.01	81894	759944	µg/L
Etazine	428.01	38542	26259450	µg/L
Ethanol	346.00	77004	64175	µg/L
Ethenylbenzene	74.04	77128	100425	µg/L
Ethion	175.00	39398	563122	µg/L
Ethoprop	634.00	81758	13194484	µg/L
Ethyl acetate	176.00	81585	141786	µg/L
Ethyl acrylate	605.00		140885	µg/L
Ethyl alcohol	346.01	77004	64175	µg/L
Ethyl isopropyl ketone	95.01	78133	108101	µg/L
Ethylan	411.01	39034	72560	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Ethylbenzene	61.00	34371	100414	µg/L
Ethylene dibromide	8.02	77651	106934	µg/L
Ethylene dichloride	10.01	34531	107062	µg/L
Ethylene glycol	347.00	77023	107211	µg/L
Ethylene thiourea	348.01	38928	96457	µg/L
Ethylidene thiourea	348.00	38928	96457	µg/L
Evik	275.01	82184	834128	µg/L
Fecal Coliform, MFM-FCBR	505.00	31616		#/100ml
Fenamiphos	349.00	38929	22224926	µg/L
Fenarimol	635.00			µg/L
Fensulfothion	350.00	38684	115902	µg/L
Fenthion	351.00	38685	55389	µg/L
Fenuron	352.00	38468	101428	µg/L
Ferbam	353.00	38806	14484641	µg/L
Ferric(3+)	188.01	01045	7439896	µg/L
Ferrous(2+)	188.02	01045	7439896	µg/L
Fluchloralin	354.00	79194	3324539	µg/L
Fluoranthene	177.00	34376	206440	µg/L
Fluorene	62.00	34381	86737	µg/L
Fluorescein(Sodium)	178.00		518478	
Fluoride	179.00	00950	16984488	mg/L
Fluormeturon	355.00	38811	2164172	µg/L
Fluridone	636.00		59756604	µg/L
Foaming Agents	606.00	01288		mg/L
Folex	369.01	39019	150505	µg/L
Folpet	607.00	46351	133073	µg/L
Fonofos	339.01	81294	944229	µg/L
Formaldehyde	356.00	71880	50000	mg/L
Freon 113	3.01	77652	76131	µg/L
Freon 12, Halon	162.01	34668	75718	µg/L
Furadan	296.01	81405	1563662	µg/L
Furazolidone	608.00	67458		µg/L
Furium	609.00			µg/L
Furmecyclox	610.00		60568050	µg/L
Gardona	581.01	38877	961115	
Gardoprim	436.01	38559	5915413	µg/L
Gasoline	471.00		6842596	
Gesatamin	280.01	82185	1610179	µg/L
Glyphosate	358.00	79743	1071836	µg/L
Grain alcohol	346.02	77004	64175	µg/L
Guthion	359.00	39580	86500	µg/L
Hardness, Total	248.00	00900	471341	mg/L CaCO3
Heptachlor	181.00	39410	76448	µg/L
Heptachlor Epoxide	180.00	39420	1024573	µg/L
Heptane	182.00	81589	25339564	µg/L
Hexachlorobenzene	183.00	39700	118741	µg/L
Hexachlorobutadiene	63.00	34391	87683	µg/L

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Hexachlorocyclohexane	132.01	81283	608731	µg/L
Hexachlorocyclohexane (alpha)	265.04	39337	319846	µg/L
Hexachlorocyclopentadiene	64.00	34386	77474	µg/L
Hexachloroethane	65.00	34396	67721	µg/L
Hexazinone	360.00	38815	51235042	µg/L
Hydram	394.02	82199	2212671	µg/L
Hydrazine	184.00	81313	302012	mg/L
Hydrocarbons, Total	473.00	81338		mg/L
Hydrocarbons, Total Fuel	462.00			
Hydrocarbons, Total Petroleum	461.00	46116	14280309	mg/L
Hydroxide	185.00	71830	14280309	mg/L
Hydroxide as CaCO3	466.00			
Hyvar	289.01	82198	314409	µg/L
IPC	423.01	39052	122429	µg/L
Imidan	361.00	39800	732116	µg/L
Indeno(1,2,3-cd)pyrene	186.00	34403	193395	µg/L
IntStd: 2,4,6-Tribromophenol	559.00	34719	118796	µg/L
IntStd: Hexabromobenzene	560.00			
Ion Balance	451.00			%
Ioxynil	561.00		16898341	µg/L
Iron, Dissolved	323.00	01046	7439896	µg/L
Iron, Total	188.00	01045	7439896	µg/L
Iron, Total Recoverable	362.00	00980	7439896	µg/L
Isobutylbenzene	552.00	77334	538932	µg/L
Isophorone	66.00	34408	78591	µg/L
Isopropyl carbanilate	423.02	39052	122429	µg/L
Isopropylbenzene (Cumene)	309.01	77223	98828	µg/L
Karmex	335.01	39650	330541	µg/L
Kepone	298.01	81281	143500	µg/L
Kerb	419.01	39080	23950585	mg/Kg
Kerosene	383.00	78878	8008206	µg/L
Kjeldahl-N, Total	249.00	00625	17778880	mg/L as N
Langlier Index	500.00			
Lead, Dissolved	402.00	01049	7439921	µg/L
Lead, Organic	463.00			
Lead, Total	403.00	01051	7439921	µg/L
Lead, Total Recoverable	189.00	01114	7439921	µg/L
Lindane	357.01	39340	58899	µg/L
Linuron	364.00	39530	330552	µg/L
Lithium	466.00	01130	7439932	µg/L
Lorsban	304.02	77969	2921882	µg/L
MBAS	233.01	34790	7429905	mg/L
MCPA	387.00	39151	94746	µg/L
MCPA Dimethylamine Salt	387.01	39151	94746	µg/L
MCPB	388.00	38486	94815	µg/L
MCPP (Water, Total)	582.00	38491	93652	µg/L
MEK	376.01	81595	78933	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
MIBK	34.02	78133	108101	µg/L
MSMA	385.00	38935	2163806	µg/L
Magnesium as CaCO3	519.00	00920	7439954	mg/L
Magnesium, Dissolved	518.00	00925	7439954	mg/L
Magnesium, Total	191.00	00927	7439954	mg/L
Malathion	192.00	39530	121755	µg/L
Mancozeb	365.00	38831	8018017	µg/L
Maneb	366.00	38835	12427382	µg/L
Manganese, Dissolved	404.00	01056	7439965	µg/L
Manganese, Total	193.00	01055	7439965	µg/L
Manganese, Total Recoverable	405.00	01123	7439965	µg/L
Matacil	277.01	38404	2032599	µg/L
Mercury, Dissolved	477.00	71890	7439976	µg/L
Mercury, Total	476.00	71900	7439976	µg/L
Mercury, Total Recoverable	194.00	71901	7439976	µg/L
Merphos	369.00	39019	150505	µg/L
Mesitylene	370.00	77226	108678	µg/L
Metasystox	371.00	39020	8022002	µg/L
Methidathion	374.00	78879	950378	µg/L
Methiocarb	373.00	38500	2032657	µg/L
Methomidophos	372.00	38927	10265926	µg/L
Methomyl	375.00	39051	16752775	µg/L
Methoxychlor	195.00	39480	72435	µg/L
Methyl Phenols, Total	378.00	45058	1319773	µg/L
Methyl Trithion	197.00	39790	953173	µg/L
Methyl Xylenes, Total	444.01	78136	25551137	µg/L
Methyl bromide	49.01	34413	74839	µg/L
Methyl chloride	55.01	34418	74873	µg/L
Methyl ethyl ketone	376.00	81595	78933	µg/L
Methyl isobutyl ketone	34.01	78133	108101	µg/L
Methyl ketone	40.03	81552	67641	µg/L
Methyl n-butyl ketone	25.01	77103	591786	µg/L
Methyl n-propyl ketone	97.01	77060	107879	µg/L
Methyl paraoxon	637.00			µg/L
Methylbenzene	76.01	34010	108883	µg/L
Methylcyclohexane	198.00	77100	108872	µg/L
Methylene Blue Active Substances	493.00	38260	61734	
Methylene bromide	160.01	81522	106934	µg/L
Methylene chloride	68.00	34423	75092	µg/L
Metolachlor	163.00		51218452	µg/L
Metribuzin	379.00	81408	21087649	µg/L
Mevinphos	413.01	39610	7786347	µg/L
Mexacarbate	380.00	38507	315184	µg/L
Mirex	381.00	39755	2385855	µg/L
Modown	382.00	78883	42576023	µg/L
Molinate	394.01	82199	2212671	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Molybdenum	467.00	01060	7439987	µg/L
Monitor	372.01	38927	10265926	µg/L
Monochloroethane	82.04	38175	75014	µg/L
Monochloroethylene	82.01	39175	75014	µg/L
Monocrotophos	383.00	81890	6923224	µg/L
Monsodium methyl arsonate	385.01	38935	2163808	µg/L
Monuron	384.00	38511	150685	µg/L
N-Nitroso-N-methylethylamine	613.00	73613	10595956	µg/L
N-Nitroso-di-n-butylamine	614.00	73609	924163	µg/L
N-Nitroso-di-n-propylamine	69.00	34428	621647	µg/L
N-Nitrosodiethanolamine	615.00	73610	1116547	µg/L
N-Nitrosodiethylamine	616.00	73611	55185	µg/L
N-Nitrosodimethylamine	392.00	34438	62759	µg/L
N-Nitrosodiphenylamine	199.00	34433	86306	µg/L
N-Nitrosopyrrolidine	617.00	78206	930552	µg/L
NH3-N, Total	109.01	00610	17778880	mg/L as N
NO3 + NO2-N, Total	321.01	00630	17778880	mg/L as N
Naled	386.00	38855	300765	µg/L
Naphthalene	70.00	34696	91203	µg/L
Napropamide	387.00	79195	1529999	µg/L
Neburon	388.00	38521	555373	µg/L
Nemacure	349.01	38929	22224926	µg/L
Nickel, Dissolved	481.00	01065	7440020	µg/L
Nickel, Total	483.00	01067	7440020	µg/L
Nickel, Total Recoverable	200.00	01074	7440020	µg/L
Nitrate + Nitrite-N, Total	321.00	00630	17778880	mg/L as N
Nitrate-N	452.00	00620	17778880	mg/L as N
Nitrite-N	202.00	00615	17778880	mg/L as N
Nitrobenzene	71.00	34447	98953	µg/L
Nitrofen	389.00	81303	1836755	µg/L
Nitrofurazone	618.00	59870		µg/L
Nitroguanidine	203.00	79753	556887	µg/L
Nonadecane	391.00	77822	629925	µg/L
Norflurazon, in Water	639.00	78064		µg/L
OBPA	206.00	58366		
Octachloronaphthalene	563.00		2234131	µg/L
Odor	619.00			std. units
Oil & Grease	207.00	03582		mg/L
Ordram	394.00	82199	2212671	µg/L
Orthene	395.00	81815	30560191	µg/L
Oryzalin	396.00	78884	19044883	µg/L
Ovex	397.00	39022	80331	µg/L
Oxamyl	398.00	38865	23135220	µg/L
Oxydisulfoton (Disyston Sulphoxide)	643.00	81030	2497076	µg/L
PAH (Polyaromatic hydrocarbons)	620.00			µg/L
PBB (Polybrominated Biphenyls)	621.00		59536651	µg/L
PCB	219.01	78012	1336363	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
PCB-1016	114.01	34671	12674112	µg/L
PCB-1221	115.01	39488	1104282	µg/L
PCB-1232	116.01	39492	11141165	µg/L
PCB-1242	117.01	39496	53469219	µg/L
PCB-1248	118.01	39500	12672296	µg/L
PCB-1254	119.01	39504	11097691	µg/L
PCB-1260	120.01	39508	11096825	µg/L
PCE	75.01	34475	127184	µg/L
PCNB	409.00	39029	81316	µg/L
PCP	213.01	39032	87865	µg/L
PID Reading	470.00			
Paraquat	399.00	82416	4685147	µg/L
Parathion	212.00	39540	56382	µg/L
Parathion, Ethyl-	400.00	46315	56382	µg/L
Parathion, Methyl-	401.00	39600	298000	µg/L
Pebulate, Water, Whole	640.00	79192		µg/L
Pendimethalin	222.02	79190	40487421	µg/L
Penoxalin	222.00	82410	40487421	µg/L
Pentachlorobenzene	410.00	77793	608935	µg/L
Pentachlorophenol	213.00	39032	87865	µg/L
Perchlorate	214.00			
Perchloroethene	75.03	34475	127184	µg/L
Perchloroethylene	75.02	34475	127184	µg/L
Persulfate-N, Total	580.00		7727540	µg/L
Perthane	411.00	39034	72560	µg/L
Phenanthrene	216.00	34461	85018	µg/L
Phencapton (Water, Whole)	564.00	81289	2275141	µg/L
Phenol	73.00	34694	108952	µg/L
Phenol, 4-AAP	217.00		108952	
Phenylethylene	74.02	77128	100425	µg/L
Phorate	218.00	46313	298022	µg/L
Phosalone	412.00	81291	2310170	µg/L
Phosdrin	413.00	39610	7786347	µg/L
Phosmet	361.01	39800	732116	µg/L
Phosphamide	331.01	46314	60515	µg/L
Phosphamidon	414.00	78881	13171216	µg/L
Phosphate-P, Diss Ortho	498.00	00671	7723140	mg/L as P
Phosphate-P, Ortho	205.00	00660	14265442	mg/L as PO 4
Phosphorodithioic acid, O,O,S-trim +	573.00	39580	86500	µg/L
Phosphorous-P, Total	251.00	00665	7723140	mg/L as P
Picloram	257.00	39720	1918021	µg/L
Polychlorinated biphenyl	219.00	76012	1336363	µg/L
Potassium, Dissolved	517.00	00935	7440097	mg/L
Potassium, Total	220.00	00937	7440097	mg/L
Princep	430.01	39055	122349	µg/L
Profluralin	415.00	38872	26399360	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Prometon	416.00	39056	1610180	µg/L
Prometryn	417.00	39057	7287196	µg/L
Pronamide	419.00	39080	23950585	µg/L
Propachlor	418.00	38533	1918167	µg/L
Propane	420.00	82358	74986	µg/L
Propanone	40.01	81552	67641	µg/L
Propargite	421.00	82085	2312358	mg/L
Propazine	422.00	39024	139402	µg/L
Propham	423.00	39052	122429	µg/L
Propoxur	424.00	38537	114261	µg/L
Propylbenzenes, Total	291.01	45046		µg/L
Propylene oxide	622.00	77011	75569	µg/L
Prowl	222.01	79190	40487421	µg/L
Prowl, Lechate	221.00	79190	40487421	µg/L
Prowl, Soil	223.00	85793	40487421	µg/L
Pyrene	224.00	34469	129000	µg/L
Pyrethrins	425.00	39930	8003347	µg/L
Radium 226	623.00	09501	13982633	pCi/L
Radium 226 & 228	624.00	11503		pCi/L
Retene	457.00	73076	483658	µg/L
Roneet	311.01	81892	1134232	µg/L
Ronnel	427.00	39357	299843	µg/L
Round-up	426.00	39941	1071836	µg/L
SCA	225.00			
Secbumeton	428.00	38542	26259450	µg/L
Selenium, Dissolved	484.00	01145	7782492	µg/L
Selenium, Total	485.00	01147	7782492	µg/L
Selenium, Total Recoverable	226.00	00981	7782492	µg/L
Sencore	379.01	81408	21087649	µg/L
Sevin	294.01	77700	63252	µg/L
Siduron	429.00	38548	1982496	µg/L
Silica (SIO2)	227.00	00992	7631869	µg/L
Silicate	497.00	00958		mg/L
Silver, Dissolved	495.00	01075	7440224	µg/L
Silver, Total	234.00	01077	7440224	µg/L
Silver, Total Recoverable	228.00	01079	7440224	µg/L
Simazine	430.00	39055	122349	µg/L
Simetryn	431.00	39054	1014706	µg/L
Sodium Absorption Ratio	501.00	00931	7440235	SAR
Sodium Chlorate	229.00	00726	7775099	µg/L
Sodium, Total	450.00	00929	7440235	mg/L
Solids, Total Dissolved	247.03	70300		µg/L
Solids, Total Suspended	486.01	74016		mg/L
Specific Conductance (Field)	502.00	00094		µmhos/cm
Specific Conductance @ 25C (LAB)	151.00	00095		µmhos/cm
Specific Conductance(FIELD)	449.00	00094		µmhos/cm

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Stirofos	432.00	38877	961115	µg/L
Strontium-90	625.00	13501	10098972	pCi/L
Styrene	74.00	77128	100425	µg/L
Sulfate, Total	230.00	00945	14808798	mg/L as SO4
Sulfide, Total	231.00	00745	18496258	mg/L
Sulfite, Total	232.00	00740	14265453	mg/L as SO3
Sumitol	428.02	38542	28259460	µg/L
Supracide	374.01	78879	950378	µg/L
Surfactants	233.00	03581		mg/L
Surflan	396.01	78884	19044883	µg/L
Surrog: 1,2-Dichloroethane-d4	460.00			%
Surrog: 1,4-Bromofluorobenzene	187.00			
Surrog: 1-Bromo-2-floroethane	157.00			
Surrog: 2-Chlorophenol-d4 (spike)	565.00	95978		
Surrog: 2-Fluorobiphenyl	479.00			
Surrog: 2-Fluorophenol	480.00			
Surrog: 4-Chloroaniline-d4	566.00			
Surrog: Dibutylchlorendate (spike)	567.00			
Surrog: Fluorene-d10 (spike)	568.00			
Surrog: Nitrobenzene-d5	474.00			
Surrog: Phenol-d5	526.00			
Surrog: Pyrene-d10 (spike)	377.00			
Surrog: Toluene-d8	458.00			%
Surrog: p-Terphenyl-d14	525.00			
Sutan	290.01	81410	2008415	µg/L
Swep	433.00	38555	918189	µg/L
Systox	325.01	39560	8065483	µg/L
T3	236.00	78166		µg/L
T4	237.00	51489		µg/L
TCE	80.01	39180	79016	µg/L
TDS	247.01	70300		µg/L
TEPP	435.00	39620	107493	µg/L
TPH	462.01			
TKN	249.01	00625	17778880	mg/L as N
TOC	250.01	00680	7440440	µg/L
TOS (Calculated)	245.00			
TPH	461.01	46116	14280309	mg/L
TPN, Total Persulfate Nitrogen	580.01		7727540	µg/L
TSS	496.00		74018	mg/L
Tebuthiuron	190.00		34014181	µg/L
Tedion	434.00	39808	116290	µg/L
Temik	274.01	39053	116063	µg/L
Temperature, O C	238.00	00010	0	C
Temperature, O F	239.00	00011	0	F
Terbacil	204.00		5902152	µg/L
Terbuthylazine	436.00	38559	5915413	µg/L
Terbutryn	437.00	38887	886500	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Tetrachloroethene	75.00	34475	127184	µg/L
Tetrachloroethylene	75.04	34475	127184	µg/L
Tetrachloromethane	51.01	32102	56235	µg/L
Tetrachlorophenol	438.00	81849	25167833	µg/L
Tetrachlorvinphos	581.00	38877	961115	
Tetradifon	434.01	39808	116290	µg/L
Tetraethyldiphosphate	435.01	39620	107493	µg/L
Tetrahydrofuran	241.00	81607	109999	µg/L
Thallium, Dissolved	522.00	01057	7440280	µg/L
Thallium, Total	523.00	01059	7440280	µg/L
Thallium, Total Recoverable	242.00	00982	7440280	µg/L
Thiophanate	439.01	78880	23564069	µg/L
Thiosulfate	243.00			
Tin, Dissolved	513.00	01100	7440315	µg/L
Tin, Total	512.00	01102	7440315	µg/L
Tin, Total Recoverable	468.00	00983	7440315	µg/L
Titanium	469.00	01150	7440326	µg/L
Toluene	76.00	34010	108883	µg/L
Topsin-MR	439.00	78880	23564069	µg/L
Total BTEX	478.00	34103		µg/L
Total BTX	72.00	34103	n/a	µg/L
Total Dissolved Solids (residue)	247.00	70300		µg/L
Total Filterable Residue	247.02	70300		µg/L
Total Organic Halides	503.00	70353		µg/L
Total Organics	486.00	81299		µg/L
Total Solids	253.00	70297		Kg/100Gal
Total Solids	252.00	70318		%
Total Trihalomethanes	494.00	82080		µg/L
Toxaphene	255.00	39400	8001352	µg/L
Trefian	443.01	81284	1582098	µg/L
Trisdimefon	440.00	38892	43121433	µg/L
Trichlorobenzoic acid	551.00	50317		
Trichloroethene	80.00	39180	79016	µg/L
Trichloroethylene	80.02	39180	79016	µg/L
Trichlorofluoromethane	83.00	34488	75694	µg/L
Trichloromethane	54.01	32106	67663	µg/L
Trichlorophon	340.01	39014	52686	µg/L
Trichlorotrifluoroethane	3.02	81611	26523648	µg/L
Trichlorotrinitrobenzenes,Total	258.00			
Tricyclazole, Water, Whole	641.00	38902	41814782	µg/L
Trifluralin	443.00	81284	1582098	µg/L
Trimethyl Benzenes, Total	444.00	78136	25551137	µg/L
Trimethyl phosphate	626.00		512561	µg/L
Trinitrobenzenes, Total	259.00			
Triphenyl phosphate (Water, Whole)	569.00	77881	115866	µg/L
Trithion	297.01	39786	786196	µg/L
Tritium	627.00	07000	10028178	pCi/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
Turbidity(Lab)	260.00	82079		NTU
UDMH	261.00	81314	57147	mg/L
Vanadium (Dissolved)	262.00	10085	7440622	
Velpar	360.01	38815	51235042	µg/L
Vernam	445.01	82200	1929777	µg/L
Vernolate	445.00	82200	1929777	µg/L
Vinyl acetate	81.00	77057	108054	µg/L
Vinyl chloride	82.00	39175	75014	µg/L
Vinyl trichloride	4.01	34511	79005	µg/L
Vinylbenzene	74.01	77128	100425	µg/L
Volatile Dissolved Solids	263.00			
Volatile Organic Compounds	487.00		78733	mg/L
Xylene isomers, M + P, Whole Water	578.00		85795	µg/L
Xylene isomers, O + P, Whole Water	32.00		80353	µg/L
Xylene, m-	67.00	77134	108383	µg/L
Xylene, o-	77.00	77135	95476	µg/L
Xylene, p-	475.00	77133	106423	µg/L
Xylenes, Total	201.00	34020	1330207	µg/L
Zinc, Dissolved	504.00	01090	7440666	µg/L
Zinc, Total	507.00	01092	7440666	µg/L
Zinc, Total Recoverable	264.00	01094	7440666	µg/L
Zineb	447.00	38912	12122677	µg/L
Ziram	446.00	38917	137304	µg/L
Zolone	412.01	81291	2310170	µg/L
Zytron	336.01	81285	299854	µg/L
a-BHC	265.00	39337	319846	µg/L
a-Endosulfan	266.01	34361	959988	µg/L
alpha-BHC	265.03	39337	319846	µg/L
alpha-Benzene hexachloride	265.01	39337	319846	µg/L
alpha-Chlordane	530.00	39348	5103719	µg/L
alpha-Endosulfan	266.00	34361	959988	µg/L
alpha-Lindane	265.02	39337	319846	µg/L
b-BHC	267.00	39338	319857	µg/L
b-Endosulfan	268.00	34356	33213659	µg/L
beta-BHC	267.03	39338	319857	µg/L
beta-Benzene hexachloride	267.01	39338	319857	µg/L
beta-Endosulfan	268.01	34356	33213659	µg/L
beta-Lindane	267.02	39338	319857	µg/L
cis-1,2-Dichloroethene	326.00	77093	156592	µg/L
cis-1,2-Dichloroethylene	326.01	77093	156592	µg/L
cis-1,3-Dichloropropene	56.00	34704	10061015	µg/L
cis-1,3-Dichloropropylene	56.01	34704	10061015	µg/L
d-BHC	269.00	34259	319868	µg/L
delta-BHC	269.03	34259	319868	µg/L
delta-Benzene hexachloride	269.01	34259	319868	µg/L

APPENDIX D: CHEMICAL DICTIONARY
01/27/93

COMP_NAME	JHK_NO	STORET_NO	CAS_NO	UNITS
delta-Lindane	269.02	34259	319868	ug/L
g-BHC	357.00	39340	58899	ug/L
gamma-BHC (Lindane)	357.04	39340	58899	ug/L
gamma-Benzene hexachloride	357.03	39340	58899	ug/L
gamma-Chlordane	529.00	39065	5103742	ug/L
gamma-Lindane	357.02	39340	58899	ug/L
m-Diethylbenzene	549.01	77348	141935	ug/L
m-Dimethylbenzene	67.04	77134	108383	ug/L
m-Xylene	67.03	77134	108383	ug/L
meta-Xylene	67.02	77134	108383	ug/L
n-Butylbenzene	539.00	78483	104518	ug/Kg
n-Octacosane	390.00	78116	630024	ug/L
n-Propylbenzene	393.00	77224	103651	ug/L
o,p'-DDT	270.00	39305	789026	ug/L
o,p'-TDE	271.00	39315	53190	ug/L
o-Chloronitrobenzene	628.00		88732	ug/L
o-Chlorophenol	24.01	34586	95578	ug/L
o-Diethylbenzene	548.01	77340	135013	ug/L
o-Dimethylbenzene	77.03	77135	95476	ug/L
o-Phenylenediamine	629.00	73628	106503	ug/L
o-Toluidine	630.00	77142	95534	ug/L
o-Xylene	77.01	77135	95476	ug/L
ortho-Xylene	77.04	77135	95476	ug/L
p,a,a,a-Tetrachlorotoluene	632.00			ug/L
p,p'-DDD	208.02	39360	72548	ug/L
p,p'-DDE	209.02	39365	72559	ug/L
p,p'-DDT	210.02	39370	50293	ug/L
p,p'-TDE	272.00	39360	72548	ug/L
p-Chloro-m-cresol	31.02	34452	59507	ug/L
p-Chloronitobenzene	631.00		100005	ug/L
p-Cresol	35.01	77146	106445	ug/L
p-Diethylbenzene	550.01	77345	105055	ug/L
p-Dimethylbenzene	475.04	77133	106423	ug/L
p-Isopropyltoluene	538.00	77356	99876	ug/L
p-Nitroaniline	36.01	73278	100016	ug/Kg
p-Nitrophenol	37.01	34646	100027	ug/L
p-Xylene	475.02	77133	106423	ug/L
pH	448.00	00400		std. units
para-Xylene	475.01	77133	106423	ug/L
propyzamide	419.02	39080	23950585	ug/Kg
sec-Butylbenzene	543.00	78485	135988	ug/Kg
tert-Butylbenzene	537.00	78448	98066	ug/Kg
trans-1,2-Dichloroethene	78.00	34546	156605	ug/L
trans-1,2-Dichloroethylene	78.01	34546	156605	ug/L
trans-1,3-Dichloropropene	79.00	34699	10061026	ug/L
trans-1,3-Dichloropropylene	79.01	34699	10061026	ug/L
269	338.40			

APPENDIX E: LABORATORY QUALIFIERS

LIST OF QUALIFIERS FOR NUMERIC RESULTS

REMARK CODE	DEFINITION
B	Analyte is found in the blank as well as the sample, indicated possible/probable blank contamination.
J	Estimated value; not accurate.
M	Presence of material verified but not quantified
U or K	Compound was analyzed for but not detected. The associated numerical value is the sample quantitation detection limit.
UJ	Compound was analyzed for but not detected. The number is the estimated minimum detection limit.
C	The value is one of, or the sum of both, Benzo (b) Fluoranthene and Benzo (k) Fluoranthene.
X	Many background organisms.
H	Over holding time. Analysis run.
G	Improper container.
Z	Sample low due to interfering substance.
D	Sample high due to interfering substance.
IS	Interfering Substance.
P	Greater than (>).
A	Less than (<).
LMX	Lab Matrix Number.
LBK	Lab Blank Number.

APPENDIX E CONTINUED:

Data Qualifier Definitions

For the purpose of this document the following code letters and associated definitions are provided:

dr	- dry weight
wt	- wet weight
R	- The data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.
N	- Presumptive evidence of presence of material.
NJ	- Presumptive evidence of the presence of the material at an estimated quantity.
UJ	- The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

The reviewer may determine that qualifiers other than those used in this document are necessary to describe or qualify the data. In these instances, it is the responsibility of each reporting entity to thoroughly document/explain the qualifiers used and notify Ecology prior to submition of data packages.

APPENDIX F: COUNTY FIPS CODES

WASHINGTON

001	ADAMS
003	ASOTIN
005	BENTON
007	CHELAN
009	CLALLAM
011	CLARK
013	COLUMBIA
015	COWLITZ
017	DOUGLAS
019	FERRY
021	FRANKLIN
023	GARFIELD
025	GRANT
027	GRAYS HARBOR
029	ISLAND