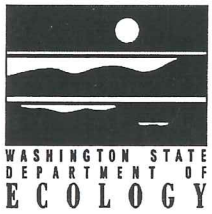
West Plains – Graham Road
Contaminant Source Investigation/Assessment Study
Spokane County, Washington

September 2002



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between the Washington State Department of Ecology and the
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WEST PLAINS – GRAHAM ROAD
Ground Water Contamination Area
Spokane County, Washington

Contaminant Source Identification/
Assessment Report

September 2002

1. EXECUTIVE SUMMARY

The Washington Department of Ecology (Ecology) Eastern Regional Office, Toxics Cleanup Program completed a Contaminant Source Identification/Assessment (CSI/A) study for potential sources of carbon tetrachloride (CCl_4) and trichloroethylene (TCE) detected in two residential water supply wells located near the intersection of Graham Road and U.S Highway 2, in the West Plains area of Spokane County, Washington. The CSI/A was conducted under a Site Assessment Cooperative Agreement between the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA).

In response to community concerns regarding the potential for the Graham Road Recycling and Disposal Facility to contaminate drinking water, a ground water monitoring program was initiated during 1998. Substantial concentrations of CCl_4 and TCE were detected in two of the wells that were sampled – the Nelson and Cook water supply wells. Initial concentrations detected in the Nelson well were 6.0 ug/l CCl_4, 13.0 ug/l TCE; the Cook well, 0.45 ug/l CCl_4 and 0.01 ug/l TCE.

The CSI/A study included review of public and governmental documents, research regarding the contaminant's use and properties, interviews of officials and residents, and field reconnaissance. The method and scope of the study was similar to those of a Phase I Environmental Site Assessment common to real estate transactions. Supplemental to the CSI/A, the Spokane Regional Health District conducted ground water monitoring through 2000 to confirm the presents of the contaminants.

The principal elements influencing the occurrence and movement of ground water in the study area are: 1) the hydrologic characteristics of the geologic units; 2) the climate, and; 3) water management practices, including withdrawal, irrigation and wastewater discharge. Based upon the hydrologic characteristics of the geologic units, the aquifer system in the study area can be divided into five hydrogeological units: 1) the Overburden unconfined aquifer system, 2) the Wanapum semi-confined aquifer system, 3) the Wanapum-Grande Ronde confining interbed, 4) the Grande Ronde confined aquifer system, 4) the basement complex, mostly a confining unit. For the purpose of the CSI/A study, the Overburden and Wanapum hydrogeologic units are the chief aquifers of interest.

The CSI/A study identified and assessed 11 possible sources for ground water contamination detected in the Nelson and Cook residential supply wells. Seven of the facilities were judged to be unlikely sources of contaminant sources. Three facilities, the Graham Road Recycling and Disposal Facility, the area of apparent dumping on R.A. Hanson Track, and the Nelson property were judged as low potential sources.

One facility, Fairchild Air Force Base (FAFB), was designated a high potential source based upon the following factors, singularly or in combination:

1. The Base, a Superfund Site, has an extensive record of problematic waste management practices involving solvents and related industrial wastes.

2. FAFB Building 2447 site, where concentration up to 9800 ug/l TCE have been detected in ground water, is located a distance of approximately 3500 feet (1 km) from the Nelson well.

3. There is a suggested regional ground water high, forming a mound or divide, in the vicinity of the western margins of the installation. Ground water flow may be directed off Base in westerly or northwesterly direction as a result of the inferred ground water high, the presents of buried paleochannels and/or a change in bedrock geometry.

Because FAFB is a listed Superfund Site, a Preliminary Assessment (PA) may not be necessary. It is recommended that the Fairchild Remedial Investigation be expanded to include the Nelson and Cook wells.

2. INTRODUCTION

2.1 BACKGROUND

The West Plains - Graham Road (WP-GR) site consists of two contaminated residential water supply wells located in the West Plains area of Spokane County, Washington, west of the Town of Airway Heights. The wells are situated in the immediate vicinity of Fairchild Air Force Base and the Graham Road Recycling and Disposal Facility (Figure 1). Fairchild Air Force Base (FAFB) is a Superfund site; Graham Road Recycling and Disposal Facility (GRRDF) is a permitted limited purpose landfill.

In response to community health concerns regarding the potential for GRRDF to contaminate drinking water, a ground water monitoring program was initiated during late 1998 (Washington State Department of Health, 1999). The monitoring program included sampling of ground water from four residential water supply wells and subsequent laboratory analysis for Volatile Organic Compounds (VOCs). Substantial concentrations of carbon tetrachloride (CCl_4) and trichloroethylene (TCE)[1] were detected in two of the

[1] Trichloroethylene (TCE), is also known as Trichloroethene and Trichlorethene.

wells – the Nelson and Cook water supply wells. Initial concentrations detected in the Nelson well were 6.0 ug/l CCl_4, 13.0 ug/l TCE; the Cook well, 0.45 ug/l CCl_4 and 0.01 ug/l TCE. Trace amounts of chloroform ($CHCl_3$) were also detected in the two wells.

The Spokane Regional Health District, under a Department of Ecology Site Hazard Assessment Grant, conducted periodic follow-up monitoring through 2000 to confirm the presence of the contaminants were consistent with the earlier monitoring. The locations of the Nelson and Cook wells are shown on Figures 1 and 2. VOC analytical results are shown in Table 1.

2.2 PURPOSE AND SCOPE

The WP-GR Contaminant Source Identification/Assessment (CSI/A) study was intended to: 1) identify and assess potential sources of CCl_4 and TCE that has contaminated two residential water supply wells and threatens the regional drinking water supply; and 2) provide a general characterization of the study area.

The work was carried out under a Site Assessment Cooperative Agreement between the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (US EPA) for the period July 1, 2000 through September 30, 2002.

Investigation activities consisted of those similar to a Phase I Environmental Site Assessment common to property transfers. Contaminant source identification was focused within a one-mile radius of the contaminated residential wells with cursory examination for potential sources within a radius of one to four miles of the site. Figure 5 shows the approximate area of investigation.

2.3 METHOD OF INVESTIGATION

The WP-GR CSI/A study consisted of the following elements:

- Examination of local and regional public records, including local telephone directories, aerial photographs and the Spokane County Assessor documents.
- Review of published and unpublished maps and documents regarding the area's geology, hydrogeology, land use and surface features.
- Research regarding the contaminant properties including use, chemistry, environmental fate and transport, human and environmental impacts, and remediation.
- Examination of governmental records pertinent to possible contaminant sources and environmental management practices, including documents and data bases maintained by Ecology and the EPA Region 10 Geographic Information Query System.

- Personal communication with Ecology staff, Spokane Regional Environmental Health Department employees and local residents.

- Field reconnaissance of the study area to identify and gather information regarding potential sources of contamination. Particular attention was given to current site activities, potential migration pathways, and evidence of possible contamination sources.

Except for field reconnaissance of the study area, no on-site inspections or investigations were conducted. Details regarding other properties are based upon "road side" observation, interpretation of aerial photograph, personal communication or public record.

Supplemental to the WP-GR CSI/A study, the Spokane Regional Environmental Health Department periodically sampled select residential water supply wells in the study area. The ground water was analyzed to confirm the presence of VOCs and to determine if other volatile organic contaminants were present. Analytical results are shown in Table 1.

3. DESCRIPTION OF STUDY AREA

3.1 SITE INFORMATION

3.1.1 Background

The WP-GR site consists of a contaminated ground water plume of unknown extent. It is situated in the West Plains area of Spokane County, Washington, about three miles west of the Town of Airway Heights and ½ mile northwest of FAFB. As currently recognized, the contaminated ground water plume is generally located in the vicinity of the Nelson and Cook residences near the intersection of U.S. Highway 2 with Graham and Christensen Roads (Figures 1 and 5), in the area of Latitude 47^0 38' 35' N, Longitude 117^0 40" 07' W. The area is shown on the Deep Creek Quadrangle, U.S Geological Survey, 1:24000 scale topographic map.

Major properties or facilities that are connected in some manner with the contaminated ground water plume include, but are not limited to, the Nelson and Cook residential properties (confirmed ground water contamination), GRRDF, the RA Hanson tract and FAFB. Narrow corridors containing Burlington Northern Railroad and two petroleum pipelines, operated by Yellowstone and Chevron pipeline companies, transect the general area and are shown on Figure 1.

3.1.2 Address, Location and Ownership

The Nelson residence is located at 1414 S. Graham Road within the N ½ of the NE ¼ of the NE ¼, Section 30, Township 25 North, Range 41 East, W.M. The 14 acre tract, parcel No. 15301.9017, is bounded on the north by US Highway 2, on the east by

Graham Road and on the south by GRRDF. The owner of record is the Nelson Family Ltd. Partnership, 312 Secondary Road, Coulee Dam, WA 99116. The residence is shown on Figures 1 and 2.

The Cook residence is located at 1203 S. Christensen Road within S ½ of the SW ¼ of the SW ¼, Section 20, Township 25 North, Range 41 East, and W.M. The 10 acre property consists of two parcels, Nos. 15203.0202 and 15203.0201, in Fairchild Estates Addition L2B2. The property is bounded by U.S. Highway 2 on the south, Christensen Road on the west and 12th Avenue on the north. The owner of record is Joseph C. Cook, 1203 S. Christensen Road, Medical Lake, WA 99022-9644. The residence is shown on Figures 1 and 2.

GRRDF (Figures 1 and 2) is located at 1820 S. Graham Road, Medical Lake, WA 99022. The 110-acre facility is within the S ¾ of NE ¼, Section 30, Township25 North, Range 41 East, W.M. The facility consist of three tracts, parcel Nos. 15301.9044, 15301.9045 and 15301.9046. The facility is bounded on the north by the Nelson Property; on the east by Graham Road. The owner of record is Sanifill of WA, Inc. (Waste Management), PO Box 1450, Chicago, Il 60690-1450.

The RA Hanson Tract is a 140-acre triangular-shaped property bounded on the north by U.S. Highway 2, on the west by Graham Road and on the southeast by Burlington Northern Railroad and FAFB (Figures 1 and 2). The tract is generally located in the NW portion of the N ½, Section 29, Township25 North, Range 41 East, W.M. The property is undeveloped except for an out-of-service water supply well. RA Hanson Co., PO Box 7400, Spokane, WA 99207-0400 is the owner of record. The tract is composed of parcels Nos. 15292.9001, 15292.9003, 15292.9004, 15292.9005, 15292.9006 and 15292.9012.

FAFB is a 4300-acre active military facility situated approximately ½ mile southwest of the known ground water contamination (Figures 1 and 5). The bulk of the Base is situated in Sections 28, 29, 32 and 33, Township 25 North, Range 41 East, W.M. and in Sections 4, 5, and 6, Township 24 North, Range 41 East, W.M. The site address is United States Air Force, Fairchild AFB, WA 99011; the main gate is located on U.S. Highway 2 approximately 2 miles west of the Town of Airway Heights. The facility is approximately bounded by U.S. Highway 2 on the north, Graham Road on the west, Rambo Road on the east, and Hallett Road on the south. According to EPA databases, the installation's CERCLIS coordinates are Latitude 47.628331 N, Longitude 117.6462 W; Toxic Release Inventory coordinates are Latitude 47.607778 N, Longitude 117.676389 W (note: coordinates are in degrees.decimal degrees).

3.1.3 Environmental Records and Databases

The WP-GR ground water contamination area is identified in Ecology's Environmental Reporting and Tracking System (ERTS) as site # E508311 and in the Ecology's Facility/Site Identification System (FAC/SITE) as #89233269. The site is also known as West Plains Ground Water Contamination Area, and is informally referred to as the "Nelson/Cook Wells".

GRRDF is identified on Ecology's Solid Waste and Financial Assistance Program Solid Waste Facility database as ID# ESG2. The Spokane County Regional Health District is the permit issuing authority; however, Ecology provides state oversight of the permit.

FAFB is identified as EPA ID# WA9571924647; Superfund Site ID# 1001139; TRI ID# 99011FRCHL100WE. In Ecology's database, FAFB Federal Superfund activities are identified as FAC/SITE #'s 72389311 and 58757186; Hazardous Waste activities as FAC/SITE # 112.

3.2 GENERAL GEOGRAPHY

3.2.1 Anthropological

The region surrounding the WP-GR ground water contamination area is sparsely populated as indicated by Figure 5. Land-use is predominantly low-density, semi-rural, single family residential broken by agricultural and undeveloped, idle tracts. Commercial development - mainly retail sales and service - is concentrated along the major transportation corridors in communities of Airway Heights and Medical Lake, the former located three miles (5 km) east of the subject area, the latter situated four miles (6.5 km) south. Except for FAFB and GRRDF, there is little industrial activity. Narrow corridors containing Burlington Northern Railroad and two petroleum pipelines, operated by Yellowstone and Chevron pipeline companies, transect the study area

According to the 1990 U.S. Census data as shown in the EPA Geographic Query System report (Appendix A) there are 54 households containing a total population of 170 people within a one-mile (1.6 km) radius of the site; 2683 households with total population of 8264 within a distance of one to four miles (6.4 km). This population distribution may be somewhat skewed as a result of a geo-statistical quirk in the demographic analysis.

A portion of FAFB housing is within a one-mile distance of the known ground water contamination (Figures 1 and 5). However, the geographic coordinates of record for FAFB are at a distance greater than one-mile from the known contaminated plume. Therefore, it is likely that the demographic analysis attributed the section of military housing within one-mile distance to the 1 to 4 mile range category. The result being that there is likely a greater population actually residing within a one-mile radius of the known contamination than the estimated 170 people.

3.2.2 Landscape

The WP-GR study area is situated in the northeastern most corner of the Columbia Basin[2] Section of the Intermountain Semidesert Ecoregion (USDA, Forest Service, 1994). Landscape of the study area is characteristic of the Palouse Hills and Channel Scablands of eastern Washington. The typical setting consists of nearly flat or gently rolling

[2] The terminology "Columbia Basin" and "Columbia Plateau" are interchangeable in most instances. Although the region is a structural and topographic basin, the expression "Columbia Plateau" is commonly used in the geologic and hydrogeologic literature.

grasslands and dry-land farms, broken by occasional conifer woodland. Ground conditions consist of a discontinuous veneer of glaciofluvial or eolian sediments overlying basalt bedrock or rubble. Stream channels, regionally called coulees, are moderately incised into the basalt.

The topography in the vicinity of the WP-GR study area is nearly flat; generally very gently sloping to the north (see Figure1). Elevation in the immediate vicinity ranges from approximately 2430 to 2450 feet above mean sea level (MSL).

There are no apparent surface drainage features in the immediate vicinity of the Nelson and Cook wells. The nearest surface water feature is Deep Creek, situated over one mile (1.6 km) distance from Nelson and Cook Wells (Figure 1). The northeast flowing perennial stream is a tributary of the Spokane River. The stream segment is listed on the EPA Geographic Information Query System (US EPA, 2001, Appendix A) as Reach # 17010307-18 which reports that the overall quality of the reach for resident fish is "moderate".

Soils of the general CSI/A study area are of the Hesseltine-Cheney-Uhlig association: dominantly moderately deep to shallow, gravelly or rocky soils of the channeled scablands and associated glaciofluvial plains (U.S. Dept. of Agriculture Soil Conservation Service, 1968). The soils are well drained and are medium to moderately course textured.

3.3 GEOLOGY

3.3.1 Regional Geology

The study area is situated in the northeast margin of the Columbia Plateau geologic province, near the boundary of the Plateau with the Northern Rocky Mountain province. The Columbia Plateau is constructed of a thick sequence of Miocene age basalt flows, collectively known as the Columbia River Basalt Group (CRBG). (Alt and Hyndman, 1995)

The CRBG is made up of approximately 300 individual basalt flows that erupted between 17 and 6 million years ago. The basalts cover about 63,200 mi^2 (164,000 $km^{2)}$ of southeast Washington, northeast Oregon and west-central Idaho, with a total volume of about 41,700 mi^3 (171,000 $km^{3)}$. The lava flows were structurally deformed, to one degree or another, both contemporaneous with and subsequent to eruption (Hopper and Reidel, 1989).

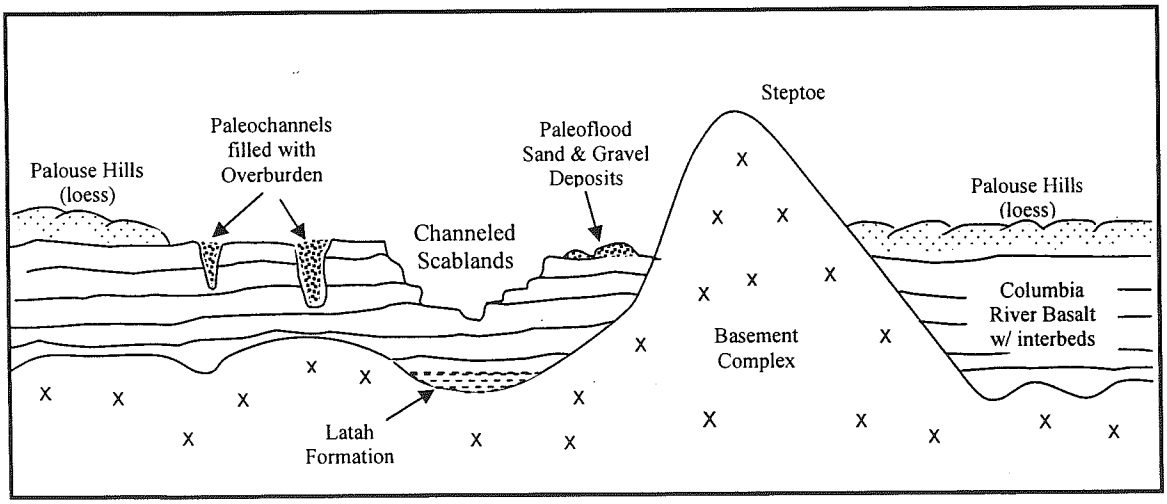
In the northern portion of the Columbia Plateau, three formations the CRBG can be recognized, from oldest to youngest: the Grande Ronde, Wanapum and Saddle Mountain Basalts; shown on Figure 4(d). Sedimentary interbeds or erosional surfaces often separates individual lava flows. The most extensive interbed within the CRBG occurs between the Grande Ronde and Wanapum Basalts (Whitehead, et. al., 1994).

Subsequent to the placement of the CRBG, the region was blanketed by Quaternary age (1.7 million years ago to present) loess deposits of the Palouse Formation and then subjected to Pleistocene age (22,000 to 12,000 years ago) catastrophic glacial Lake Missoula outburst floods (Molenaar, 1988 and, Whiteman, K.J., et. al., 1994).

3.3.2 Local Geology

Deobald and Buchanan (1995) identify three general geologic units in the CSI/A study area: (1) crystalline basement, (2) basalt of the CRBG including sedimentary interbeds, and (3) overlying unconsolidated sediments (i.e. overburden). The general geology of the study area is shown on Figure 3(c); thickness of overburden is shown on Figure 3(a). Figure 6 is an idealized cross-section showing the general geologic features and relationships within the study area.

FIGURE 6
Idealized Geologic Cross-section of Study Area
Modified from Stradling, D.F. and Kiver, E.P., 1989



The crystalline basement rocks, composed of pre-Tertiary age (> 63 million years old) igneous intrusive and metamorphic rocks, are the oldest rocks in the study area. This basement complex represents a somewhat irregular erosional surface upon which younger rocks were deposited. Deobald and Buchanan (1995) report that a prominent ridge of buried basement rock is present in the vicinity of Fairchild Air Force Base. In a few places basement rocks extend above the basalt flows to form Steptoes; the nearest located approximately three miles south of the CSI/A study area.

In the immediate CSI/A study area, the basement complex is overlain by the Grande Ronde and Wanapum Formations of the CRBG with interbedded fluvial and lucustrine deposits. Overlying the basement complex, and basal to and interbedded (?) with the Grande Ronde, are discontinuous lucustrine and fluvial sediments of the Miocene age Latah Formation.

According to Deobald and Buchanan (1995) the Grande Ronde Formation in the study area varies in thickness from absent to 514 ft (157 m). The Grande Ronde–Wanapum interbed/saprolite zone separates the Grand Ronde from the overlying Wanapum flows and at an elevation of 2,100-2,200 ft (649-670 m). Thickness of the interbed varies from absent to 120 ft (37 m) and averages 37 ft (11 m). The interbed is composed mainly of clay and shale with zones of sand and gravel. The saprolite occurs at the top of the Grande Ronde.

The Wanapum Formation varies in thickness from not present to 292 ft (89 m); averaging 125 ft (38 m) (Deobald and Buchanan ,1995). In addition to the Latah Formation and the Grande Ronde–Wanapum interbed, several less substantial interbeds occur within the basalts.

The relief of the upper basalt surface is highly variable due to erosion, principally by the Lake Missoula floods. In the CSI/A study area, significant buried basalt surface relief features include: 1) several deep westerly trending paleochannels incised into the basalt surface indicated on Thickness of Overburden Map, Figure 3(a), and; 2) a prominent north-south trending basement rock ridge situated under Fairchild Air Force Base as reported by Deobald and Buchanan, 1995. Character of the upper basalt surface ranges from unweathered and highly fractured to a dense, clay-rich saprolite.

Basalt bedrock in the vicinity of the CSI/A area is generally concealed by assortment of Quaternary age unconsolidated sedimentary deposits, collectively designated "overburden" (Deobald and Buchanan, 1995 and, Whiteman, K.J., et. al., 1994). In a few locations the underlying basalt is exposed by Lake Missoula flood scouring, aggregate mining, or other anthropological surface disturbance. The overburden materials, differentiated on the General Geology map, Figure 3(c), consist of:

- Loess Deposits (Ql) – Eolian (wind deposited) silt, clay, sand and volcanic ash of the Palouse Formation. In the immediate vicinity of the contaminated wells, most of Palouse Formation has been eroded by Pleistocene age glacial Lake Missoula floods.

- Glaciofluvial Deposits (Qfg) – Weakly stratified, poorly sorted mix of sand, gravel, cobbles and boulders deposited by episodic Lake Missoula outburst floods. These course grained surficial deposits are predominant in the vicinity of the contaminated wells and in the southeastern section of the study area. In the West Plains region, thickness of the flood deposits ranges from absent to several hundred feet, but is typically less than 50 ft (15 m).

- Sand Dunes (Qd) – fine to medium grained sand reworked from older sediments. The principal area of dune deposition is situated northwest of the contaminated wells, generally parallel to Deep Creek.

In addition to the above described overburden deposits, a thin mantle of Recent (< 10,000 years old) eolian silt blankets the post-Lake Missoula flood landscape This "top soil",

not distinguished on Figure 3(c), consistS of volcanic ash and reworked Palouse Formation. Typical thickness of this veneer ranges from not present to 1 ½ ft ($^1/_2$ m).

Regionally, thickness of the overburden deposits ranges from absent to approximately 400 feet (120 m); the thickest occurrences apparently being paleochannels filled with glacial Lake Missoula flood deposited gravels (Deobald and Buchanan, 1995). In the immediate vicinity of the contaminated wells, depth to bed rock is typically less than 100 ft (30 m). Overburden thickness is shown on Figure 3(a).

3.4 HYDROGEOLOGY

3.4.1 Introduction

In the CSI/A study area, the principal elements influencing the occurrence and movement of ground water are: 1) the hydrologic characteristics of the geologic units; 2) the climate, and; 3) water management practices including withdrawal, irrigation and discharge.

Based upon the hydrologic characteristics of the geologic units, the aquifer system in the study area can be divided into five hydrogeological units: the overburden, Wanapum unit, Wanapum-Grande Ronde interbed unit, Grande Ronde unit, and basement unit (Deobald and Buchanan, 1995 and, Whiteman, K.J., et. al., 1994). The relationship of the hydrogeologic units and their general character are shown on Figure 7.

FIGURE 7

Hydrogeologic Units of the West Plains - Graham Road area.
Adapted form Deobald and Buchanan, 1995, and Whiteman, K.J., et. al., 1994

HYDROGEOLOGIC UNIT
Overburden *unconfined aquifer system*
Wanapum Unit *semiconfined aquifer system*
Wanapum-Grande Ronde Interbed Unit *confining unit*
Grand Ronde Unit *confined aquifer system*
Basement Unit *mostly a confining unit*

The overburden, basalt formations and the basement complex are the principal hydrogeologic units of ground water occurrence. The basalt aquifers are the most important sources of ground water supply for the area. The two basalt aquifers – the Grande Ronde and Wanapum units - are two unique aquifers, separated by the Wanapum-Grande Ronde aquiclude.

For the purpose of the CSI/A study, the Overburden and Wanapum hydrogeologic units are the chief aquifers of interest.

3.4.2 Description of Hydrogeologic Units

The following description of the hydrogeologic units is summarized from Deobald and Buchanan (1995). It should be noted that the descriptions are general, based upon typical regional conditions.

The Overburden Unit -
An unconfined aquifer with recharge principally from precipitation, irrigation or a leaky wastewater drainage system at Fairchild. This hydrogeologic unit is also locally known as the "Shallow", "Upper" or "Alluvial" aquifer system. The unit is generally not saturated, therefore, does not usually provide a reliable water supply. Consequently, the Overburden unit is not ordinarily developed for production. Exceptions include: 1) the FAFB area of artificial recharge; 2) the gravel-filled paleochannels, and; 3) temporally intermittent, spatially discontinuous saturation during wet periods. Where saturated, ground water in the overburden unit is apparently in direct hydraulic continuity with the

underlying hydrogeologic unit – essentially the Wanapum unit. However, some perched ground water conditions exist (CH2Mhill, 1999). Because of the wide range of geologic materials composing the Overburden unit and a general lack of data, no characterization of the aquifer parameters is possible.

The Wanapum Unit –
A semiconfined aquifer system that generally matches the Wanapum basalt formation in the thickness and extent. Water table conditions exist locally in the upper part of the unit, but become more confining with depth.

In the CSI/A study area, Wanapum ground water flow direction is northwesterly, away from FAFB; shown on Figure 4(c). The westerly flow of Wanapum ground water from the Fairchild area is apparently controlled by the following features, either singularly or in combination:

- The large ground water mound under FAFB, shown on Figure 4(c).
- The prominent ridge of buried basement rock in the vicinity of FAFB.
- The westerly trending paleochannels, shown on Figure 3(a).

Similar to the Overburden Unit, recharge of the Wanapum Unit is from precipitation, irrigation and a leaky wastewater drainage system at Fairchild. Downward vertical hydraulic gradients indicate the Wanapum aquifer discharges mostly into the Grande Ronde aquifer below. Some discharge likely occurs to Deep Creek, situated west of the study area; shown on Figures 1, 4(b) and 5.

The hydrogeologic parameters for the Wanapum aquifer unit as determined by pump tests of three wells - located at FAFB, GRRDF, and another well some 8 miles (13 km) to the northeast - are summarized below:

- Hydraulic Conductivity - from 0.18 to12.1 feet/day
- Transmissivities - from 4.8 to 20.9 feet squared per day
- Storativity - form 0.0000177 to 0.0005500

Reported Wanapum seasonal head change for May to October 1994 amounted to an average decline of approximately 4 feet, and varied from +2 to -37 feet ($^2/_3$ to 11 m). In the West Plains area, the difference in head between the Wanapum and Grande Ronde aquifers ranges approximately from 20-210 feet (6-64 m).

The Grande Ronde–Wanapum Interbed Unit -
A confining interbed/saprolite zone separates the Grand Ronde from the overlying Wanapum flows. The unit is composed mainly of clay and shale with zones of sand and gravel. A saprolite occurs at the top of the Grande Ronde. Thickness of the interbed varies from absent to 120 ft (37 m) and averages 37 ft (11 m). .

The Grande Ronde Unit –
A confined aquifer system that matches the extent and thickness of the Grande Ronde basalt formation. Recharge occurs by slow infiltration of ground water from overlying aquifers, principally the Wanapum unit. Cascading water from the overlying Wanapum

aquifer (a result of uncased wells) may be a significant contributor of Grande Ronde recharge. Reported seasonal head change for May to October, 1994 ranged from +7 to -34 feet (+2 to -10 m) for an average decline of approximately 5 feet (1 $^{2}/_{3}$ m). Regional ground water flow direction in the Grande Ronde unit is principally northerly and easterly. However, in the vicinity of FAFB, an apparent north-south trending ridge of buried basement rock results in an east-west ground water divide. In the CSI/A study area, the ground water flow is westerly from under the FAFB area as shown on Figure 4(a). At least some portion of the Grand Ronde ground water likely discharges into the underlying Latah Formation and basement rocks.

The Basement Unit –
For the most part the basement complex has a relatively low permeability, therefore, it creates a confining unit or lower boundary to the overlying Wanapum and Grande Ronde aquifer systems. Ground water is most common in the upper 60 feet (18 m) of the unit where weathering of the rock has resulted in increased permeability and porosity. Reported average yield is 11 gpm (42 lpm); highest 35 gpm (132 lpm).

3.4.3 Internal Structure and Hydrology of the Basalt Flows

Basalt flow internal structure and hydrology is extremely complex. The internal structure is the chief control of the movement and occurrence of ground water in the basalt flows. The anisotropic and heterogeneous character of the basalt flows results in a high variability of the hydrologic properties.

Individual basalt flows in the Wanapum and Grande Ronde formations range in thickness from a few inches to several hundred feet. Deobald and Buchanan (1995), in part summarizing Whiteman and others (1994), describe basalt flow internal structure and hydrology as follows:

> A typical basalt flow consists of four sections: the flow top, the entablature, the colonnade, and the flow base. Where superimposed with the base of an overlying flow, the flow top is referred to as an interflow zone, and is generally vesicular and scoriacious. The entablature consists of small-diameter columns in fan-shaped arrangement. Nearly vertical three- to eight-sided columns bound by cooling joints make up the colonnade section. The columns are typically crosscut by systems of nearly horizontal joints, and the base of the colonnade may be marked by a vesicular zone. The columns average 3 feet (0.9 m) in diameter and 25 feet (8 m) in length. The flow base is generally a thin zone of glassy basalt and may be pillowed. While these four sections are commonly recognizable in individual basalt flows, their degree of development can vary markedly both laterally within the flows and vertically among them.
>
> Water is transmitted laterally, and most readily through the broken vesicular and scoriacious interflow zones along the basalt flow top and base. In the more massive and less transmissive entablature and colonnade, ground water movement is controlled by the more or less vertical fractures and joint systems, and lateral movement of ground water is probably negligible in this zone as compared to the

volume of water that moves laterally through the interflow zones.

Vertical movement of ground water between the basalt flows is also controlled by the presence of sedimentary interbeds, and the hydraulic characteristics of the interbeds. The lithology of the interbeds may vary from indurated shales to unconsolidated clay, sand and gravel. Thus, interbeds may be locally transmissive and function as aquifers where materials are course-grained, or impede the vertical movement of ground water where fine-grained. Interbeds typically act as semiconfining to locally confining layers, transmitting only small amounts of water laterally with respect to the interflow zones. Fine-grained sediments in combination with dense basalt flow interiors (entablature and colonnade) slow the downward migration of ground water, perching water above, and confining the aquifer below. It has been reported that in most parts of east-central Washington, the hydraulic heads in basalt aquifers are progressively lower in the deeper aquifer zones. The differences in hydraulic head reflect the low permeability of the intervening dense basalt zones and interbeds. Wells that intersect several water-bearing interflow zones are typically cascading wells, where water falls from the upper interflow zones to the potentiometric surface below.

4. SUMMARY OF FINDINGS

4.1 GROUND WATER MONTIORING

In response to community health concerns regarding the potential for Graham Road Recycling and Disposal Facility to contaminate drinking water, a ground water monitoring program was initiated during late 1998 (Washington State Department of Health, 1999). The initial ground water monitoring effort was collaboration between the Washington State Departments of Ecology and Health, the Spokane Regional Health District and the West Plains Neighborhood Association and included sampling of ground water from four residential water supply wells and subsequent laboratory analysis for Volatile Organic Compounds (VOCs).

Substantial concentrations of carbon tetrachloride (CCl_4) and trichloroethylene (TCE) were detected in two of the four wells – the Nelson and Cook water supply wells, situated approximately 1000 feet distance from each other (Figures 1 and 2). Initial concentrations detected in the Nelson well were 6.0 ug/l CCl_4, 13.0 ug/l TCE; the Cook well, 0.45 ug/l CCl_4 and 0.01 ug/l TCE. Trace amounts of chloroform were also detected in the two wells.

The Spokane Regional Health District conducted periodic follow-up monitoring through 2000 to confirm the presence of the contaminants. Table 1 summarizes VOC concentrations detected in ground water in the residential water supply wells. Carbon tetrachloride and trichloroethylene are predominately used as degreasers and industrial solvents. The low concentrations of chloroform are judged not to be of concern at this time.

TABLE 1
Volatile Organic Chemical Concentrations in Ground Water
Nelson and Cook Residential Water Supply Wells
West Plains – Graham Road Ground Water Contamination Area
Spokane County, Washington

Well	CCl_4[1]	CCl_4 MCL[3]	CCl_4 Cleanup Level[4]	TCE[2]	TCE MCL[3]	TCE Cleanup Level[4]	Chloroform
Nelson							
10/98	6.0	5.0	0.337	13.0	5.0	3.4	Trace
3/23/99[5]	6.0	"	"	13.0	"	"	N/D
4/28/99	6.0	"	"	13.2	"	"	0.5
8/10/00	6.6	"	"	14.3	"	"	0.7
11/8/00	8.7	"	"	14.4	"	"	0.8
Cook							
10/98	0.45	"	"	0.01	"	"	Trace
3/23/99[5]	N/D	"	"	N/D	"	"	N/D
4/28/99	N/D	"	"	0.8	"	"	N/D
8/10/00	0.6	"	"	1.4	"	"	0.8
11/8/00	0.6	"	"	1.2	"	"	0.7

Values in ug/l (ppb)

[1] Carbon Tetrachloride
[2] Trichloroethylene
[3] US EPA Maximum Contaminant Level for drinking water
[4] Model Toxics Control Act, Method B Cleanup Level for ground water
[5] Analytical method used for this ground water monitoring event had a higher method detection limit than the other occasions.

4.2 CONTAMINATED WELL SITE DESCRIPTION

4.2.1 Introduction

The location and ownership of the Nelson and Cook properties are detailed above in Section 3.1.2, *Description of Study Area*. The location of the sites are shown on Figures 1 and 2, and generalized on Figures 3 and 4.

4.2.2 Nelson Property and Well

Land use of the Nelson property is residential/agricultural (Spokane County Regional Health District, 1999b). The property is relatively flat. Site geology consists of near surface basalt covered by gravel deposits of the glacial Lake Missoula outburst floods,

and in places, a thin veneer of eolian silt. Improvements consist of a house, shop and well house.

There is one well on site that serves as a source of domestic water supply for the Nelson residence. There is no well log on record; therefore, there are no details available regarding well depth, construction or water level. The wellhead is protected by a concrete slab and a pump house. Reportedly, the well was constructed in the 1950's. Based upon that period of construction, it is reasonable to suppose that the well casing is perforated and was not properly sealed. Should such circumstances exists, it is possible that cross-contamination between aquifers could occur by means of cascading water in the well.

From 1954 until early 1957, the Nelson property was the site of Fairchild Anti-Aircraft Artillery Battery 81 (U. S. Army Corps of Engineers, 1996). Remnants of the AAA activities that remain on site include concrete slabs, building foundations and an earthen gun enclosure. In May 1996 a site Preliminary Assessment was conducted by the US Army Corps of Engineers under the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS). The facility, DERP-FUDS Site No. F10WA060100, received a No Further Action (NOFA) recommendation.

In addition to the AAA site, it is also reported (but not documented) that a radar or radio station was situated on the Nelson property (Ecology, 2000a).

Table 1 provides the analytical results for ground water samples taken from the Nelson domestic well. Appendix B contains copies of Spokane Regional Health District field reports for the Nelson site.

4.2.3 Cook Property and Wells

Land use of the Cook property is residential/agricultural (Spokane County Regional Health District, 1999a). The property is relatively flat. Geology consist of near surface basalt covered by gravel deposits of the glacial Lake Missoula outburst floods, and in places, a thin veneer of eolian silt.

There are four wells on the Cook property. However, only one well, Unique Well I.D. # ACP618, is in service as a source of domestic water supply for the residence. According to the Well Log, the domestic well was constructed in 1997, is 110 feet (33.5 m) deep, encountered weathered basalt about 18 to 30 feet (5.5 to 9.1 m), and has a static water level of -30 feet (9.1 m). The wellhead is a pitless adapter type.

Table 1 provides the analytical results for ground water samples taken from the Cook domestic well. Appendix C contains copies of Spokane Regional Health District field reports, including Well Logs, for the Cook property.

4.3 REGULATED FACILITIES WITHIN THE CSI/A STUDY AREA

According to the U.S. EPA *Geographic Information Query System* database, 2001 (Figure 5, Appendix A), the following federally regulated facilities are situated within one mile of the Nelson and Cook contaminated wells[3]:

CERCLA: Fairchild Air Force Base (4 Waste Areas), FAC ID WA9571924647
RCRA TSD: USAF Fairchild AFB, FAC ID WA9571924647
NPDS: Fairchild AFB, FAC ID WA0025542

In addition to the above facilities, Ecology's *Facility/Site Information System* database indicates a number of sites within the CSI/A study area that are state regulated for waste management practices. Major facilities include the GRRDF and the FAFB CERCLA site. Less significant facilities are discussed in Section 4.5.2, below. Appendix D contains a map showing approximate *Facility/Site Information System* site locations and corresponding *Facility/Site Detail* sheets with specific facility information including location, regulatory classification and facility type.

4.4 UNREGULATED FACILITIES WITHIN THE CSI/A STUDY AREA

As indicated by aerial photograph interpretation preformed U.S. EPA Environmental Monitoring Support Systems Laboratory (EMSL), Las Vegas, some portions of the RA Hanson property have a history of waste storage, dumping and disposal (Washington Department of Ecology, 2000b). The area of concern is the southern one-third of the triangular-shaped tract, roughly bounded on the west by Graham Road and on the southeast by the Burlington Northern Railroad and FAFB and U.S. Highway 2 on the north. This area of reported dumping is shown on (Figures 1, 2, 3 and 4).

A "borrow pit" is situated just south of US Highway 2 and west of the Nelson property (see Figures 1 and 2). The facility is used for the mining, crushing and storage of road aggregate and is possibly a former site of a portable asphalt batch plant.

4.5 CONTAMINANT SOURCE IDENTIFICATION AND ASSESSMENT

4.5.1 Introduction

The CSI/A study identified and assessed 11 possible sources for ground water contamination as exhibited by the Nelson and Cook residential supply wells. Seven of the facilities were judged to be unlikely sources of contaminant sources. Three facilities, the GRRDF, the area of apparent dumping on R.A. Hanson Track, and the Nelson property were judged as low potential sources. One facility, FAFB, was designated a high potential source.

[3] Although the official *coordinates* of the regulated facilities fall outside a one-mile radius of the contaminated wells, the *boundaries* of the Fairchild Air Force Base are situated *within* a one-mile radius.

Figures 1 and 2 shows the approximate location of the facilities identified and assessed as being a low or high potential contaminant source.

4.5.2 Sites Identified and Assessed as Unlikely Sources of Contamination

The initial identification of the following facilities as potential sources of contamination was based solely upon the facility either 1) being listed as a state or federally regulated site located within a one-mile radius of the contaminated residential wells, or 2) having a documented or speculated waste stream, process or site history that may include solvents.

The listing of a site as an unlikely potential source does not imply a release has not occurred. Although the following sites are possible sources of contamination, they were assessed to be an "unlikely" source because such facilities would not ordinarily use, store or dispose of the carbon tetrachloride and trichloroethylene in such a manner and quantity as to contaminate ground water to the degree exhibited in the Nelson and Cook residential wells.

Highway 2 Borrow Pit - No report of a release on file. In addition, the Spokane Regional Health District sampled and analyzed water standing in the pit and found no indication of VOCs (Chain of Custody and Lab report for sample #003-SW contained in Washington Department of Ecology Site File for West Plains Groundwater Contamination Area, Spokane County).

AAFES Station Bldg 2386 - Ecology's *Facility/Site Information System* database entry encompasses 159 underground storage tanks (USTs) located on Fairchild AFB. Most are fuel tanks including active, inactive, exempt, decommissioned and removed USTs. Only two releases reported; both petroleum products.

Fairchild Shoppette - Retail petroleum underground storage tanks; no release reported.

Northwest Pipe Line Corp Spokane - Natural Gas Transmission; Hazardous Waste Generator.

NW Pipeline Airway Heights - Metals contamination.

USAF Fairchild AFB - Air Quality Operating Permit.

Yellowstone Pipeline Co Fairchild - Petroleum Pipeline; petroleum release.

4.5.3 Sites Identified and Assessed as a Low Potential Source of Contamination

The identification and assessment of the following facilities as low potential contaminant sources is based solely upon the facility having a speculated waste stream, process or circumstance that may have involved solvents. The listing of a site as a low potential source does not imply a release, although such may have occurred.

Although the following three sites are possible sources of contamination, they were judged to be of "low potential" because the CSI/S revealed no indication (e.g. documentation) that there had been a release into the environment. In other words, although it is certainly possible, the study revealed no information or data that suggest that these facilities ordinarily used, stored or disposed of carbon tetrachloride and trichloroethylene in such a manner and quantity as to contaminate ground water to the degree exhibited in the Nelson and Cook residential wells.

4.5.3.1 Nelson Property

As mentioned above in Section 4.2.2, the Nelson property (Figures 1 and 2) is a former military AAA site (U. S. Army Corps of Engineers, 1996). Furthermore, it is 1) reported that a radar or radio station may have formerly been located on the property, and 2) has been implied that Mr. Nelson commonly repaired and maintained farm equipment on site (Washington State Department of Ecology, 2000a). Any of these activities could have involved the use or disposal of solvents; however, no information or data were encountered in CSI/A study that indicates such.

4.5.3.2 Graham Road Recycling and Disposal Facility (GRRDF)

GRRDF is adjacent to and immediately south of the Nelson property (Figures 1, 2, 3 and 4). USA Waste Services, Inc (1997) describes the GRRDF site as follows: A limited purpose landfill which is permitted under Washington Administrative Code (WAC) 173-304, Minimum Functional Standards for Solid Waste Handling. The existing facility consists of a 40-acre parcel, located one- half mile south of Highway 2. About 14 acres of the property have been developed for waste disposal. The facility receives about 4,000 tons of inert construction demolition debris and special waste per month. Inert asphalt, concrete and wood products are temporarily stored and recycled on-site outside the active landfill area.

The active landfill portion of the site is comprised of six lined cells (Waste Management, 2000) with a leachate collection system. The cell liners are a composite consisting of a 2-feet (0.61 m) thick layer of compacted clay and a 60-mil thick layer of high density polyethylene (HDPE). Each cell has a leachate collection and removal system. Leachate is discharged into an on-site double lined evaporation pond. To ensure that a minimum separation of five feet (1.5 m) is maintained between groundwater (i.e. SWBU, see below) and the bottom of cell liner system, a hydraulic gradient control system has been installed under cells.

GRRDF has conducted long-term ground water monitoring intended to demonstrate conformance of the waste operation with permit requirements of the Spokane Regional Health District Solid Waste Regulations and the requirements of the Minimum Functional Standards for Solid Waste Handling, WAC 173-304. In response to the Washington Department of Health report (1999) recommendation that "*Historical land use practices should be examined and potential source(s) in the vicinity, including*

Fairchild Air Force Base and GRRDF expansion area should also be considered. Determination of the source(s) should include monitoring in the vicinity if necessary", Waste Management increased ground water monitoring measures at the facility. In addition to routine ground water monitoring, GRRDF also sampled monitor wells and piezometers located between the disposal units and the Nelson wells (Waste Management Inc., 2000b).

In regard to the GRRDF being a potential source of contamination detected in the Nelson and Cook wells, the following is a summary of ground water conditions as reported by HWA GeoSciences, Inc. (2001 and 2000), Waste Management Inc. (2000a, 2000b and1999) and USA Waste Services Inc. (1997):

- Two ground water units are monitored at the facility, both basalt aquifers: a "shallow water-bearing unit" (SWBU) and a "Wanapum water-bearing unit" (WWBU). The SWBU is confined to semi-confined by overlying alluvial deposits and weathered basalt. The deeper WWBU is contained in a scoriacious interflow zone some 40 to 60 feet (12 to 18 m) below the SWBU. Perched ground water in the overburden unit is laterally discontinuous and is not monitored except where partially screened by some monitoring wells.

- General ground water flow direction of the SWBU is westerly. Locally, historic ground water elevations for the SWBU indicate there is a east-west trending ground water divide situated between the disposal units and the Nelson well. The divide is apparently influenced, if not created, by the hydraulic gradient control system located under the disposal cells. The ground water divide renders it unlikely that contamination could migrate from the disposal units to the Nelson well in the SWBU. The ground water gradient of the WWBU is north-northeasterly, from under the disposal units toward the Nelson well.

- VOCs, including TCE, have been detected in low concentrations in the leachate collection and removal system. Up-gradient monitor well MW-1A, developed in the SWBU, has a history of declining TCE concentrations in addition to occasional detection of xylene. MW-1A is located at the southeast corner of GRRDF, just northwest of FAFB, and along the railroad and pipeline corridor.

- GRRDF data from ground water monitoring wells situated down-gradient of the disposal cells show that no VOCs were detected in either the SWBU or WWBU. More expressly, three monitoring wells, BH-12 (SWBU), BH-13 (WWBU) and Oberholtzer (WWBU) are situated between the disposal units and the Nelson Wells. BH-12 and BH-13 are located in the northeast corner of the facility, within 300 feet (100 m) of the Nelson well; Oberholtzer is situated about 1000 feet (300 m) south of the Nelson well. GRRDF sampling showed no VOCs present in any of the wells.

In summary, although there is a record of VOCs in the leachate control system and MW-1A, the CSI/A study did not encounter any information or data that contradicts HWA

Geoscience Inc. (2001) assertion that *"first quarter 2001 monitoring results are consistent with the results of previous monitoring events, and indicate that no release of leachate from GRF disposal cells to site ground water has occurred"* and that VOCs detected in MW-1A *"is not attributable to leachate release from GRF and is probably attributable to an off-site source"*.

4.5.3.3 R. A. Hanson Tract

As discussed above in "Unregulated Facilities in the CSI/A Study Area", copies of eight aerial photographs with interpretive overlays spanning the period of 1950 to 1991 suggest the southern most portion of the RA Hanson property has a history of waste storage, dumping and disposal (Washington Department of Ecology, 2000b). The area containing the most activity is shown on Figures 1, 2, 3 and 4. During the 40-year period of record, the photo interpretations show areas of likely excavation, disturbed ground, dumping, disposal, trenching, solid waste, burial and storage tanks.

In addition to the RA Hanson property, the aerial photograph interpretations indicate that nearby areas of Fairchild AFB has a history of dumping, solid waste, ground stain, mounded material, drums and storage tanks. The photographs also show disturbed ground and dumping west and north of the Nelson residence that are apparently associated with borrow pit operations (see "Unregulated Facilities in the CSI/A Study Area", above).

Roadside reconnaissance of the RA Hanson property shows it to be vacant and unused; the north portion had been farmed in recent times. From the road, no conditions were evident that would suggest that the property is or has been used for activities that may be associated with VOC use, storage or disposal. Nevertheless, the interpretive overlays provide a record of suspected improper waste handling activities.

4.5.4 Sites Identified and Assessed as a High Potential Source of Contamination

4.5.4.1 Introduction

Fairchild Air Force Base (the Base) (Figures 1, 2, 3, 4 and 5) is determined to be a high potential source for the ground water contamination detected in the Nelson and Cook residential wells. This determination is based upon three primary factors, singularly or in combination:

1. The Base, a Superfund Site, has an extensive record of problematic waste management practices involving solvents and related industrial wastes.

2. An area of documented TCE ground water contamination, Building 2447, is located at a distance of approximately 3500 feet (1 km) from the Nelson well (Figures 1 and 2).

3. There is a suggested regional ground water high, forming a mound or divide, in

the vicinity of the western margins of the installation. Consequently, ground water flow direction from the northwest portion of the Base is westerly northwesterly, toward the Nelson and Cook wells.

4.5.4.2 CERCLA Background and Status

Environmental investigations at FAFB have identified 39 hazardous waste sites (Washington Department of Health, 1997). According to the US EPA (2002a, 2002b), the equivalent of over 4000 drums of solvents, paint wastes, plating sludge and related industrial waste have been disposed of at various locations on the Base. Contaminated locations include landfills, spill areas, waste pits and lagoons, fire training areas, and disposal pits and ditches. Contaminants include VOCs - chiefly TCE, semi-volatile organic compounds (SVOCs) and inorganic compounds. Both ground water and soil have been impacted.

Investigation and remediation of FAFB is being conducted through the CERCLA process. The Air Force is the lead cleanup agency; Ecology is the lead regulatory agency. As of April 2002, formal cleanup action decisions have been made for 28 of the installation's 39 contaminated sites. EPA's CERCLA Site Summary (US EPA, 2002a) gives the cleanup background and current status of Fairchild waste sites as follows:

> In 2000, the Air Force completed a five-year review to evaluate the continued protectiveness of its ongoing cleanup actions at the facility. During 2002, an Explanation of Significant Difference and an Institutional Controls Management Plan are expected to be completed to improve the enforceability of institutional controls for cleanup actions across the facility.
>
> Project Area 1
> This project consists of the Craig Road Landfill, the primary disposal site for municipal and production wastes produced at Fairchild from 1958 to 1977. An investigation revealed that wastes disposed in the landfill were contaminating ground water near the site with TCE, including the water supply wells for a mobile home park adjacent to the landfill site. The Air Force provided an alternate water supply to those residents in 1989, and instituted a monitoring program to verify that other water supply wells in the vicinity of the Base were not experiencing contamination. In 1991, the Air Force initiated a removal action to capture and treat contaminated ground water at the site boundary. The Record of Decision (ROD) for this project was signed in February 1993. The Air Force completed a landfill cap and an expansion of the ground water containment and treatment system in 1995 as part of the cleanup action called for in the ROD. The landfill cap was installed to prevent water from infiltrating the contaminated landfill and transporting contaminants into the ground water. The ground water containment and treatment system captures ground water as it leaves the source areas of the landfill and removes the contamination before returning the water to the aquifer. Operation of the ground water containment and treatment system as well as long-term monitoring of the ground water beneath the landfill and the

surrounding area are ongoing.

Project Area 2
This project includes seven sites: an old fire training pit, a wastewater lagoon, a drywell, an old landfill, and three fuel spill sites on the flightline. The Record of Decision (ROD) for this project was signed in July 1993. Remedial work is either underway or completed with monitoring at all of the sites except for the wastewater lagoon.

Wastewater Lagoons
The wastewater lagoons historically provided retention and settling for flightline stormwater runoff and industrial waste discharges from floor and shop drains in aircraft maintenance buildings along the flightline. The industrial wastes are now pretreated as needed and discharged to the sanitary sewer, and the lagoons are used principally for the stormwater treatment. The lagoons discharge to No-Name Ditch, which flows off the Base and through neighboring agricultural and residential properties for about a mile before percolating into the ground. Investigation of the site found a plume of TCE in ground water originating in the immediate area of the lagoons and flowing east under agricultural land beyond the Base boundary. In 1995, the Air Force installed a system to capture and treat contaminated ground water in the area of the Base site boundary. Operation of the system is ongoing, as is the monitoring of the plume and of nearby residential water supply wells.

In 2000, the Air Force performed an additional investigation to identify the source of the ground water contamination, and recovered 30 drums containing a variety of wastes, including TCE. The drums had been buried, possibly in the process of filling a lagoon which had been in that location during the 1950s and 1960s. The Air Force is evaluating additional cleanup alternatives to address both residual contamination in the source area and the off-Base portion of the contaminant plume, which currently extends for about a quarter of a mile beyond the Base boundary.

Project 3
The third project consists of 20 sites. Investigations conducted for this project found that no contamination existed at twelve of these sites. The Air Force, EPA and the State of Washington made preliminary determinations of no further action for these sites during 1991. The ROD formalizing those determinations of no further action and selecting remedies for the eight sites requiring cleanup was signed in 1995. Of the eight sites, remedial work (including monitoring) has been completed at five sites; all remedial work except ongoing monitoring has been completed at the remaining three sites.

Project 4
This project includes eleven sites at various locations across the Base. Several of these sites are associated with oil/water separators, underground storage tanks,

and surface water ditches. Through its compliance program, the Air Force has upgraded or removed all of the old oil/water separators and underground storage tanks with which the sites in this project are associated. This project also encompasses the ground water investigation currently being conducted along the north edge of the flightline for TCE plumes identified during investigations of several sites from Projects 2 and 3, but which were not attributable to those sites themselves. ROD is scheduled for 2003.

4.5.4.3 TCE at Building 2447

TCE contaminated ground water at FAFB Building 2447 is of particular potential relevance to the contamination detected in the Nelson and Cook residential wells. Figures 1, 2, 3 and 4 show the location of Building 2447 in relation to the residential wells. The Nelson well is approximately 3500 feet (1 km) northwest of the contaminated ground water plume at Building 2447.

Building 2447 is a small part of a remedial investigation (RI) study area known as storm drain (SD)-37. According to the draft RI report for SD-37 (URS, 2001a), Building 2447 was at one time a fuels lab. Spent laboratory reagents used in jet fuel testing were stored in a 1,000 gallon UST located just northeast of the lab building. Wastes generated in fuels testing were discharged to the UST through a sink in the lab. The tank was removed in 1994. The UST had previously tested tight. The suspected cause of the release was a leak in the pipe that connected the sink to the tank (URS, 2001a).

A site inspection identified TCE concentrations ranging up to 9,320 ug/l after the UST at Building 2447 was removed in 1995 (URS, 2001a). Ground water monitoring conducted during 2000 revealed TCE ground water concentration up to 9800 ug/l (URS, 2001a). In addition to TCE, numerous other VOC and petroleum compounds are present in the Building 2447 plume. Table 2 summarizes TCE concentrations in ground water in the vicinity of Building 2447.

In addition to the confirmed contamination at Building 2447, interpretation of aerial photographs spanning the period of 1950 to 1991 suggest that the northwestern portion of the Base has a history of dumping, solid waste disposal, ground stain, mounded material, drums and storage tanks (see "Unregulated Facilities in the CSI/A Study Area", above).

TABLE 2
Summary of TCE Concentrations in Ground Water (ug/l)
Building 2447 Fairchild Air Force Base, Spokane, Washington
Source: URS, 2001

Monitoring Well	TCE, ug/l
MW260	9,800(1)
MW261	22(1)
MW262	7.4(1)
MW268	Not Present
MW269	79(1) 377(2)
MW270	3,800(1) 2,800(2)
MW271	31(1) 41(2)
MW272	230(1) 200(2)
MW276	17(1)
MMW2447-1	10(1)
MMW2447-2	Not Present

(1) July/August sampling
(2) November/December sampling

4.5.4.4 FAFB Ground Water

On FAFB, unconfined ground water typically occurs in the Overburden Unit between six to twelve feet (2 to 4m) below ground surface (USR, 2001a and EA Engineering, Science and Technology, 1997). Overburden Unit aquifer materials consist principally of poorly sorted, medium to course sand, along with some fine sands and minor gravels. According to the Draft RI (USR, 2001), a dense clayey silt typically underlies the sands and is known to regionally overlie the basalt. The basalt aquifers are present beneath the Overburden aquifer and are considered interconnected with the shallow aquifer to some degree.

Within the FAFB, the Overburden aquifer is chiefly recharged by: 1) infiltration of natural precipitation; 2) leakage from the Base's storm and sewer drain systems; and 3) irrigation. (EA Engineering, Science and Technology, 1997, Deobald and Buchanan, 1995, and USR, 2001). The leakage from the wastewater drain system is significant enough to impact ground water gradients and flow direction (EA Engineering, Science and Technology, 1997).

The principle water supply for the Base is provided by a well field situated approximately 10 miles (16 K) northeast of the Base. An auxiliary well developed in the deep basalt aquifers is situated on the southern portion of the Base and supplies approximately 10

percent of Fairchild's water supply (USR, 2001 and EA Engineering, Science and Technology, 1997).

In the Overburden aquifer an easterly ground water flow direction has been conceptionalized for the greater part of the Base (USR, 2001 and EA Engineering, Science and Technology, 1997). However, there are several indications that a ground water high, in the form of a mound or divide, is situated in the vicinity of the west and northwest margins of the Base (e.g. in the vicinity of Building 2447, that segment of Graham Road located on the Base, and the western end of the runway). Consequently, shallow ground water flow direction from the western portion of FAFB may be westerly or northwesterly, toward the Nelson and Cook wells.

Several circumstances support a case for the northwesterly flow direction of ground water from the western portions of FAFB. First, Deobald and Buchanan (1995), using regional well coverage, identified a ground water high under FAFB in the Overburden Unit, the Wanapum aquifer, Figure 4(c) and the Grand Ronde aquifer, Figure 4(a). Their conclusions include:

1. The Wanapum aquifer is recharged, in part, by the Overburden aquifer, which in turn is recharged by the Base's leaky wastewater drainage system and irrigation.
2. A large ground water mound is present under the Base in the Wanapum aquifer, shown in Figure 4c.
3. Ground water flow of the Wanapum aquifer from under the Base is directed westerly by the ground water mound and/or a ridge of buried basement rock.
4. Paleochannels also influence the westerly flow of ground water from FAFB where the ground water in the Overburden unit intersects the buried channels. The presence of buried westerly-trending paleochannels is indicated by the Thickness of Overburden map, Figure 3(a).
5. Ground water of the Grande Ronde aquifer flows west from under FAFB; shown in Figure 4(a). A buried basement rock ridge is apparently the cause of this east-west divide.

Second, there is a general difference in the flow direction of shallow ground water at the Graham Road Recycling and Disposal Facility and that for the eastern portions of Fairchild Air Force Base. At GRRDF, flow of the "shallow water bearing unit" is westerly (HWA GeoSciences, Inc., 2001 and 2000, Waste Management Inc., 2000a, 2000b and1999, and USA Waste Services Inc., 1997). Within FAFB, a general easterly flow direction has been conceptionalized for the Overburden aquifer (USR, 2001 and EA Engineering, Science and Technology, 1997). Although the aquifer system classifications used at GRRDF and FAFB respectively cannot be fully correlated, it is apparent that the direction of regional shallow ground water flow at GRRDF is generally divergent from that of the Base. Given the close proximity of FAFB to GRRDF, it is reasonable to conclude that a ground water divide of some degree and geometry exists in the vicinity of Fairchild's western and northwestern margins. Furthermore, the TCE concentrations found in GRRDF's up-gradient monitor well MW-1A (discussed above in

Section 4.5.3.2) is a likely indication that ground water from FAFB is moving westerly, off the Base.
As a final point, the FAFB SD-37 Draft RI Report (URS, 2001) and The Final Regional Ground Water Modeling Study (EA Engineering, Science and Technology 1997) describe regional shallow ground water flow direction at the installation to be "generally east and east-northeast". Nevertheless, the reports contain numerous caveats, exceptions and omissions in regard to FAFB ground water flow, particularly that of the northwest portion of the Base. Furthermore, the studies contain data and information that indicates that ground water under the western portion of the Base is moving in a direction other than easterly. The following are a few examples that indicate that the ground water system under the western portion of FAFB has yet to be fully characterized.

According to the Regional Ground Water Modeling Study (EA Engineering, Science and Technology 1997):

- Figure No. 3-4 (p. 3-13/3-14), Contoured November 1992, Alluvial Aquifer Ground Water Levels. On the west margin of the base the map shows two relative small areas of ground water mounds, contours of 2450 and 2430 foot respectively. Similarly, the 2430 and 2440 foot ground water contours (open to the northwest and southwest) infer that a large north – south trending ground water mound is present under the west margin of the base. Furthermore, the 2430 foot contour swings around to the west in the vicinity of Building 2447, indicating a northerly ground water flow direction for that part of the Base. Likewise, Figure No. 6-1 (p. 6-2), Regional Pathlines and Travel Times also shows a northerly flow direction for the northwest portion of the Base. In addition, Figure 5-8 (p. 5-15/5-16), Calculated Water Levels and Residuals, Layer 1, also implies a northwesterly flow direction in the vicinity of Building 2447.

- In regard to model confidence, the report states (p. 1.3) "*Observed data uncertainties were identified in the assumptions used to conceptualize the ground water flow system.* ***These data uncertainties are primarily due to lack of available field data outside of FAFB boundaries***" (emphasis added). The lack of ground water elevation data west and northwest of the Base amplify the "uncertainties" in areas on the margin of the Base, for example Building 2447.

According to the SD-37 Draft RI Report (URS, 2001):

- In Section 2.3 Regional Hydrogeology (p. 8), shallow ground water flow direction is characterized as "*generally east and east-northeast* ***but significant local ground water flow variability may be associated with local changes*** *in alluvial sediments and bedrock topography*" (emphasis added).

- In regard to the Building 2447 site area, ground water elevations were apparently obtained only twice; during August and December of 2000. The measured wells were situated east of the building, toward the core of the Base. Figure 7-63, Ground Water Elevations and Flow Direction, December 2000, portrays an easterly "inferred" flow direction. Conversely, it is reported in Section 7.3.3,

Building 2447 Site Hydrogeology (p. 63) that *"...summer ground water flow was to the northwest."*

- Under the section *Conceptual Hydrologic Models* (p.xix), ground water flow direction of the SD-37 RI area is summarized as follows: *"Significant differences in groundwater elevations were observed between wells located at adjacent buildings and in wells horizontally separated by only a few feet. Several instances of localized groundwater mounding, with elevated groundwater levels in centrally-located monitoring wells compared to elevation in surrounding wells, were also noted. Groundwater flow direction exhibited considerable variation, with local ground water flow oriented in multiple directions depending upon location and season.* ***These observed variable groundwater depths and flow directions are inconsistent with the generalized Base-wide hydrogeologic setting*** *as discussed in other reports"* (emphasis added).

In summary, there is sufficient information to reasonably *suspect* a westerly and northwesterly ground water flow direction from the northeast margin of FAFB. Ground water from the western portions of the Base could be directed toward the Nelson and Cook residential wells by current or historic water mounding, buried bedrock, paleochannels. The uncertainty is largely due to the lack of hydrogeological field data off Base, and, to some extent, a deficiency of ground water elevation data on Base.

4.5.4.5 Carbon Tetrachloride at FAFB

In regard to FAFB being a potential source of CCl_4 contamination, as found in the Nelson and Cook wells, the following is noted:

- Hazardous waste stream details for reporting years 1993 to 1999 (Washington State Department of Ecology, 2001) indicate that FAFB has a record of CCl_4 use and storage.

- The Site SD-37 draft RI/FS report (USR, 2001) contains no reference regarding ground water being analyzed for CCl_4. Apparently, the compound was not a Chemical of Potential Concern for the RI/FS. Furthermore, the Public Health Assessment for FAFB (Washington State Department of Health, 1997) does not cite CCL_4 as a Contaminate of Concern. The CSI/A study did not encounter a rationale regarding why CCl_4 is not of "concern" at FAFB.

5. CONCLUSIONS AND RECOMMENDATIONS

Fairchild Air Force Base is assessed to be a high potential source of the VOC contamination detected in the Nelson and Cook residential water supply wells. Because the Base is a listed Superfund Site, a Preliminary Assessment (PA) is likely not necessary. It is recommended that the Remedial Investigation be expanded to evaluate whether or not the contamination detected in the Nelson and Cook wells have an on-Base source.

In planning and conducting additional investigation, the following circumstances should be considered:

- The VOCs detected in the Nelson and Cook residential supply wells are of relatively high concentrations and are persistent over time. Such circumstances imply a large, continuous contaminant source. Potential VOC-contaminant sources include Building 2447 or similar site situated the northwest margin of the Base.

- Due to the absence of hydrogeological field data outside of FAFB boundaries, the ground water flow regime in the northwest margin of the Base has not been fully characterized. Existing data and information suggest that a ground water divide or mound exists under the extreme northwestern portion of the Base. Ground water flow may be directed off Base in westerly or northwesterly direction as a result of an inferred ground water high, the presence of buried paleochannels or change in bedrock geometry. Furthermore, ground water flow direction may vary over time with ground water elevation changes.

- It is uncertain which aquifer the residential wells are drawing the contaminated ground water from - the Overburden Unit, the Wanapum Aquifer or both. Furthermore, in context of ground water recharge and withdrawal, there is a general lack of knowledge regarding the hydraulic relationship between the Overburden and the Wanapum units.

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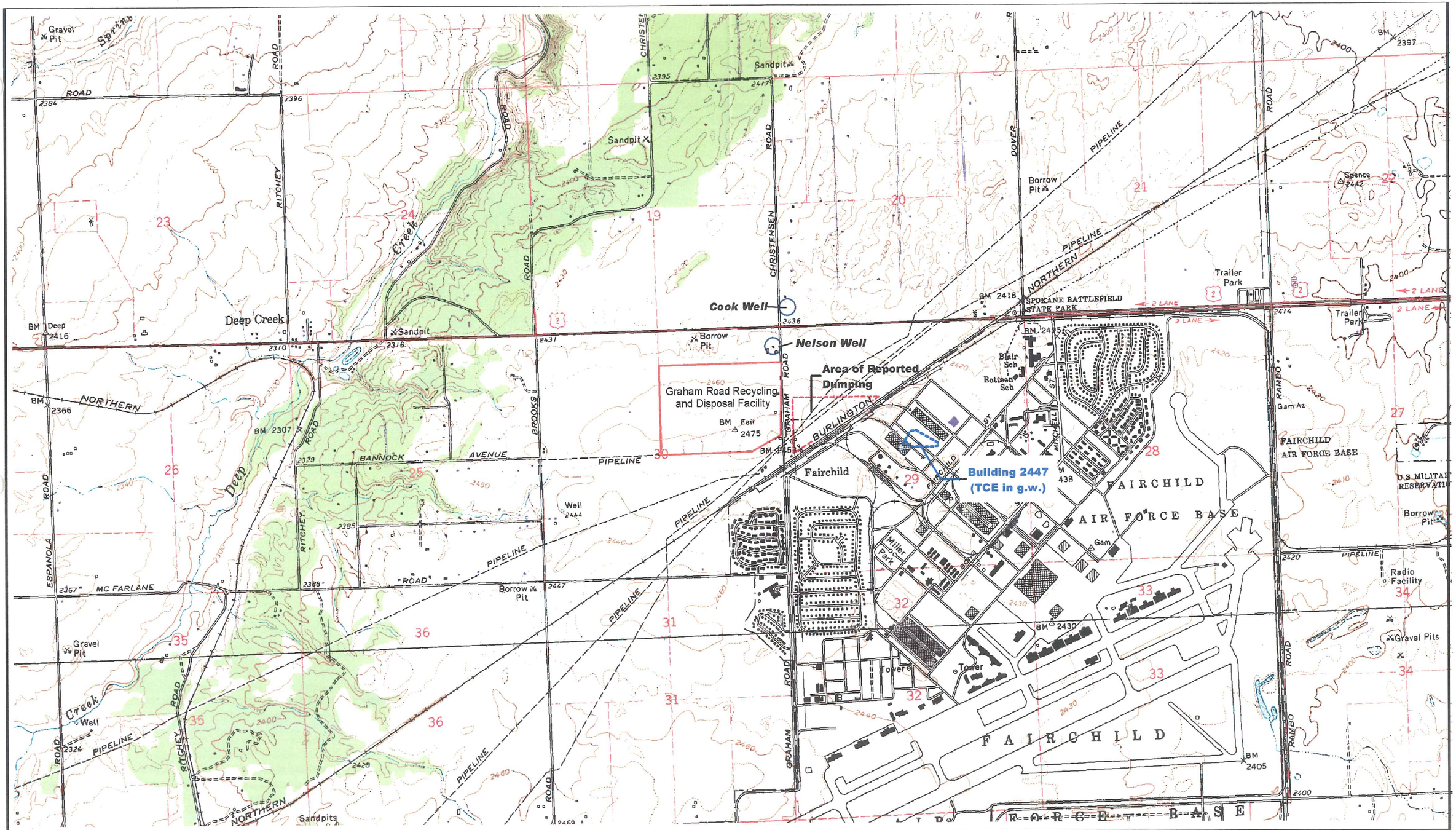


Topographic Map Source:
USGS 7.5' Series Quadrangles
- Deep Creek Quad
- Airway Heights Quad
- Medical Lake Quad
- Four Lakes Quad

○ Location of Contaminated Residential Wells

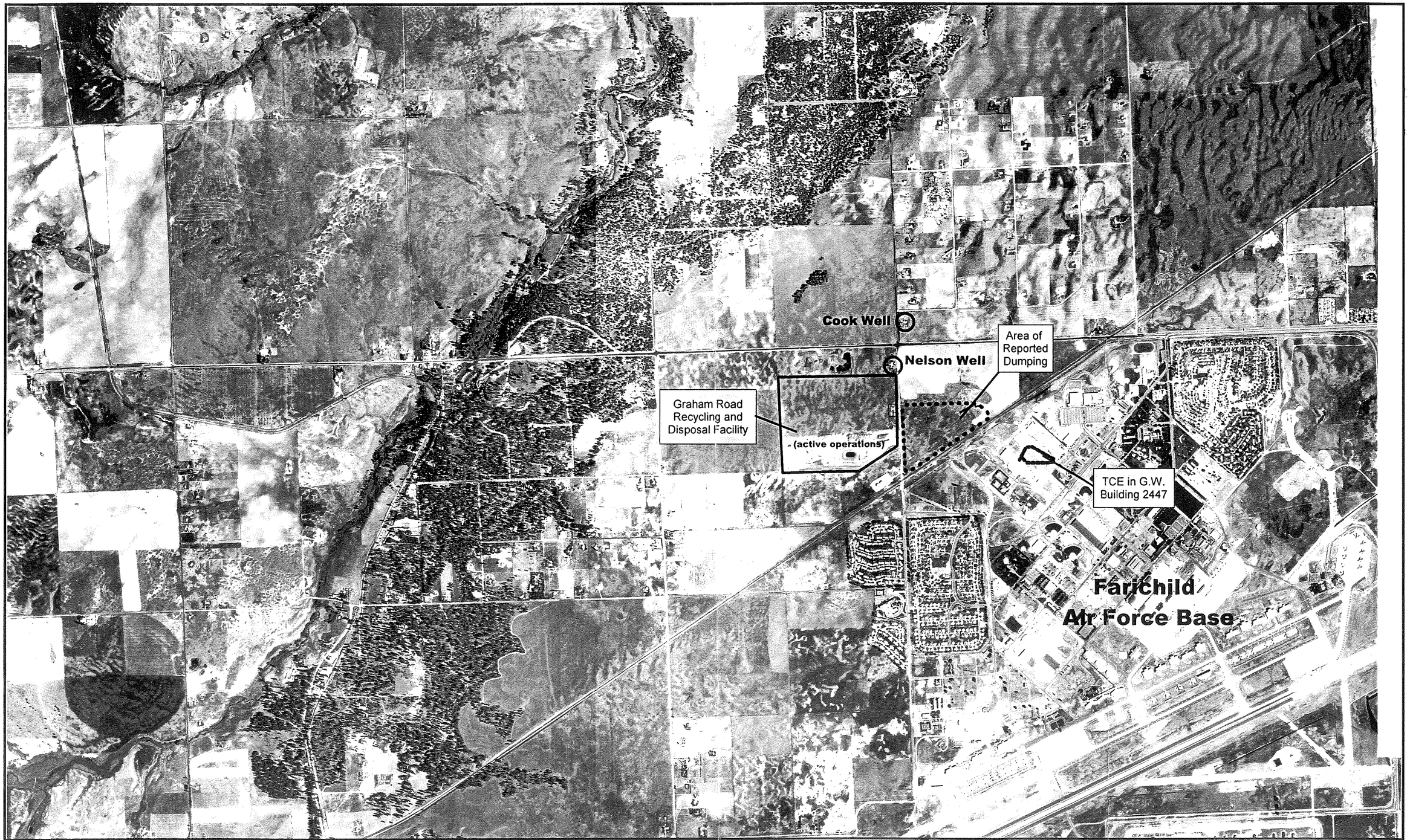
SCALE 1:24000

0.5 0 0.5 1 Miles

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 Feet

FIGURE 1
Site Vicinity Map
West Plains - Graham Road Ground Water Contamination Area
Spokane County, Washington

PML, WA ECY/ERO/TCP, 8/01



OrthoPhoto:
Data from July 1995 flight, from an altitude of 46,000 feet. 1:24000 Scale. Resolution approximately 8 feet per pixle.

Data provided by Spokane County, Water Quality Management Program - GIS

NOTE:
Refer to Figure 1, Site Vicinity Map, regarding topography and anthropogenic features.

N

SCALE 1:24000

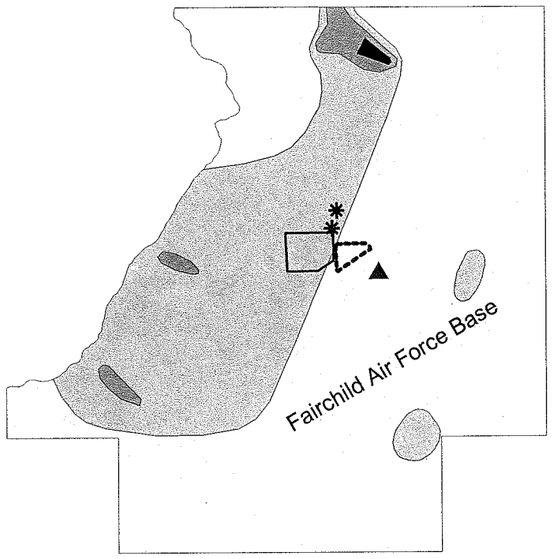
0.5 0 0.5 1 Miles

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 Feet

FIGURE 2
Site Vicinity OrthoPhoto
West Plains - Graham Road
Ground Water Contamination Area
Spokane County, Washington
PML, WA ECY/ERO/TCP, 1/01

(a)

Thickness of Overburden

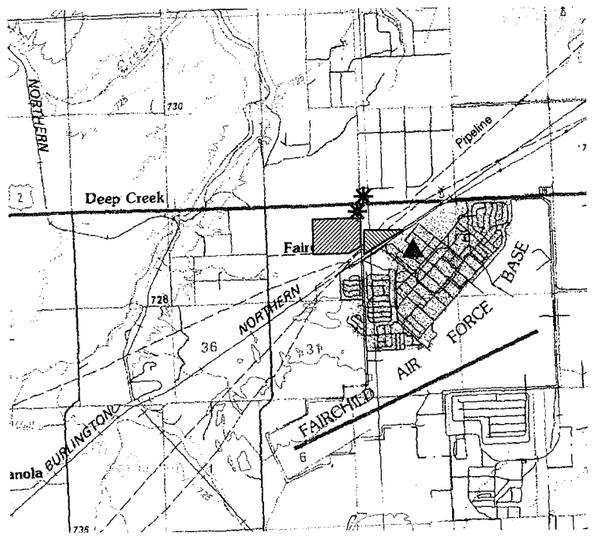


▲ Building 2447, TCE in g.w.
✱ Contaminated Residential Wells
Graham Road Recycling and Disposal Facility
Area of Reported dumping
OVERBURDEN THICKNESS, Feet
0 - 50
51 - 100
101 - 200
200 +

(b)

Site Vicinity Map

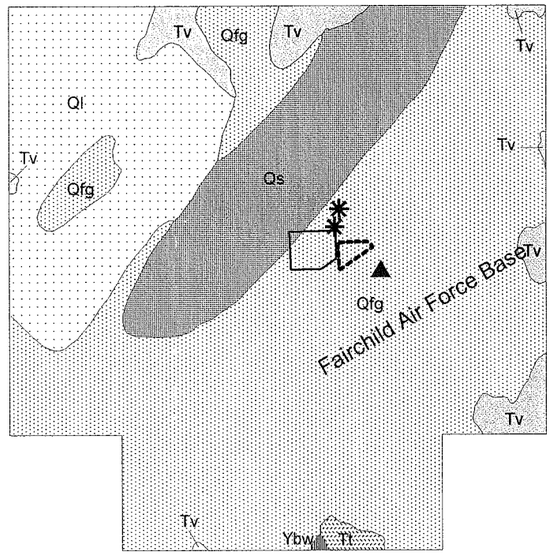
Spokane 30 X 60 Minute Series Quadrangle
Elevation in Meters



▲ Building 2447, TCE in g.w.
✱ Contaminated Residential Wells
Graham Road Recyling and Disposal Facility
Area of Reported Dumping

(c)

General Geology



▲ Building 2447, TCE in g.w.
✱ Contaminated Residential Well
Graham Road Recyling and Disposal Facility
Area of Reported Dumping
GEOLOGY EXPLANATION
Qs - Sand Dunes
Qfg - Missoula Flood Deposits; gravel, sand
Ql - Palouse Fm.; loess
Tv- Columbia River Basalt Goup
Tt - Pre-Basalt Intrusives; granitic
Ybw - Pre-Cambrain Metasedements

SCALE 1:100,000

5000 0 5000 10000 15000 20000 25000 Feet

1 0 1 2 3 4 5 Miles

Overburden Thickness and General Geology maps adapted from Deobald, Wm. and Buchanan, John P., 1995: Hydrogeology of the West Plains Area of Spokane County, Washington. Report prepared for the Spokane County Water Quality Management Program. GIS map data provided by Spokane County.

N

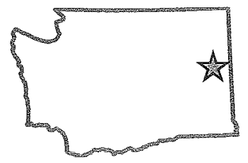
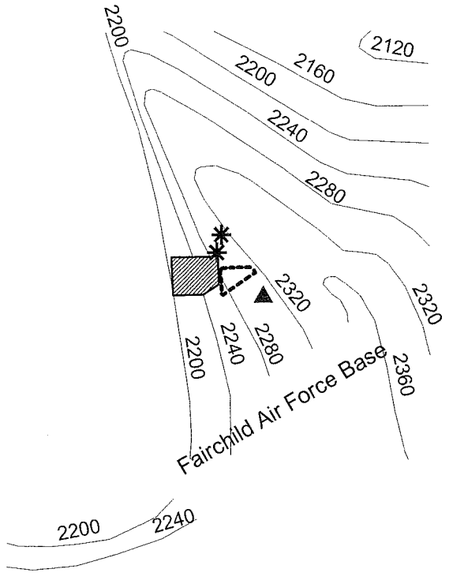


FIGURE 3
Geologic Setting
West Plains - Graham Road
Ground Water Contamination Area
Spokane County, Washington

PML, WA ECY/ERO/TCP, 1/01

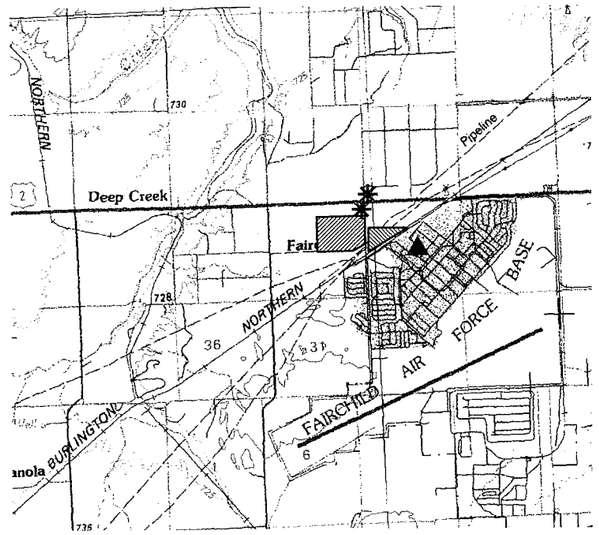
(a)
Potentiometric Surface
Grand Ronde Aquifer



▲ Building 2447, TCE in g.w.
✱ Contaminated Residential Wells
Graham Road Recycling and Disposal Facility
Area of Reported Dumping
Potentiometric Surface, Feet

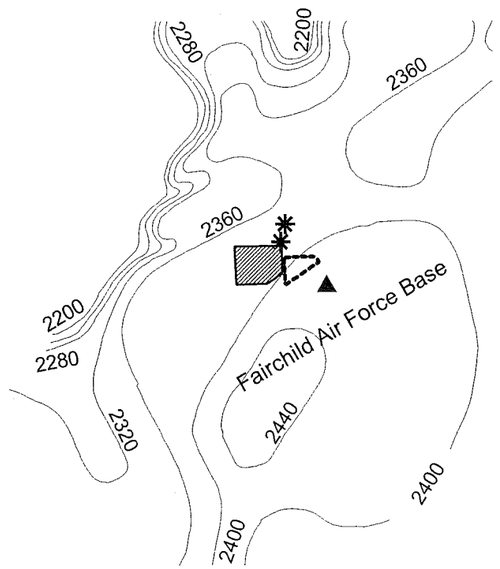
(b)
Site Vicinity Map

Spokane 30 X 60 Minute Series Quadrangle
Elevation in Meters



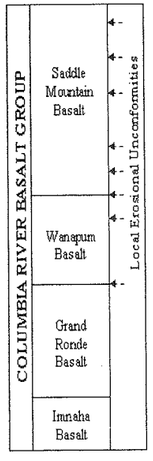
▲ Building 2447, TCE in g.w.
✱ Contaminated Residential Wells
Graham Road Recyling and Disposal Facility
Area of Reported Dumping

(c)
Potentiometric Surface
Wanapum Aquifer



▲ Building 2447, TCE in g.w.
✱ Contaminated Residential Wells
Graham Road Recycling and Disposal Facility
Area of Reported Dumping
Potentiometric Surface, Feet

(d)
Generalized Hydrostratigraphic Units
Columbia Basin Region
(Adapted from Deobald and Buchanan, 1995)



Note:
Saddle Mountain Basalt
not present in study area

SCALE 1:100,000

5000 0 5000 10000 15000 20000 25000 Feet

1 0 1 2 3 4 5 Miles

Aquifer Potentiometric maps adapted from Deobald, Wm. and Buchanan, John P., 1995: Hydrogeology of the West Plains Area of Spokane County, Washington. Report prepared for the Spokane County Water Quality Management Program. GIS map data provided by Spokane County.

N

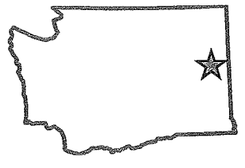


FIGURE 4
Hydrogeologic Setting
West Plains - Graham Road
Ground Water Contamination Area
Spokane County, Washington

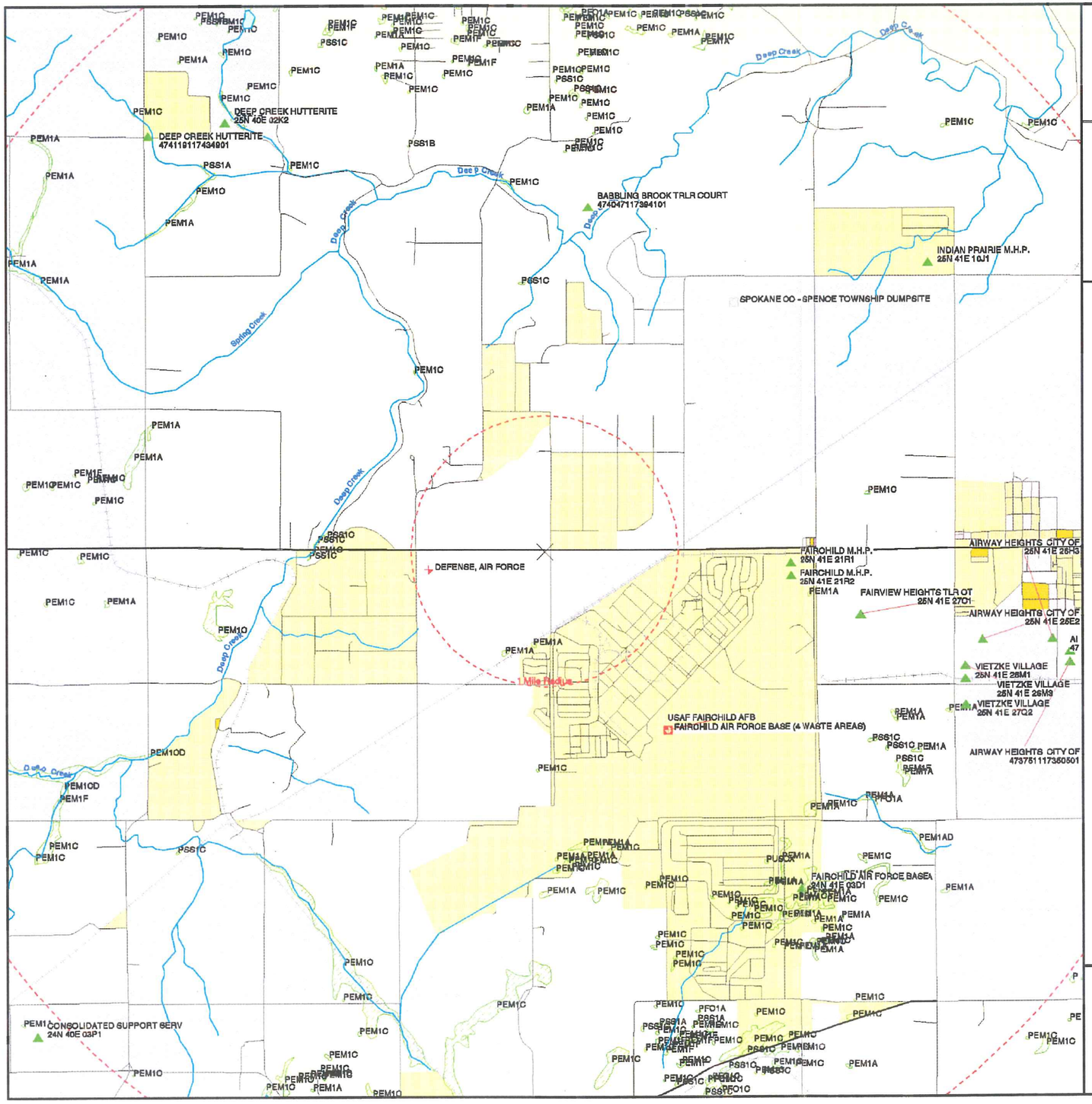
PML, WA ECY/ERO/TCP, 1/01

Figure 5

West Plains - Graham Road

Ground Water Contamination Area

Lat: 47 38 35 Long: 117 40 7
SPOKANE County, WA.



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LEGEND

Note: Facility labeling turned off for categories with more than 50 points.
Some facilities without good addresses may plot at zip code centroids.
Facility points have been restricted to user specified area.

- CERCLIS NPL Site
- CERCLIS NPL Site (Proposed)
- CERCLIS Deleted From NPL Final Site
- CERCLIS Part of NPL Final Site
- CERCLIS Non-NPL Site Many located by zipcode!
- Archived from CERCLIS
- RCRA TSD or LQG Site (Others Excluded)
- EPCRA TRI Site (Toxics Release Inventory)
- PCS Facility Site
- AFS/AIRS Site
- Public Ground Water Supply Well
- Public Surface Water Supply Intake
- Major Roads and Highways
- Other Roads
- National Park/Recreation Area
- Wetlands / Washington Area (National Wetland Inventory)
- County Boundary

1990 Population Density Per Sq Mi

- Under 10
- 10 - 100
- 100 - 1,000
- 1,000 - 3,000
- 3,000 - 6,000
- 6,000 - 10,000
- 10,000 - 20,000
- Over 20,000

0 0.5 1 1.5 2
Miles
Albers Projection

EPA
U.S. Environmental Protection Agency

Produced 01/17/01
By SITEPLUS (Req 642469)

APPENDIX A

US EPA Geographic Information Query System Results

EPA GEOGRAPHIC INFORMATION QUERY SYSTEM (Version 97.1.8) 01/17/01

Title : West Plains - Graham Road
Sub-Title: Ground Water Contamination Area

SPOKANE County, WA.

Location in Lat/Long: 47 38 35 117 40 7 (DMS)

US Albers: X= 24903 Y= 654969 (Meters)

Map Scale: Auto Fit to 15 x 11

Notes:

Read Notes on accuracy and extent of all GIS database coverages!!!

Note Version Id on top line as we are continuously upgrading data layers, quality, and calculation methods for this report and associated graphics.

Disclaimer:

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*** End of Notes ***
<ff>

EPA Regulated Site / Management Information

Indian Nation Information

Site apparently not located within 1 mile any Indian Nation areas.

EPA Facility Databases Information

Distance Range From 0 to 1 mile(s):

CERCLA: 0 sites in distance 0 to 1 mile(s):

RCRA TSD: 0 sites in distance 0 to 1 mile(s):

Toxic Release Inventory (TRI): 0 sites in distance 0 to 1 mile(s):

NPDES (Mostly Majors): 1 sites in distance 0 to 1 mile(s):
Rec#1954 Fac ID:WA0025542 Lat/Long: 47 37 56 117 39 00
Name: DEFENSE, AIR FORCE
Plant: FAIRCHILD AFB City: FAIRCHIL
Major:

AIRS/AFS: 0 sites in distance 0 to 1 mile(s):

Distance Range From 1 to 4 mile(s):

CERCLA: 2 sites in distance 1 to 4 mile(s):
Rec# 800 Fac ID:WA9571924647 Lat/Long: 47 37 26.0 117 38 56.7
Name: FAIRCHILD AIR FORCE BASE (4 WASTE AREAS)
NPL Status: F Archived Code (NFRAP):
Rec#1411 Fac ID:WAD988466173 Lat/Long: 47 40 10.0 117 38 17.0
Name: SPOKANE CO - SPENCE TOWNSHIP DUMPSITE
NPL Status: N Archived Code (NFRAP): NFA

RCRA TSD: 1 sites in distance 1 to 4 mile(s):
Rec# 40 Fac ID:WA9571924647 Lat/Long: 47 37 26.0 117 38 56.7
Name: USAF FAIRCHILD AFB
Trtmnt-Stor: X Land Disp: Incinerate:
Discharge Indicator: GW: SW: Soil: Air:
Corrective Action: X

Toxic Release Inventory (TRI): 0 sites in distance 1 to 4 mile(s):

NPDES (Mostly Majors): 0 sites in distance 1 to 4 mile(s):

AIRS/AFS: 0 sites in distance 1 to 4 mile(s):

<ff>

** Human Health Factors/Concerns **

Population Factors Using 1990 Census Data

Approximate Population and Demographic Analysis

Notes:
1) Based on summing Census Tract/Block centroids within distance ranges. A portion of actual block may extend beyond distance (overcount), or portions of some blocks may be within distance but centroid is outside (undercount). Usually within 5% in the 1 to 5 mile range.
2) The Hispanic Origin category is defined as an ethnic category, not as a race in the official Census definitions. Hispanic Origin may include counts from any of the Census race categories including White. PL171 Census data included a cross tabulation of origin versus race. Our definition for Total People of Color is Total Population - White Origin as tabulated in the PL171 data. The individual race summaries are summarized as originally defined.

Distance Range 0 to 1 mile(s):
---

13 Census Tract/Block Centroids within area

			Comparison
Houshold Units =	54		
Total Population =	170		
Age Over 18 =	127	74.7%	ID,OR,WA
Age Under 18 =	43	25.3%	Stats
By Race: White =	152	89.4%	90.6%
Black =	4	2.4%	2.3%
Amer Indian =	4	2.4%	1.5%
Asian =	2	1.2%	3.3%
Other =	8	4.7%	2.3%
By Origin: Hispanic Org =	11	6.5%	4.4%

```
  Total People of Color =      21     12.4%      11.3%   See note 2.

       Average Pop Density per sq mi =     54 (Centroids/Described Area)

Distance Range 0 to 4 mile(s):
----------------------------------
    152 Census Tract/Block Centroids within area
       Houshold Units   =    2683
       Total Population =    8264              Comparison
           Age Over 18  =    5588     67.6%     ID,OR,WA
           Age Under 18 =    2676     32.4%      Stats

  By Race: White        =    7117     86.1%      90.6%
           Black        =     491      5.9%       2.3%
           Amer Indian  =      66      0.8%       1.5%
           Asian        =     374      4.5%       3.3%
           Other        =     216      2.6%       2.3%

By Origin: Hispanic Org =     385      4.7%       4.4%

  Total People of Color =    1290     15.6%      11.3%   See note 2.

       Average Pop Density per sq mi =    164 (Centroids/Described Area)
<ff>

Groundwater Sole Source Aquifer Information
===========================================

  Site located 1 mile or less from the Spokane Valley Rathdrum Prairie Aquifer
    Class: Source   Status: Designated
    Date Petitioned: 10/15/1976   Designated: 02/09/1978


Public Groundwater Supply Information
=====================================

Distance Range 0 to 1 mile(s):
----------------------------------

  Washington Public Groundwater Supply Wells: 0 found

Distance Range 1 to 4 mile(s):
----------------------------------

  Washington Public Groundwater Supply Wells: 13 found
    Rec#3182
      System ID: 25N 41E 25E2          Lat/Long: 473800  1173555
      Name: AIRWAY HEIGHTS  CITY OF         State Permit#: 006502
      Total System Population Served = 1965.
    Rec#3184
      System ID: 25N 41E 26H3          Lat/Long: 473800  1173515
      Name: AIRWAY HEIGHTS  CITY OF         State Permit#: 006502
      Total System Population Served = 1965.
    Rec#3186
      System ID: 473751117350502          Lat/Long: 473755  1173505
      Name: AIRWAY HEIGHTS  CITY OF         State Permit#: 006502
      Total System Population Served = 1965.
    Rec#3246
      System ID: 24N 41E 03D1          Lat/Long: 473625  1173740
      Name: FAIRCHILD AIR FORCE BASE         State Permit#: 243500
      Total System Population Served = 7709.
    Rec#3378
      System ID: 474047117394101          Lat/Long: 474047  1173941
```

```
    Name: BABBLING BROOK TRLR COURT          State Permit#: 036400
    Total System Population Served = 45.
  Rec#3387
    System ID: 25N 40E 02K2          Lat/Long: 474120  1174310
    Name: DEEP CREEK HUTTERITE         State Permit#: 18375A
    Total System Population Served = 32.
  Rec#3395
    System ID: 25N 41E 21R1          Lat/Long: 473830  1173745
    Name: FAIRCHILD M.H.P.          State Permit#: 24355K
    Total System Population Served = 102.
  Rec#3396
    System ID: 25N 41E 21R2          Lat/Long: 473825  1173745
    Name: FAIRCHILD M.H.P.          State Permit#: 24355K
    Total System Population Served = 102.
  Rec#3397
    System ID: 25N 41E 27C1          Lat/Long: 473810  1173705
    Name: FAIRVIEW HEIGHTS TLR CT          State Permit#: 24595V
    Total System Population Served = 60.
  Rec#3419
    System ID: 25N 41E 10J1          Lat/Long: 474025  1173625
    Name: INDIAN PRAIRIE M.H.P.          State Permit#: 106144
    Total System Population Served = 160.
  Rec#3482
    System ID: 25N 41E 26M1          Lat/Long: 473745  1173605
    Name: VIETZKE VILLAGE          State Permit#: 917385
    Total System Population Served = 95.
  Rec#3483
    System ID: 25N 41E 26M3          Lat/Long: 473750  1173605
    Name: VIETZKE VILLAGE          State Permit#: 917385
    Total System Population Served = 95.
  Rec#3484
    System ID: 25N 41E 27Q2          Lat/Long: 473735  1173605
    Name: VIETZKE VILLAGE          State Permit#: 917385
    Total System Population Served = 95.

Public Surface Water Supply Information
=======================================

Distance Range 0 to 1 mile(s):
----------------------------------

  Washington Public Surface Water Intakes: DATABASE NOT AVAILABLE.

Distance Range 1 to 4 mile(s):
----------------------------------

  Washington Public Surface Water Intakes: DATABASE NOT AVAILABLE.


Food Chain Information
==========================

Distance Range 0 to 1 mile(s):
----------------------------------

  Washington Stream Segments with Fisheries Catch Data: DATABASE NOT AVAILABLE.

Distance Range 1 to 4 mile(s):
----------------------------------

  Washington Stream Segments with Fisheries Catch Data: DATABASE NOT AVAILABLE.
<ff>
**********************************************************
```

** Ecosystem/Sensitive Environments Factors/Concerns **
****

National Park Information
==========
Site apparently not located within 1 mile any National Park areas.

Priority/Sensitive Animals, Plants, and Habitats
==========
In general, agreements, concerns, and legislative requirements with the providers of the following databases prevent us from plotting and/or analyzing in more detail the sensitive areas and points on maps that may be released to the general public. Contact the local database source for the most recent or further detailed information.

State Natural Heritage Databases
Individual State Heritage Programs compile databases containing significant site observations of selected species of concern, including federal and state species listed threatened, endangered, sensitive and other priority species.

Washington Priority Habitats and Species
Database from Washington Dept of Fish & Wildlife - Jan 1994. Includes priority habitats and species information. May include DUPLICATE information from the Washington Heritage database. Contact the WDW Data Request Line (Lori Adkins) at 360-902-2543 for more information.

State Heritage Databases

Sorry -- Due to restrictive distribution agreements with the State Heritage Database programs, this information is available for internal EPA users only. You must separately contact the individual State Heritage programs for info.

Washington Natural Heritage Program
Mail: snmm490@wadnr.gov
Phone: 360-902-1667

Washington Priority Habitats and Species

Distance Range 0 to 1 mile(s):

Washington - Priority Habitats/Species areas/points: 1/0 within area
Areas below may be overlapping - Actual total of areas = 4210.6 acres.
Also, portions of the Spec/Hab areas may lay outside of selected area.

Spec/Hab: Urban Natural Open Space Species Use:
Desc: URBAN NATURAL OPEN SPACE - SHRUB-STEPPE REMNANTS WITH HISTORY OF GRAZ ING, ASSOCIATED WITH WESTERN BLUEBIRD, GRASSHOPPER SPARROW, RED-TAILE D HAWK; GREAT-HORNED OWLS. HUNS & PHEASANTS.
Areas= 1 Sum Area= 4210.6 acres

Distance Range 1 to 4 mile(s):

Washington - Priority Habitats/Species areas/points: 9/0 within area
Areas below may be overlapping - Actual total of areas = 17107.9 acres.
Also, portions of the Spec/Hab areas may lay outside of selected area.

Spec/Hab: Shrub-steppe Species Use:
Desc: SHRUB-STEPPE HABITAT - UNIQUE IN 17" RAINFALL ZONE AND LACK OF GRAZIN G. NATIVE BISCUIT-SCABLAND HABITAT. WHITE-TAILED JACKRABBITS; NORTHER N HARRIERS; HUNS; LOGGERHEAD SHRIKE; RAPTORS DEPENDENT UPON MICROTINE S;BADGER;PRAIRIE FALCON & MERLIN.
Areas= 2 Sum Area= 1648.3 acres
Spec/Hab: Riparian zone Species Use:
Desc: STREAM AND PONDS WITH ASSOCIATED RIPARIAN VEGETATION-WHITETAIL DEER F AWNING AREA' AND ASSOCIATED FOREST/WOODLANDS AND CLIFF HABITAT,WITH P ILEATED WOODPECKER USE'& WINTER,SPRING USE BY BALD EAGLE.
Areas= 3 Sum Area= 4910.5 acres
Spec/Hab: Urban Natural Open Space Species Use:
Desc: URBAN NATURAL OPEN SPACE - SHRUB-STEPPE REMNANTS WITH HISTORY OF GRAZ ING, ASSOCIATED WITH WESTERN BLUEBIRD, GRASSHOPPER SPARROW, RED-TAILE D HAWK; GREAT-HORNED OWLS. HUNS & PHEASANTS.
Areas= 1 Sum Area= 10142.4 acres
Spec/Hab: Shrub-steppe Species Use:
Desc: SHRUB-STEPPE HABITAT: RARE HABITAT WITHIN COUNTY ASSOCIATED WITH LARG E CONCENTRATIONS OF WINTERING WATERFOWL, WINTERING MERLIN, RED-TAILS, SHORT-EARED OWLS, OTHER SHRUB-STEPPE ASSOCIATED TAUNA.
Areas= 3 Sum Area= 406.6 acres

Wetlands Areas

Portions of any reported wetland area(s) may lay outside of the actual specified distance range.
Washington Database from USF&W National Wetlands Inventory (NWI). Obtained from Washington Dept Ecology in 1992. We are reporting only a subset of wetland type: US EM FO RS SB SS.

Distance Range 0 to 1 mile(s):

Washington Wetlands (USF&W NWI): 2 within area
2 Wetland(s) with FWS Code: PEM1A and total area of 1.9 acres.

Distance Range 1 to 4 mile(s):

Washington Wetlands (USF&W NWI): 170 within area
99 Wetland(s) with FWS Code: PEM1C and total area of 365.9 acres.
35 Wetland(s) with FWS Code: PEM1A and total area of 115.5 acres.
4 Wetland(s) with FWS Code: PFO1A and total area of 4.1 acres.
14 Wetland(s) with FWS Code: PSS1C and total area of 11.9 acres.
10 Wetland(s) with FWS Code: PEM1F and total area of 6.5 acres.
1 Wetland(s) with FWS Code: PSS1B and total area of 0.1 acres.
3 Wetland(s) with FWS Code: PSS1A and total area of 1.7 acres.
1 Wetland(s) with FWS Code: PEM1AD and total area of 5.8 acres.
2 Wetland(s) with FWS Code: PEM1CD and total area of 39.7 acres.
1 Wetland(s) with FWS Code: PUSCX and total area of 0.5 acres.
Total area of wetlands= 551.8 acres.

Stream Segments of Concern

Portions of reported segments may occur outside of distance ranges.
Note that streams may not register correctly with other stream traces on maps due to differing source data scales and other considerations.

Washington streams information from 1992 WARIS GIS Database from the Department of Fish & Wildlife. Contact Martin Hudson at F&W for any more infomation at 206-664-0383.
The report indicates overall quality of reach for resident fish, existence of critical spawning habitats, presence species of concern, and the number of anadroumous species present.

Distance Range 0 to 1 mile(s):

Washington Stream Segments with data: 0 in area

Distance Range 1 to 4 mile(s):

Washington Stream Segments with data: 37 in area

Reach #/Stream Name		Length Miles	Res Fish Quality	Crit Spawn	Spec Cncrn	#Anad Pres
17010307-18	DEEP CR	2.35	Moderate	-	-	0
17010307-18	DEEP CR	0.55	Moderate	-	-	0
17010307-18	DEEP CR	0.90	Moderate	-	-	0
17010307-18	DEEP CR	0.08	Moderate	-	-	0
17010307-18	DEEP CR	3.51	Moderate	-	-	0
17010307-18	DEEP CR	1.62	Moderate	-	-	0
17010307-18	DEEP CR	0.47	Moderate	-	-	0
17010307-18	DEEP CR	1.79	Moderate	-	-	0
17010307-18	DEEP CR	0.80	Moderate	-	-	0
17010307-37	SPRING CREEK	4.79	Low	-	-	0
17010307-1004	Name not specified	1.41	Low	-	-	0
17010307-1005	Name not specified	1.36	Low	-	-	0
17010307-1006	Name not specified	0.55	Low	-	-	0
17010307-1010	Name not specified	0.36	Low	-	-	0
17010307-1018	Name not specified	0.35	Low	-	-	0
17010307-1020	Name not specified	1.57	Low	-	-	0
17010307-1022	Name not specified	1.20	Low	-	-	0
17010307-1025	Name not specified	1.39	Low	-	-	0
17010307-1027	Name not specified	0.59	Low	-	-	0
17010307-1028	Name not specified	1.57	Low	-	-	0
17010307-1029	Name not specified	1.33	Low	-	-	0
17010307-1033	Name not specified	1.02	Low	-	-	0
17010307-1035	Name not specified	1.01	Low	-	-	0
17010307-1036	Name not specified	1.30	Low	-	-	0
17010307-1066	Name not specified	1.43	Low	-	-	0
17010307-1080	Name not specified	1.36	Low	-	-	0
17010307-1082	Name not specified	1.42	Low	-	-	0
17010307-1084	Name not specified	1.20	Low	-	-	0
17010307-1085	Name not specified	0.65	Low	-	-	0
17010307-1089	Name not specified	1.00	Low	-	-	0
17010307-1093	Name not specified	0.74	Low	-	-	0
17010307-1094	Name not specified	2.18	Low	-	-	0
17010307-1095	Name not specified	0.93	Low	-	-	0
17010307-1099	Name not specified	0.44	Low	-	-	0
17010307-1102	Name not specified	3.16	Low	-	-	0
17010307-1106	Name not specified	1.75	Low	-	-	0
17060108-532	Name not specified	1.45	Low	-	-	0

****
*** End of Report ***
****

APPENDIX B

Spokane Regional Health District Field Reports
for the
NELSON WELL

FIELD STATUS REPORT

SITE NAME

Nelson Property

SITE LOCATION INFORMATION

Contact Person: Carey Fulton **Title:** Tenant **Phone:** 244-0450

Mailing Address: 1414 S. Graham Rd. **City:** Medical Lake **State:** WA **Zip:** 99022

Site Location: 1414 S. Graham Rd. **Closest City:** Medical Lake **County:** Spokane

Quarter/Quarter: N ½ NE/NE **Section:** 30 **Township:** 25 **Range:** 41 **E.W.M.**

Longitude: **Degrees** **Minutes** **Seconds**

Latitude: **Degrees** **Minutes** **Seconds**

INSPECTION INFORMATION

Inspection Date: March 23, 1999 **Inspection Time:** 11:00 AM **Type of Entry Notice:** Invitation

Photographs yes ☒ no ☐
Videotape yes ☐ no ☒
ıples yes ☒ no ☐

Weather: clear ☐ partly cloudy ☒ overcast ☐
Precipitation None **Temperature** 42°
Wind Direction SW **Wind Speed** 0-5

SITE DESCRIPTION

Land Use:

Current Residential/agricultural

History

Soil Type: Cheney and Uhlig silt loams 0-8% slopes

Terrain: Grasses on relatively flat land

Geology: QGO and TCR (older glacial deposits and Columbia basin basalt

DEPARTMENT REVIEW

Investigator: Michael LaScuola and John Wiley **Date:** March 23, 1999

Approved by:
Supervisor: **Date:**

SITE LAYOUT SKETCH

NOT TO SCALE | LEGEND | NOT TO SCALE

Monitoring well:	⊕	**Railroad tracks:**	++++++++++
Supply well:	▯		
Tip rdng location:	o		
Photo & orientation:	⇨		

WELL DATA: 173-160 WAC Unknown - no well log

Well logs attached? Yes ☐ **No** ☒

COMMENTS: Visual observation of wellhead indicated sanitary construction consistent with WAC 173-160. Adequacy of sub-surface well construction is unknown.

Site Name: Nelson Property

POTENTIAL CONTAMINANT SOURCES

☒ **Above ground storage tanks** None observed

Status _____ **Contents** _____

☒ **Animal feed lots** None observed
(type/number of acres)

☒ **Containers:**
Drums 6-8 old, empty **Retail? (type)** _____
(paint, auto, garden etc.)
Waste Minor salvage material

☒ **Fertilizer applications** Unknown
(type)

☒ **Graveyard** None observed

☒ **Commercial activity** None observed
(type)

☒ **Ground water/surface water** West at old quary

☒ **Irrigation practices: Type** None observed **Return flow?** _____

☒ **Land application** None observed
(type)

☒ **Landfills** (≈ 1750')

☒ **Stockpiles** None observed

☒ **Mining/logging** None observed

☒ **Natural source: Background** Unknown **SW/Wetland** No

☒ **Open dumps/solid waste** None observed

☒ **Pesticides** Unknown
(applications/stored/type)

☒ **Pipelines** Yes - by USGS map (petroleum and natural gas)

☒ **Salts** None observed

☒ **Septic system** setback from well >100'

☒ **Storm water drainage** None

Site Name Nelson Property

☒ **Surface impoundments** None observed
(lagoons, etc)

☒ **Underground storage tanks** None observed

☒ **Urban runoff** None

☒ **Waste piles** None observed
(type)

☒ **Railroad** Yes, south 2500'

☒ **Other** Highway (SR 2) adjacent to property

Comments: It was reported by the owner that the property had been previously used by the US Army for some type of facility where munitions were stored and used. Signs of this activity were visible at the site. The status of buried materials (if any) is unknown.

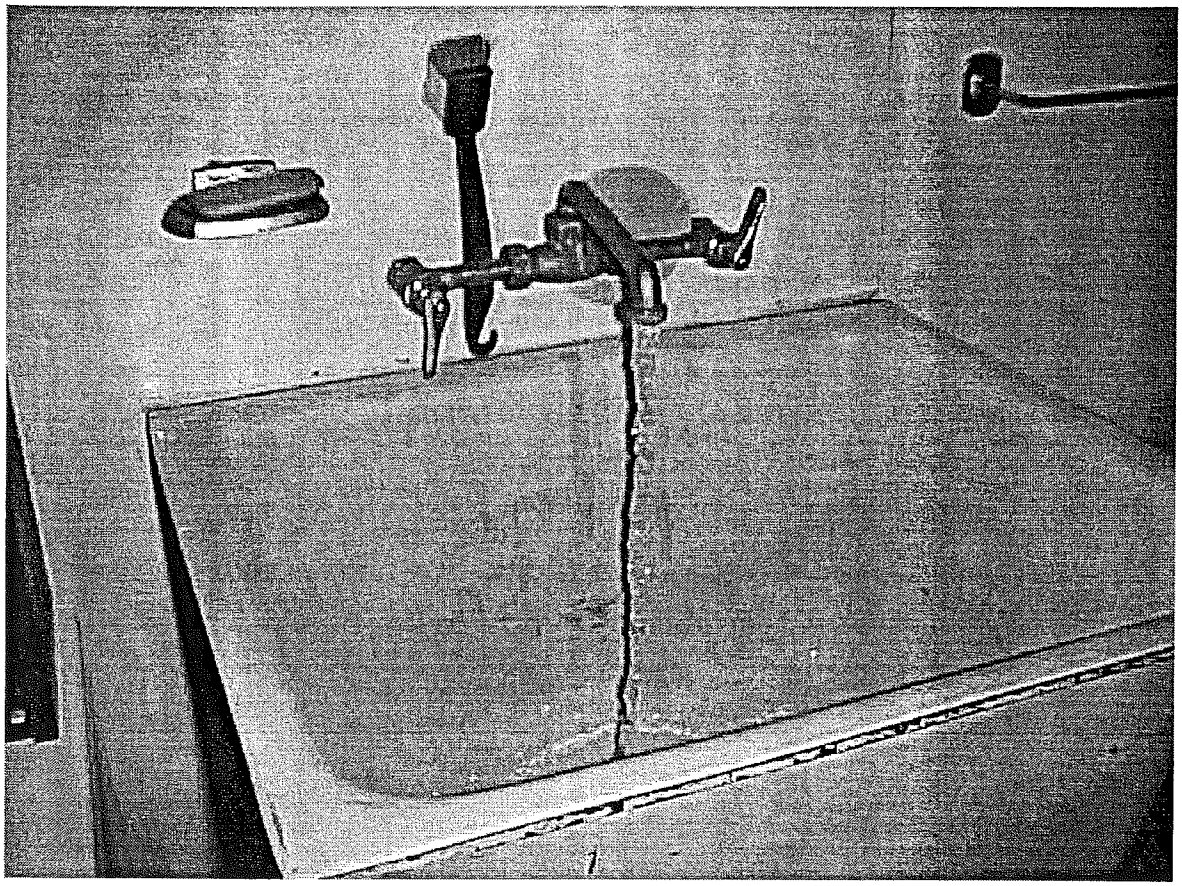


Figure 1 - Nelson Property - 1414 S Graham Rd. - 3/23/99

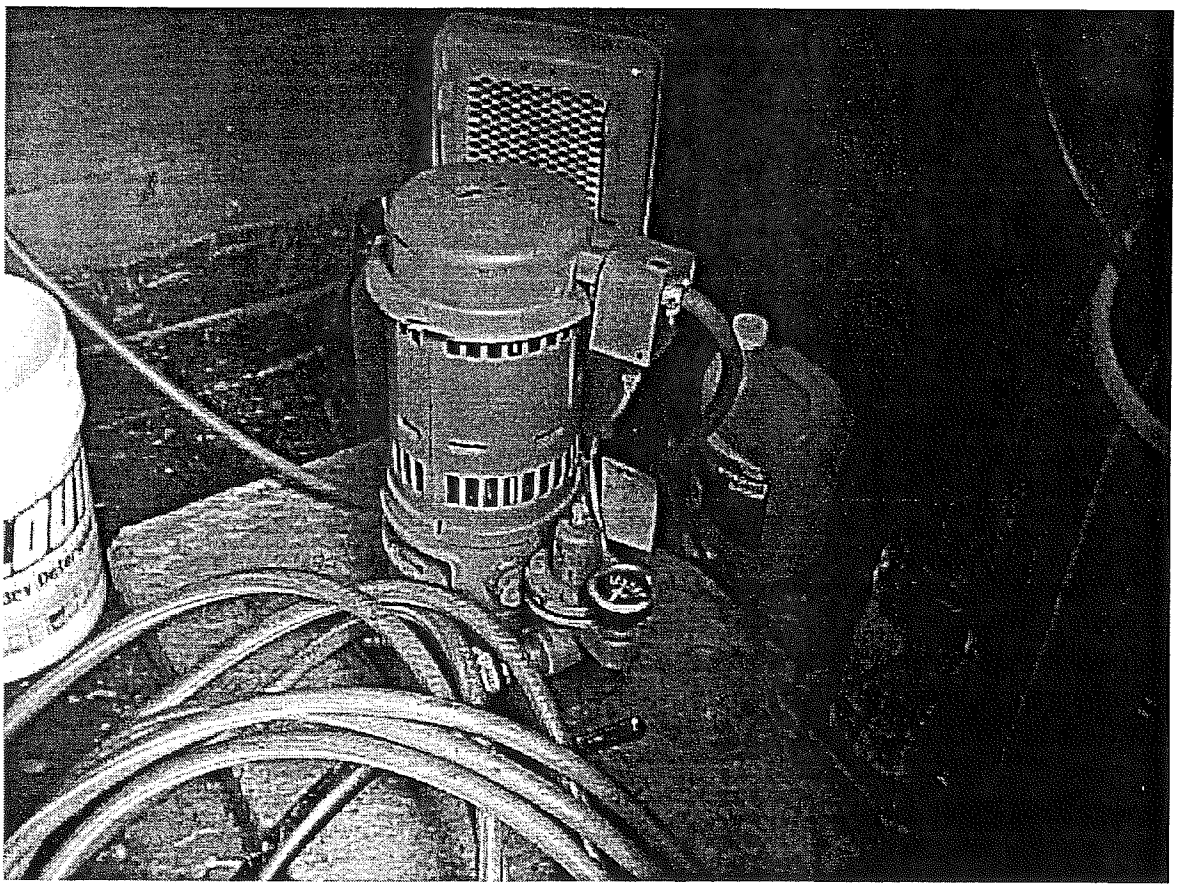


Figure 2 - Nelson Property - 1414 S Graham Rd. - 3/23/99

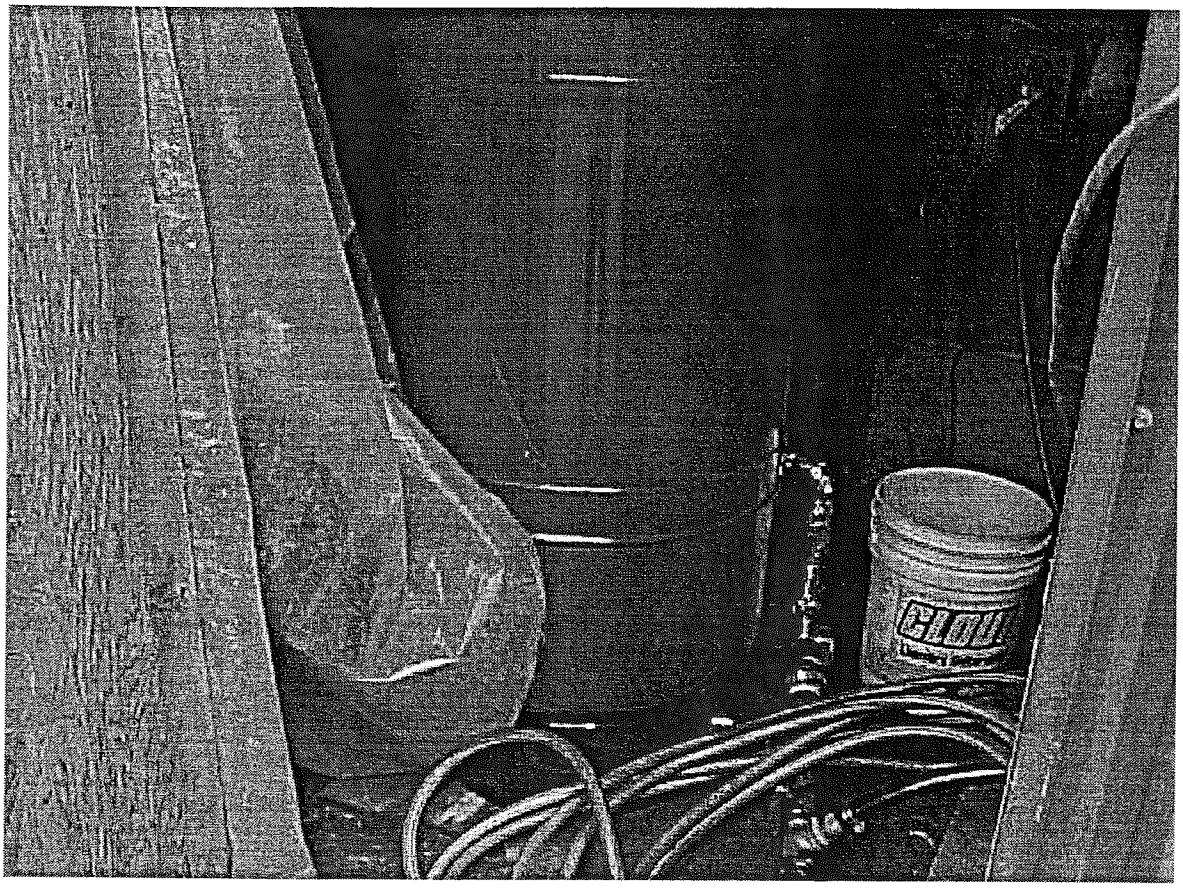


Figure 3 - Nelson Property - 1414 S Graham Rd. - 3/23/99

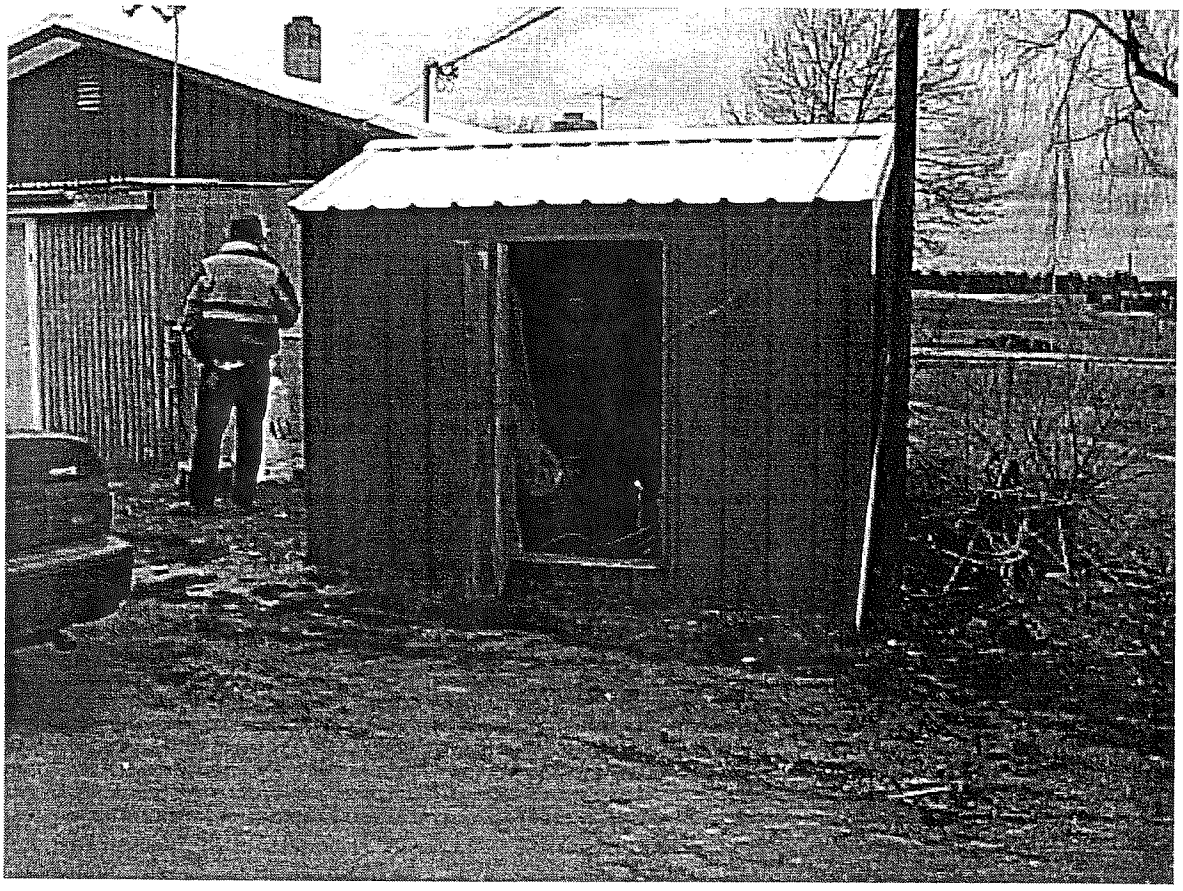


Figure 4 - Nelson Property - 1414 S Graham Rd. - 3/23/99

CT 104.02

CI 8/16/82 Revised 6/14 8/26/82

Reinsp.

SPOKANE COUNTY HEALTH DISTRICT
West 1101 College Avenue
Spokane, Washington 99201
456-6040

Repl - P.A Coded

APPLICATION TO INSTALL OR RECONSTRUCT ON-SITE SEWAGE DISPOSAL SYSTEMS

Register No. 2526 Date 8/16/82 Application No. B 14035

Legal Owner Adolph Nelson Address

Phone Address/Legal Description 30-25-41 Christensen

Type of Use Res No. of Bedrooms 4 Basement? Yes (No) Side Sewer Connection Public System? Name of System?

Water Supply: Public (Name) or Private Source Well

Replacement? (Yes) No ___ Septic Tank ___ Drainfield ___ Bldg. Sewer Drywell? Yes (No) Drywell Replacement? Yes (No) Drywell Capacity ___ Gals.

Septic Tank Capacity 1000 Gals. Length of Dispersal Piping 300' Ft. Bldg. Sewer Elevation: ___ Ft. Below Finished Grade

Other Flow/Day Gals.

Agreement Systems? Yes No No. of Acres No. of Dwelling Units 1 Mgt. Name

FEES PD: 40.00 Application 20.00 Permit Reinsp. Bldg. Codes Release Rel (Date)

REMARKS: NR & exist
North Christensen Rd Off Hwy 2 first house
on right - Plot plan forthcoming
Test holes required - Plan forthcoming
System changed - old cess pool
8/24/82 rec'd app for permit

Application By Roland J Reynolds Reynolds (Pdbr)
(Signature of owner or authorized representative of owner's interest)

Permit Mailing Address Reynolds Rt 1 Box 114 (022) Phone

Location Approval/Date 8-26-82 Expiration Date 2-20-83

Installation Permit: Issued 8/24/82 Expires 8/24/83 Installer

Installation Approved By Date 8/27/82

SCHD FRM 000 (Rev. 3/79)

Parcel: 15301.9017

Owner: NELSON ETAL, L. JEAN

CoOwner:

Owner Address

312 SECONDARY HWY COULEE DAM WA 99116

Site Address

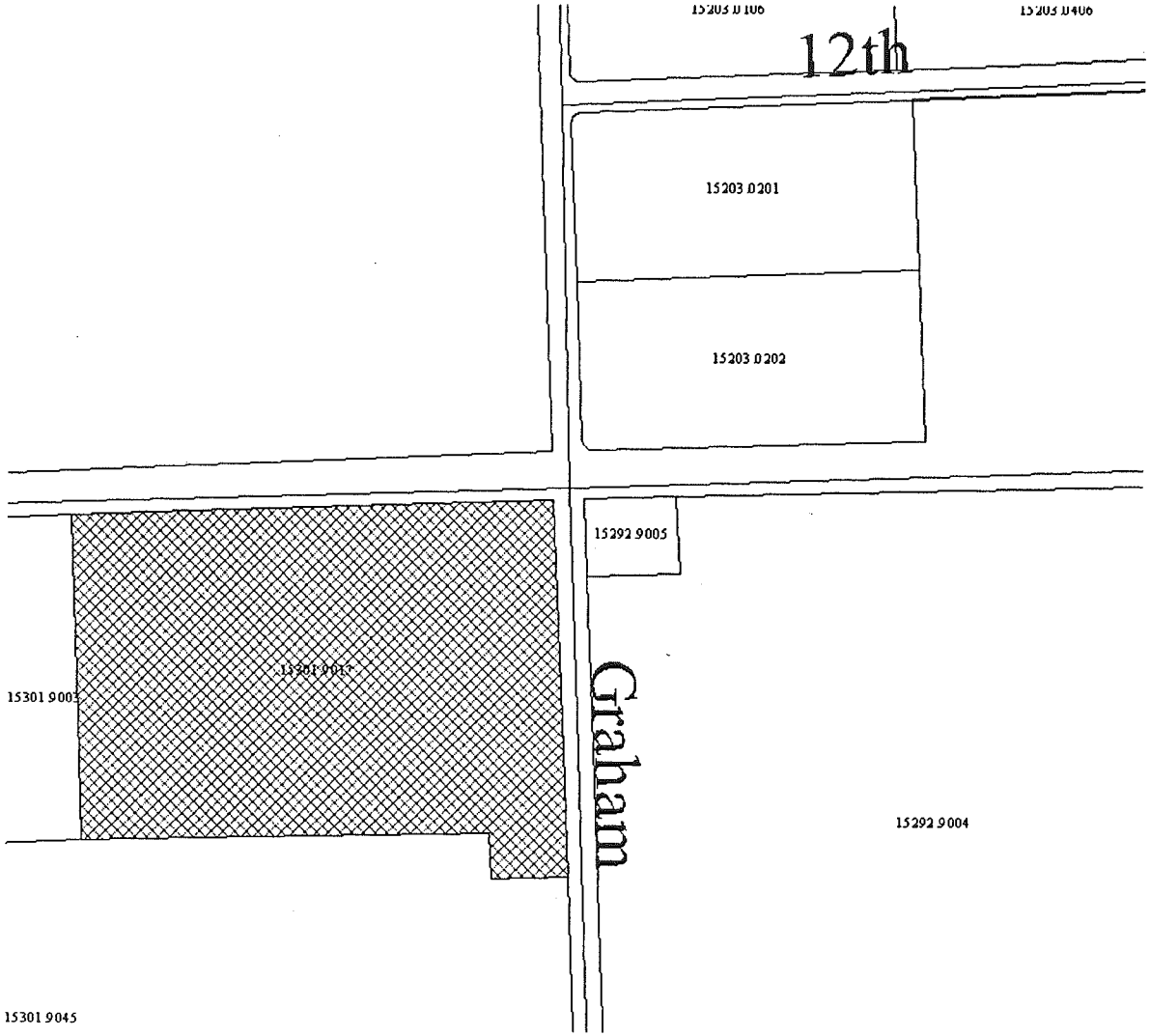
1414 S GRAHAM RD MED

Legal Description

30-25-41 N1/2 OF NE1/4 OF NE1/4 EXC W357' LYG S OF ST HWY &

W OF GRAHAM RD & N100' OF E150' OF S1/2 OF NE1/4 OF NE1/4

LYG W OF GRAHAM RD EXC RDS



Notice: This is not a legal document. Data depicted on this map is general & subject to constant revision. It is intended for reference use only. Legal documents should be obtained from the appropriate agency.

Parcel: 15301.9017

Owner: NELSON ETAL, L. JEAN

CoOwner:

Owner Address

312 SECONDARY HWY COULEE DAM WA 99116

Site Address

1414 S GRAHAM RD MED

Legal Description

30-25-41 N1/2 OF NE1/4 OF NE1/4 EXC W357' LYG S OF ST HWY &

W OF GRAHAM RD & N100' OF E150' OF S1/2 OF NE1/4 OF NE1/4

LYG W OF GRAHAM RD EXC RDS

Notice: This is not a legal document. Data depicted on this map is general & subject to constant revision. It is intended for reference use only. Legal documents should be obtained from the appropriate agency.

ACTION: ? SCREEN: SUMP USERID: INQ

---- S U M M A R Y O F P A R C E L C H A R A C T E R I S T I C S ----

JU= 11 RO= RE PARC= 15301.9017 YR= 00 ALTKEY= 0350168

DYR= 00 STATUS: ACTIVE

'EGAL: 30-25-41 N1/2 OF NE1/4 OF NE1/4 EXC W357' LYG S OF ST HWY &

S: 001414 GRAHAM RD S MEDICAL LAKE

	TOTAL	MKT-LD	CLS-LD	BLDG-1	OTHER	O/R
APPRAISED:	81,200	18,200	0	63,000	0	Y

LINE CNT:	2	ACREAGE:	13.660		
LAND USE:	TO20	FRONTAGE:	0	LOC%:	
TYPE:	AC	DEPTH:	0 1.00000	SHP%:	
NO UNITS:	13.66	ZONING:		PHYS%:	
RATE:	1,335.58	NOTES:			

NO. RES BLDG:	1	YEAR BUILT:	1958	STRUCTURE TYPE:	R1
NO. COM BLDG:	0	AIR COND:	N	BUILDING ID:	01
TOTAL SQ FT:	1,456	FIREPLACES:	1		
NO. BEDROOMS:	2	EXT WALL:	CONCRETE BLOCK		
NO. BATHS:	1.0	STORIES:	1.00		

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION, CORPS OF ENGINEERS
P.O. BOX 2870
PORTLAND, OREGON 97208-2870

Reply to
Attention of:

CENPD-PM-M (200-1a)

16 AUG 1996

MEMORANDUM FOR

Commander, Seattle District, P.O. Box C-3755, Seattle, Washington 98124-2255
Commander, U.S. Army Engineering & Support Center, Huntsville (CEHNC-PM), P.O. Box 1600, Huntsville, Alabama 35807-4301

SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS); Inventory Project Report (INPR) for Site No. F10WA060100, Fairchild AAA Battery 81, Spokane County, Washington

1. This memorandum approves the No Further Action (NOFA) recommendation.

2. Request that:

a. CENPS, within sixty days of the date of this memorandum, notify landowners of the decision and provide copies of the notification letter(s) to CEMP-RF, CEHND-PM, and CENPD-PM-MP.

b. CENPS update DERP-FUDS Inventory database.

c. CEHNC file this INPR.

3. The CENPD-PM-MP POC for this action is Mr. Moon-Yong Han, P.E., (503) 326-7361.

Bartholomew B Bohn

BARTHOLOMEW B. BOHN II
Colonel, EN
Acting Commander

Encl
Memo, CENPS-EN-GT-EM,
18 Jul 96

CF (w/encl):
CEMP-RF

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-2255

REPLY TO ATTENTION OF
CENPS-EN-GT-EM (200-1a)

JUL 18 1996

MEMORANDUM FOR Commander, U.S. Army Engineer Division, North Pacific, ATTN: CENPD-PM-MP, P.O. Box 2870, Portland, Oregon 97208-2870

SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) Inventory Project Report (INPR) for Site No. F10WA060100, Fairchild AAA Battery 81, Spokane County, Washington.

1. The enclosed INPR presents the DERP-FUDS Preliminary Assessment (PA) for the above facility. A site visit was conducted on 13 May 1996. The site survey summary sheet and site map are included in the INPR.

2. We have determined that the site was formerly used by the United States Army. A recommended Findings and Determination of Eligibility (FDE) is included in the INPR.

3. Also, we have determined that there is no potential for hazardous waste at the site which would be eligible for cleanup under DERP-FUDS, and that no further action at the site is warranted.

4. Seattle District Office of Counsel has reviewed this INPR and concurs with all findings and recommendations.

5. I recommend:

a. No further action (NOFA) be taken on this site;

b. Approval and signing the FDE;

c. Forwarding a copy of this INPR to CEHND for the PA file.

Encls
as

DONALD T. WYNN
Colonel, Corps of Engineers
Commanding

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. F10WA060100
FAIRCHILD AAA BATTERY 81
SPOKANE COUNTY, WASHINGTON
MAY 1996

SITE NAME: Fairchild AAA Battery 81

LOCATION: The former gun battery site is located in Spokane County, Washington, immediately west and adjacent to Graham road approximately 400 feet south of Highway 2 (see attached map).

SITE HISTORY: The Seattle District, U.S. Army Corps of Engineers, leased 1.03 acres in 1954 for construction of a single 75mm anti-aircraft gun site and battery command post. The gun battery was linked with 15 similar gun sites to provide a protective defense against enemy aircraft targeting Fairchild Air Force Base. All gun sites were operated by Army personnel attached to the 10th AAA-AW Battalion of the 31st AAA Brigade, Sixth Army.

Prior to Department of Defense acquisition, the site was used for dry-land wheat farming. Property improvements constructed by the Army consisted of the following: a gravel access road and security fencing; one gun ring berm and two ammunition bunkers constructed of soil, gravel, and wood; a concrete generator pad and utility poles; a prefabricated command post building with concrete foundation; and a pit latrine. Telephone and electrical service was obtained from local utilities. Water was apparently trucked into the site. The Army deactivated Battery 81 in early 1957 as defensive anti-aircraft missiles (Nikes) were being introduced. The site was reported excess to the General Services Administration in May 1957, and the property returned to private ownership.

Currently, concrete slabs, building foundations, and an earthen gun enclosure remain as evidence of former DOD activities on the site. The property appears unoccupied and no longer used for farming.

SITE SURVEY SUMMARY SHEET FOR DERP-FUDS SITE NO. F10WA060100
Fairchild AAA Battery 81 cont.

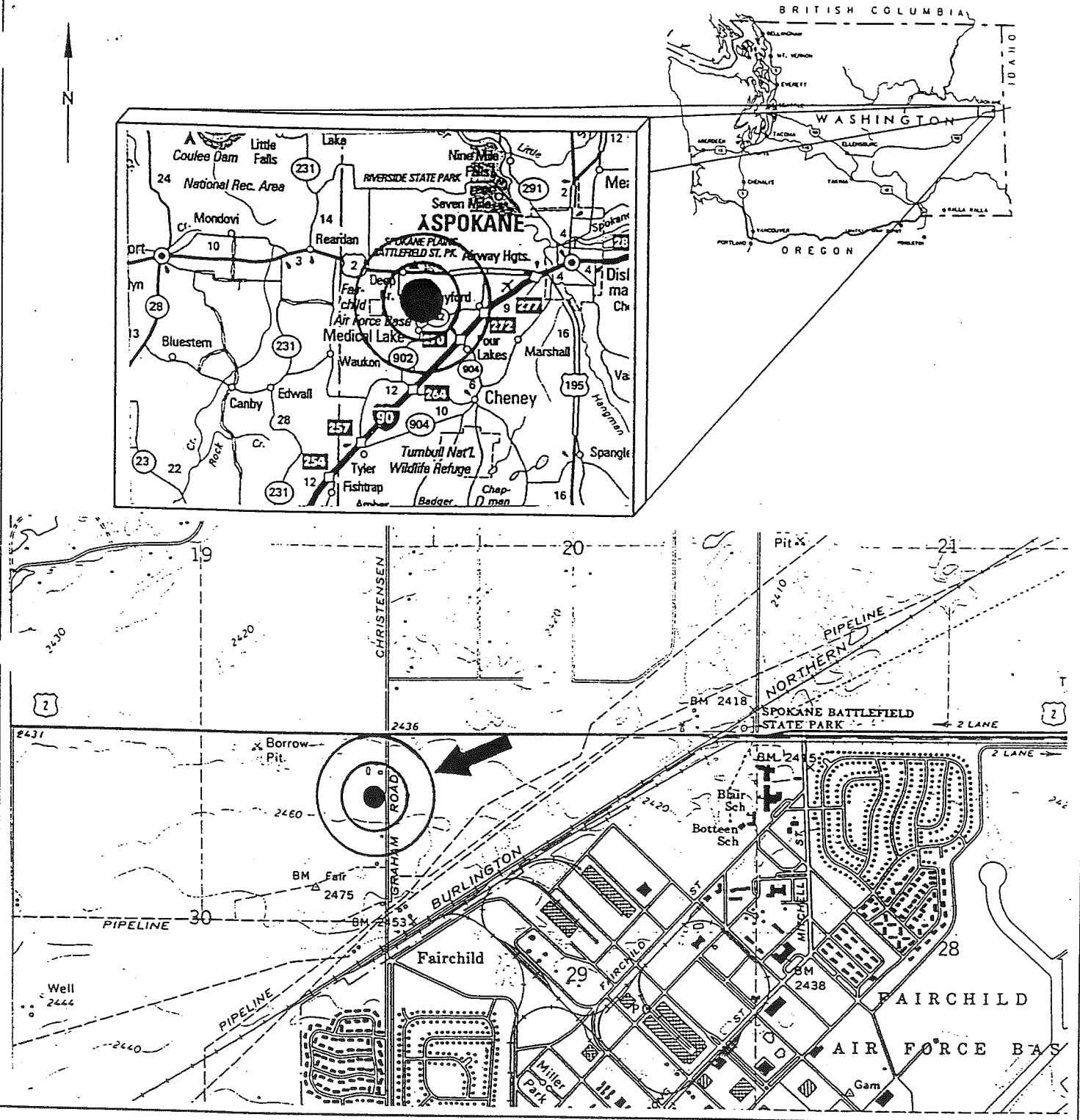
SITE VISIT: Joseph Marsh and Glen Terui (CENPS-EN-GT-GE) conducted a site visit on 13 May 1996. The owner of the property containing the gun site lives out of the Spokane County area, and could not be contacted. Without permission to enter the property, the site visit was limited to the adjacent county road right-of-way where all gun site features could be clearly seen.

CATEGORY OF HAZARD: No DOD-caused hazards were reported or identified.

PROJECT DESCRIPTION: No project is proposed.

AVAILABLE STUDIES AND REPORTS: All site information was obtained from Seattle District Real Estate files and drawings, and Seattle District Real Estate Planning Report dated 18 June 1953. All provided information can be found in the project file.

SEATTLE DISTRICT POC: Jonathan A. Maas, CENPS-EN-GT-EM
(206) 764-6745.



SITE VICINITY & LOCATION MAP
FAIRCHILD AAA BATTERY 81
SPOKANE COUNTY, WA
SITE NO. F10WA060100

LEGEND:

SITE LOCATION

NOT TO SCALE

US Army Corps of Engineers
Seattle District
Defense Environmental Restoration Program

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FOR FORMERLY USED DEFENSE SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY

Fairchild AAA Battery 81
Spokane County, Washington

Site No. F10WA060100

FINDINGS OF FACT

1. The Fairchild AAA Battery 81 site is located approximately 400 feet south of the northeast corner in the northeast quarter of the northeast quarter of Section 30, Township 25 North, Range 41 East Willamette Meridian, Spokane County, Washington. It is situated immediately west and adjacent to Graham Road, and approximately 400 feet south of Highway 2. The site consists of 1.03 acres leased from W.E. Darlington in 1954. Two no-area licenses were also acquired from Spokane County.

2. This site was one of 15 anti-aircraft artillery gun batteries that formed a defensive ring around Fairchild Air Force Base. All gun batteries were manned by U.S. Army personnel. Improvements may have included security fencing, gravel access roads, gun ring berms, ammunition bunkers, concrete generator pads, prefabricated support buildings, and latrines.

3. The site was deactivated in early 1957. It was reported excess to the General Services Administration in May 1957, and the interests were subsequently terminated.

DETERMINATION

Based on the foregoing findings of fact, the site has been determined to be formerly used by the Department of Defense. It is therefore eligible for the Defense Environmental Restoration Program - Formerly Used Defense Sites, established under 10 US 2701 et seq.

16 Aug 1996
DATE

Bartholomew B Bohn II

BARTHOLOMEW B. BOHN II
Colonel, EN
Acting Commander

APPENDIX C

Spokane Regional Health District Field Reports
for the
COOK WELL

FIELD STATUS REPORT

SITE NAME

Joseph Cook Property

SITE LOCATION INFORMATION

Contact Person: Joseph Cook **Title:** _____ **Phone:** _____

Mailing Address: 1203 S. Christensen Rd. **City:** Medical Lake **State:** WA **Zip:** 99022

Site Location: 1203 S. Christensen Rd **Closest City:** Medical Lake **County:** Spokane

Quarter/Quarter: SW **Section:** 20 **Township:** 25 **Range:** 41 **E.W.M.**

Longitude: **Degrees** _____ **Minutes** _____ **Seconds** _____

Latitude: **Degrees** _____ **Minutes** _____ **Seconds** _____

INSPECTION INFORMATION

Inspection Date: March 23, 1999 **Inspection Time:** 11:30 AM **Type of Entry Notice:** Invitation

Photographs yes ☒ no ☐
Videotape yes ☐ no ☒
nples yes ☒ no ☐

Weather: clear ☐ partly cloudy ☐ overcast ☒
Precipitation None **Temperature** _____
Wind Direction SW **Wind Speed** 5-10

SITE DESCRIPTION

Land Use:

Current Landuse

History Agricultural

Soil Type: Cheney and Uhlig silt loam (CnB)

Terrain: Grasses on relatively flat land

Geology: QGO and TCR (older glacial deposits and Columbia basin basalt

DEPARTMENT REVIEW

Investigator: Michael LaScuola and John Wiley **Date:** March 23, 1999

Approved by:

Supervisor: _____ **Date:** _____

SITE LAYOUT SKETCH

NOT TO SCALE | LEGEND | NOT TO SCALE

Monitoring well:	⊕	**Railroad tracks:**	++++++++++
Supply well:	▯		
Tip rdng location:	o		
Photo & orientation:	⇨		

WELL DATA: 173-160 WAC Yes - well logs

Well logs attached? Yes ☒ **No** ☐

COMMENTS: Well log for active domestic-use well indicates sub-surface construction is in compliance with WAC 173-160. Above ground well construction meets standards set in WAC 173-160. There are three other wells on the property for which well logs exist. These wells are currently inactive.

Site Name: Joseph Cook Property

POTENTIAL CONTAMINANT SOURCES (Within 600' Radius of Well)

☒ **Above ground storage tanks** None observed

Status _____ **Contents** _____

☒ **Animal feed lots** None observed
(type/number of acres)

☒ **Containers:**
Drums None observed **Retail? (type)** _____
(paint, auto, garden etc.)

Waste None observed

☒ **Fertilizer applications** Reported in area
(type)

☒ **Graveyard** None observed

☒ **Commercial activity** None observed
(type)

Ground water/surface water Seasonal high ground water / no surface water observed

☒ **Irrigation practices: Type** Domestic only **Return flow?** No

☒ **Land application** Unknown
(type)

☒ **Landfills** (≈ 2500')

☒ **Stockpiles** None observed

☒ **Mining/logging** None observed

☒ **Natural source: Background** Unknown **SW/Wetland** _____

☒ **Open dumps/solid waste** None observed

☒ **Pesticides** Unknown
(applications/stored/type)

☒ **Pipelines** Yes - by USGS (petroleum and natural gas)

Salts None observed

☒ **Septic system** Setback per regulation ok

☒ **Storm water drainage** Normal

Site Name Joseph Cook Property

☒ **Surface impoundments** None observed
(lagoons, etc)

☒ **Underground storage tanks** None observed

☒ **Urban runoff** None observed

☒ **Waste piles** None observed
(type)

☒ **Railroad** > 600' away

☒ **Other** Highway (SR 2) adjacent to property

Comments: There is an asphalt driveway/parking area about 20' to the west of the drinking water wellhead (see Figure 4 photograph). It appeared that this driveway may drain toward the wellhead. Although this is not a major concern as a potential source of contamination to the well, some petroleum based compounds released from the vehicles could migrate toward the wellhead. A raised curb could be placed along the edge of the halt area running north to south to divert driveway runoff away from the wellhead.

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 9223

Water Right Permit No. _____

OWNER: Name JOE COOK Address S.1203 CHRISTIANSON RD. MEDICAL LK, WA. 99

LOCATION OF WELL: County SPOKANE NW ¼ NW ¼ Sec 20 T. 25 N., R. 41E W.M

(2a) STREET ADDDRESS OF WELL (or nearest address) Lot 3 BK 5 FAIRCHILD Estates 1st Add

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) _____

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 195 feet. Depth of completed well 186 ft.

(6) CONSTRUCTION DETAILS: DRIVESHOE

Casing installed: 6" Diam. from +1 ft. to _____ ft.
Welded ☒ Liner installed ☒ Threaded ☐ 4" Diam. from 10 ft. to 125 ft.
_____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations 7" in. by 1/8 in.
125 perforations from 120 ft. to 180 ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 40 ft. below top of well Date 6-23-89
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.))

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " " "
" " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at 186 ft. for 1 hrs.
Artesian flow _____ g.p.m. Date 6-23-89
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated with at least one entry for each change of information.

MATERIAL	FROM	TO
OVERBURDEN	0'	1'
CLAY (BROWN)	1'	3'
SAND	3'	19'
SAND - GRAVEL MIX	19'	21'
SAND	21'	28'
CLAY (BROWN W/ BASALT GRAVEL)	28'	33'
BASALT (BROWN - BROKEN)	33'	34'
" " (BROWN - SOFT)	34'	44'
" " (GRAY - MED)	44'	81'
BASALT (BROWN - SOFT)	81'	82'
" " (GRAY/VIS. - SOFT - WB)	82'	86'
" " (GRAY - HARD)	86'	98'
" " (BROWN - SOFT)	98'	100'
BASALT (GRAY W/ GREEN VIS - SOFT)	100'	116'
" " (GRAY W/ BROWN - MED)	116'	135'
" (" " " - SOFT)	135'	140'
" (" " " - MED)	140'	145'
" (" " BROKEN - WB)	145'	148'
" (GRAY - BROWN - GREEN - BROKEN)	148'	157'
BASALT (GRAY/BROWN - MED)	157'	160'
" (" " " - SOFT)	160'	161'
" (GRAY - HARD)	161'	168'
" (GRAY/BROWN - VIS - SOFT - WB)	168'	171'
BASALT (GRAY - HARD)	171'	186'
CLAY (GREEN W/ FINE SAND)	186'	195'

Work started 6-22, 19. Completed 6-23, 1989

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME ALLBERY DRILLING CORP. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address W. 220 FRANCIS SUITE 4 SPOKANE, WA. 99205

(Signed) MIKE ROBINSON (WELL DRILLER) License No. 1544
Contractor's Registration No. ALLBEDC135JO Date 7-20, 1989

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name JOE COOK Address RT. 1 BOX 174 D MEDICAL LK., WA 99022

LOCATION OF WELL: County SPOKANE — SW ¼ SW ¼ Sec. 20 T. 25 N., R. 41 E W.M.

Bearing and distance from section or subdivision corner 530' N & 246' E. FROM SW CORNER OF SEC. 20

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 98 ft. Depth of completed well 164 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 1" P.V.C. Diam. from -5 ft. to 164 ft.
Threaded ☐ ..." Diam. from ..... ft. to ..... ft.
Welded ☐ ..." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☒ No ☐ IN 4" P.V.C. LINER
Type of perforator used SKIL SAW
SIZE of perforations 7 in. by 1/8 in.
150 perforations from 104 ft. to 164 ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☐ No ☒ To what depth? ..... ft.
Material used in seal .....
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level ... 2432 ft.
Static level 40 ft. below top of well Date 1-21-81
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test 25 gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date 1-21-81
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation*

MATERIAL	FROM	TO
BASALT (BLACK-MED)	70'	79'
BASALT (BLACK & BROWN - FRACTURED)	79'	102'
BASALT (SCORIA)	102'	114'
BASALT (BLACK-MED)	114'	136'
BASALT (BLACK - SOFT TO MED WATER BEARING 25 T G.P.M)	136'	164'

RECEIVED
... 1981
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 1-23 19 81 Completed 1-24 19 81

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME K.C. KANE WELL DRILLING (Person, firm, or corporation) (Type or print)

Address RT 3 BOX 17A COLVILLE, WA 99114

[Signed] Steven L Allberg (Well Driller)

License No. 1 Date 1-24 19 81

8/3/81

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. ....
Permit No. G325046 990

(1) OWNER: Name Joseph Cook Address Rt #1 Box 174D Medical Lake Wa

(2) LOCATION OF WELL: County Spokane SW ¼ SW ¼ Sec 10 T 25 N., R 41 E W.M.

and distance from section or subdivision corner 250'N - 250'E of SW cor

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....

New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 120 ft. Depth of completed well 120 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1 ft. to 240 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☑ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☑
Type of perforator used.....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☑
Manufacturer's Name.....
Type..... Model No.....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☑ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☑ No ☐ To what depth? ..... ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water?..... Depth of strata.....
Method of sealing strata off.....

(7) PUMP: Manufacturer's Name —
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 2436 ft.
Static level 40 ft. below top of well Date 4-16-76
Artesian pressure ..... lbs. per square inch Date.....
Artesian water is controlled by..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom?.....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 4-16-76
Bailer test 40 gal./min. with — ft. drawdown after — hrs.
Artesian flow — g.p.m. Date.....
Temperature of water — Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Surface soil	0	5
Sand and gravel	5	12
Clay Dark Brown	12	14
Sand and gravel	14	18
Brown Broken Basalt	18	85
Black Broken "	85	110
Caliche	110	115
Grey Broken Basalt	115	120

35
33
23

RECEIVED
APR 23 1976
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 14 April 1976 Completed 16 April 1976

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Aqua Drilling & Development Inc
(Person, firm, or corporation) (Type or print)

Address P.O. Box 1002 Coeur d'Alene Ida

[Signed] J. C. Quiroz
(Well Driller)

License No. 0382 Date 16 April 1976

1/26/14

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356 — (Rev. ...)

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W081568
Unique Well I.D. # ACP618
Water Right Permit No.

(1) OWNER: Name **COOK, JOSEPH** Address **1203 S. CHRISTENSEN RD. MEDICAL LAKE, WA 99022-**

(2) LOCATION OF WELL: County **SPOKANE** - SW 1/4 SW 1/4 Sec 20 T 25 N., R 41E WM

(2a) STREET ADDRESS OF WELL (or nearest address) ,

(3) PROPOSED USE: **DOMESTIC**

(4) TYPE OF WORK: Owner's Number of well (If more than one)
NEW WELL Method: **ROTARY**

(5) DIMENSIONS: Diameter of well **6** inches
Drilled **110** ft. Depth of completed well **110** ft.

(6) CONSTRUCTION DETAILS:
Casing installed: **6** " Dia. from **+2** ft. to **45** ft.
LINER **4** " Dia. from **30** ft. to **110** ft.
" Dia. from ft. to ft.

Perforations: **YES**
Type of perforator used **SKILL SAW**
SIZE of perforations **1/4** in. by **6** in.
30 perforations from **90** ft. to **110** ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: **NO**
Manufacturer's Name
Type Model No.
Diam. slot size from ft. to ft.
Diam. slot size from ft. to ft.

Gravel packed: **NO** Size of gravel
Gravel placed from ft. to ft.

Surface seal: **YES** To what depth? **45** ft.
Material used in seal **BENTONITE**
Did any strata contain unusable water? **YES**
Type of water? **SURFACE WATER** Depth of strata **40** ft.
Method of sealing strata off **CASING**

(7) PUMP: Manufacturer's Name
Type **NONE** H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ... ft.
Static level **30** ft. below top of well Date **08/15/97**
Artesian Pressure lbs. per square inch Date
Artesian water controlled by

(9) WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? **NO** If yes, by whom?
Yield: gal./min with ft. drawdown after hrs.

Recovery data

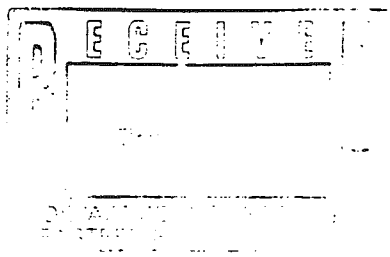
Time	Water Level	Time	Water Level	Time	Water Level

Date of test / /
Bailer test gal/min. ft. drawdown after hrs.
Air test **25** gal/min. w/ stem set at **109** ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? **NO**

(10) WELL LOG

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kin and nature of the material in each stratum penetrated, wi at least one entry for each change in formation.

MATERIAL	FROM	T
TOPSOIL	**0**	**2**
SAND GRAVEL	**2**	**1**
CLAY BROWN BASALT	**14**	**1**
CLAY RED WITH	**18**	
------- BROWN BASALT	**18**	**3**
BASALT BROWN SOFT	**30**	**4**
BASALT BLACK HARD	**40**	**4**
BASALT BLACK FRACTURED	**45**	**4**
BASALT BLACK AND	**49**	
------- BROWN FRACTURED	**49**	**5**
BASALT BLACK MEDIUM	**55**	**5**
BASALT BLACK FRACTURED	**57**	
------- W/WATER	**57**	**6**
BASALT BLACK MEDIUM	**62**	**1**
BASALT BLACK AND	**100**	
------- BROWN FRACTURED	**100**	**1**



Work started **08/15/97** Completed **08/15/97**

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials use and the information reported above are true to my best knowledge and belief.

NAME **FOGLE PUMP & SUPPLY, INC.**
(Person, firm, or corporation) (Type or print)

ADDRESS **POB 1450, AIRWAY HTS. WA.**

[SIGNED] Mike Robinson/MO License No. **1544**

Contractor's
Registration No. **FOGLEPS095L4** Date **08/20/97**

SPOKANE COUNTY HEALTH DISTRICT

E. O. PLOEGER, M. D., M.P.H., HEALTH OFFICER
N. 819 Jefferson Street
Spokane, Washington 99201

C3

DATE 3/31/72

PERMIT NO. 09420 ✓1203 S Christensen Rd. № 09656

APPLICATION FOR PERMIT TO INSTALL OR RECONSTRUCT SEWAGE DISPOSAL FACILITIES

Name Joseph C. Cook Address 9355 Ohio St. Fairchild 99011 Phone No CH-4-9473

Address of Proposed Site 20-25-41 - Christenson Rd.

Type of Use Res. Is basement for building planned? none

Number of Bedrooms 4 Building Capacity ______ Camp Capacity ______ Other ______

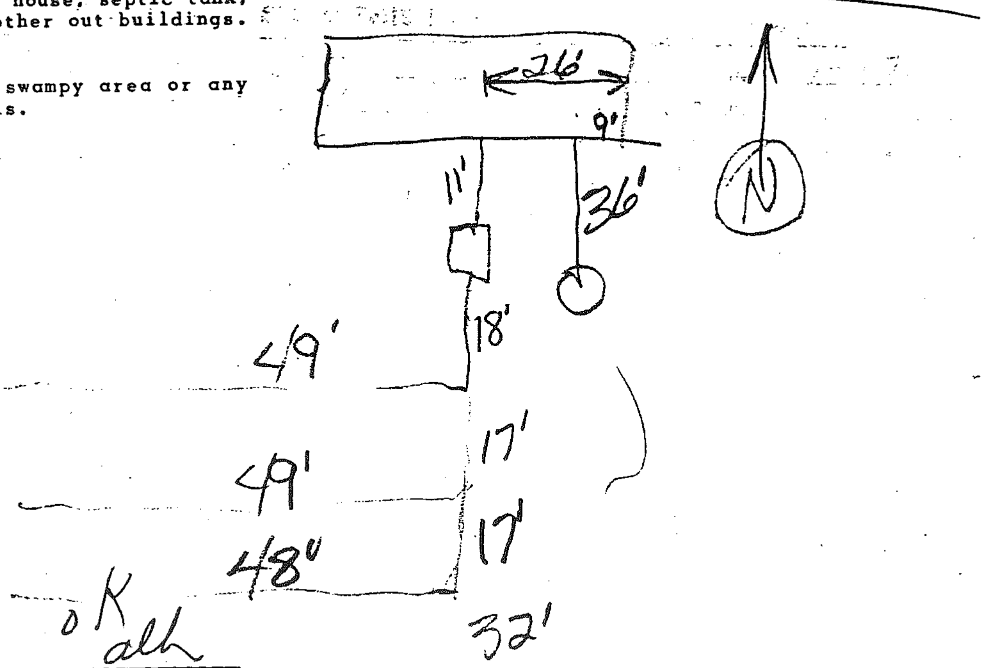
Water Supply Well (City, Well, Spring). Drywell yes

Septic tank capacity 1000 gals. Style of tank ______

Length of disposal field 288 Absorption Pits ______ Leach Bed ______

(1) Show relative location of: Proposed house, septic tank, disposal field, well, garage and other out buildings.

(2) Make note of any heavy slope or swampy area or any other important topographic details.



re-insp. fee $5.00 T#04994 11/14/72 alh

OK alh

Installer Vietzke

Final Inspection Date 11/16/72 alh

Remarks: Must change to 2" line to Drywell 9/28/72 alh

CONTRACTOR X Joseph C. Cook

dbase 2/9/99 g

______ For Spokane County Health District

FORM 346 REV. HEALTH

Parcel: 15203.0202

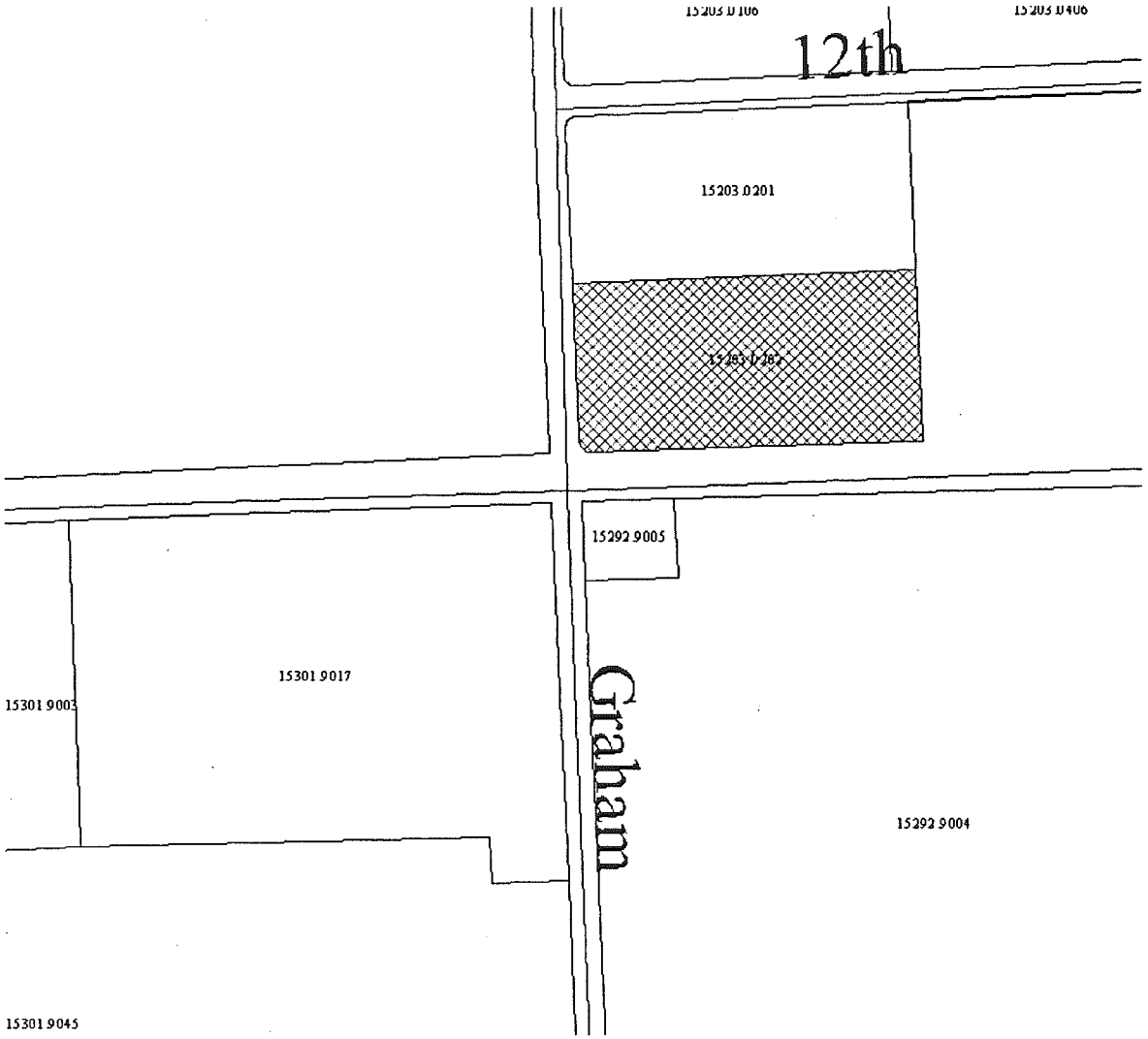
Owner: COOK, JOSEPH C

CoOwner:

Owner Address
1203 S CHRISTENSEN RD MEDICAL LAKE WA 99022-9644

Site Address
VACANT LAND . SPO

Legal Description
FAIRCHILD ESTATES ADD L2 B2



Notice: This is not a legal document. Data depicted on this map is general & subject to constant revision. It is intended for reference use only. Legal documents should be obtained from the appropriate agency.

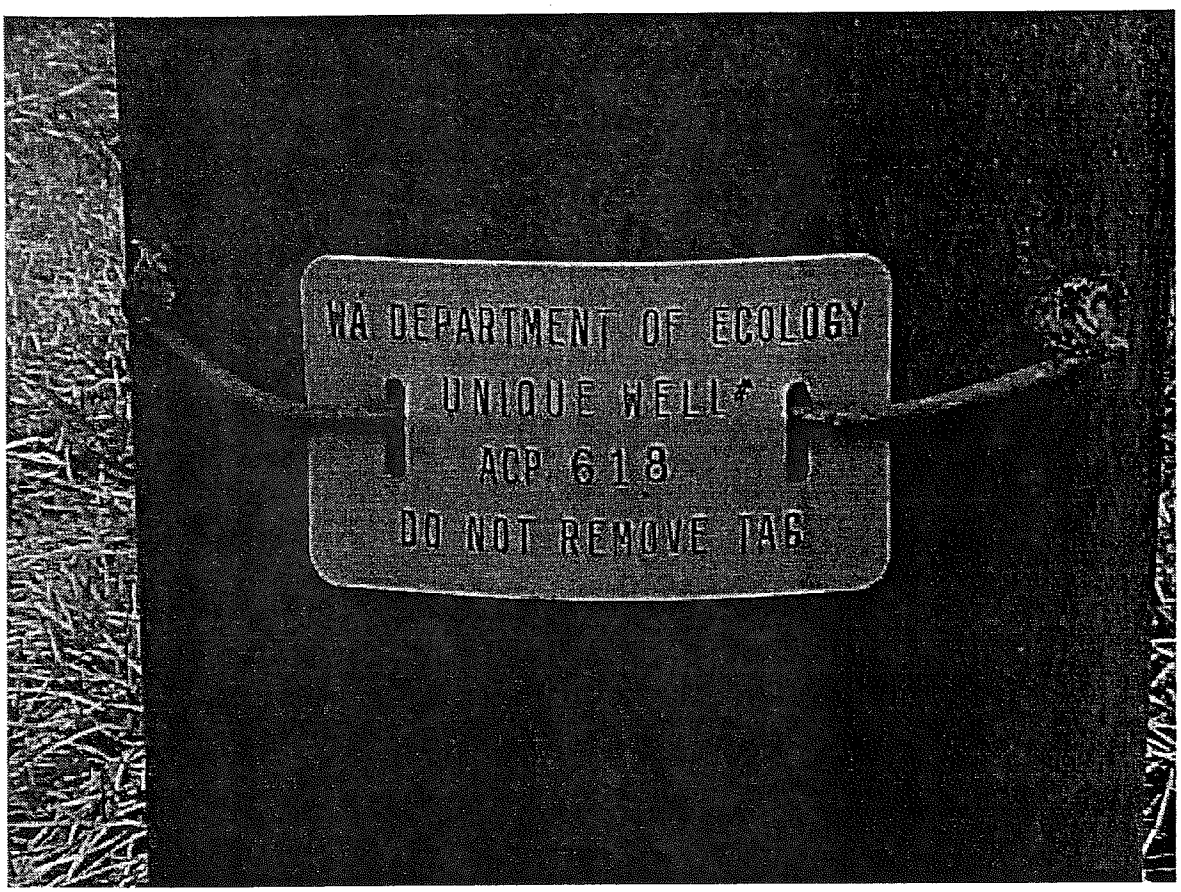


Figure 1- Cook Property - 1203 S Christensen Rd. - 3/23/99

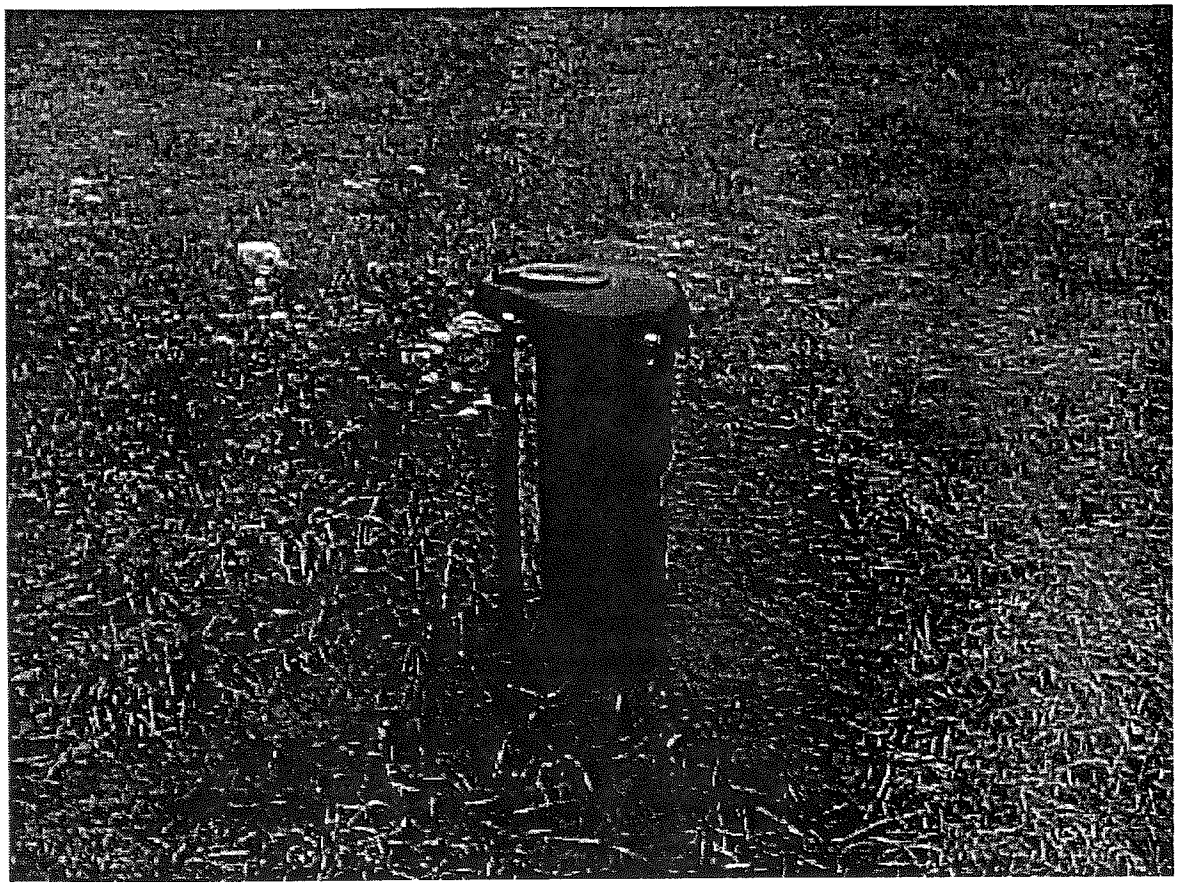


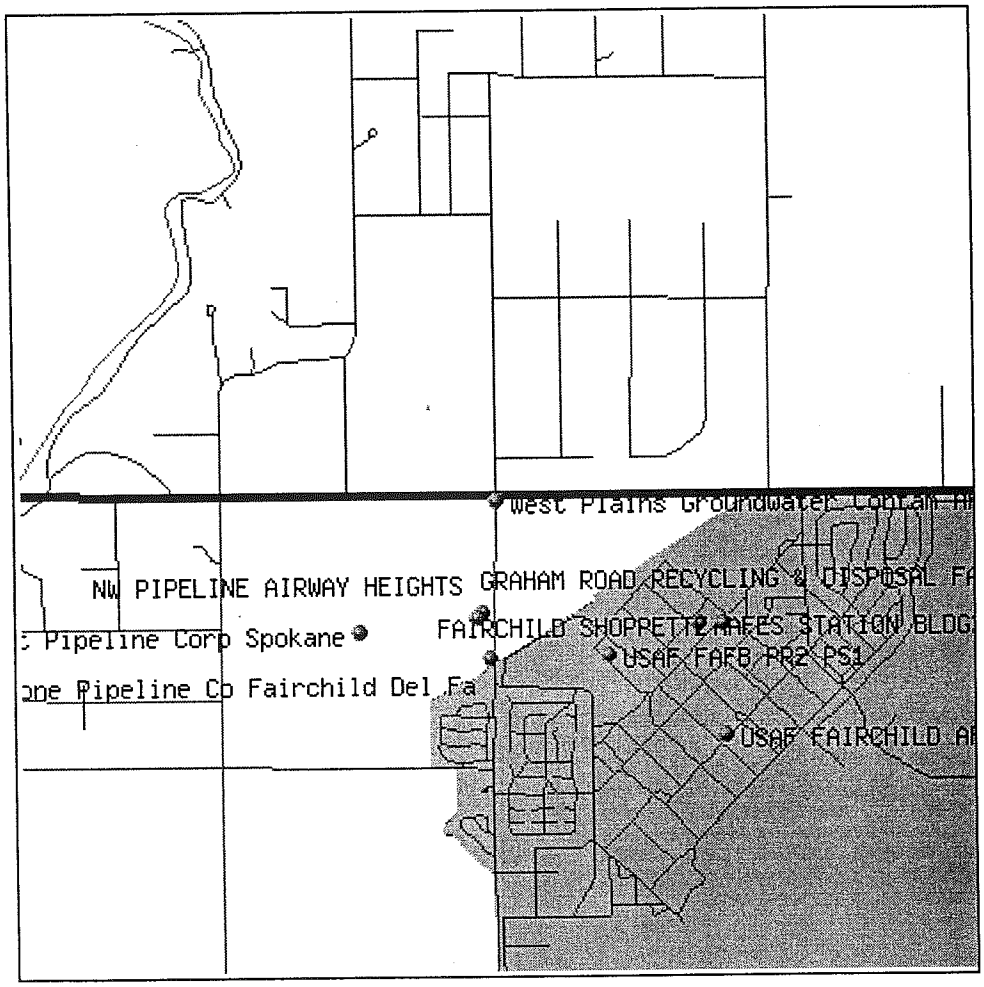
Figure 2 - Cook Property - 1203 S Christensen Rd. - 3/23/99

Figure 3 - Cook Property - 1203 S Christensen Rd. - 3/23/99

Figure 4 - Cook Property - 1203 S Christensen Rd. - 3/23/99

APPENDIX D

Dept. of Ecology Facility/Site Identification System Query Results



Approximate Location of Sites Identified From
Ecology's Facility/Site Information System Data Base
Within a One-mile Radius
Of
West Plains-Graham Road
Ground Water Contaminant Area

A maximum of one thousand records will be returned. If you exceed the maximum, please use the Advanced Options to narrow your search.

The database used by F/S on the WEB is updated each weekend. Please take note of the Department's disclaimer concerning the data it contains.

- HOME
- NEW QUERY
- BOTTOM

ID	NAME	COUNTY	ZIP CODE
76177555	AAFES STATION BLDG2386	SPOKANE	99011-1305
79762467	FAIRCHILD SHOPPETTE	SPOKANE	99011
46767518	GRAHAM ROAD RECYCLING & DISPOSAL FACILIT	SPOKANE	99022-9790
36635115	Northwest Pipeline Corp Spokane	SPOKANE	99223
678	NW PIPELINE AIRWAY HEIGHTS	SPOKANE	99011
58757186	USAF FAFB PR2 PS1	SPOKANE	99011-9404
54359899	USAF FAIRCHILD AFB	SPOKANE	99011
89233269	West Plains Groundwater Contam Area	SPOKANE	99001
15488433	Yellowstone Pipeline Co Fairchild Del Fa	SPOKANE	99206

Display map of All sites above

Your query returned 9 records.

- TOP

Facility/Site Detail

Facility/Site Name: USAF FAIRCHILD AFB **Ecology Identifier:** 54359899

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location 92 CES CEV 100 W ENT ST S155 **City:** FAIRCHILD AFB **ZIP Code:** 99011 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 9	**Latitude: Deg:** 47 **Min:** 37 **Sec:** 49.00 **Longitude: Deg:** 117 **Min:** 39 **Sec:** 3.00 **Decimal Equivalents** **Latitude:** 47.6303 **Longitude:** 117.6508 **Accuracy Level:** Unknown

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Air Qual Oper Permit Source	AIRQUAL	(360) 407-6806	Active

Industrial Classification

SIC Code	SIC Code Description
9711	NATIONAL SECURITY

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: NW PIPELINE AIRWAY HEIGHTS **Ecology Identifier:** 678

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location GRAHAM RD **City:** AIRWAY HEIGHTS **ZIP Code:** 99011 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 7	**Latitude: Deg:** 47 **Min:** 38 **Sec:** 11.58 **Longitude: Deg:** 117 **Min:** 40 **Sec:** 12.79 **Decimal Equivalents** **Latitude:** 47.6365 **Longitude:** 117.6702 **Accuracy Level:** Unknown

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Voluntary Cleanup Sites	TOXICS	(360) 407-7224	Inactive

Industrial Classification

SIC Code	SIC Code Description
	No SIC Code Information Available

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: AAFES STATION BLDG2386 **Ecology Identifier:** 76177555

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location FAIRCHILD ST BLDG 2386 **City:** SPOKANE **ZIP Code:** 99011-1305 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 9	**Latitude: Deg:** 47 **Min:** 38 **Sec:** 9.79 **Longitude: Deg:** 117 **Min:** 39 **Sec:** 10.28 **Decimal Equivalents** **Latitude:** 47.6361 **Longitude:** 117.6529 **Accuracy Level:** Greater than 2000 feet

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Underground Storage Tank	TOXICS		Inactive

Industrial Classification

SIC Code	SIC Code Description
	No SIC Code Information Available

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: FAIRCHILD SHOPPETTE **Ecology Identifier:** 79762467

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location 300 N SAC BLVD 2383 **City:** FAIRCHILD AFB **ZIP Code:** 99011 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 9	**Latitude:** Deg: 47 Min: 38 Sec: 9.95 **Longitude:** Deg: 117 Min: 39 Sec: 3.95 **Decimal Equivalents** **Latitude:** 47.6361 **Longitude:** 117.6511 **Accuracy Level:** Greater than 2000 feet

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Underground Storage Tank	TOXICS		Active

Industrial Classification

SIC Code	SIC Code Description
	No SIC Code Information Available

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: GRAHAM ROAD RECYCLING & DISPOSAL FACILIT

Ecology Identifier: 46767518

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location 1820 S GRAHAM RD **City:** MEDICAL LAKE **ZIP Code:** 99022-9790 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 7	**Latitude: Deg:** 47 **Min:** 38 **Sec:** 13.00 **Longitude: Deg:** 117 **Min:** 40 **Sec:** 8.00 **Decimal Equivalents** **Latitude:** 47.6368 **Longitude:** 117.6699 **Accuracy Level:** Unknown

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Emergency/Haz Chem Rpt TIER2	HAZWASTE	(360) 407-6729	Active
Landfill	SWFAP		Active

Industrial Classification

SIC Code	SIC Code Description
4953	REFUSE SYSTEMS

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: Northwest Pipeline Corp Spokane **Ecology Identifier:** 36635115

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location T25N R41E S30 NE SE **City:** SPOKANE **ZIP Code:** 99223 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 7	**Latitude: Deg:** 47 **Min:** 38 **Sec:** 8.70 **Longitude: Deg:** 117 **Min:** 40 **Sec:** 45.87 **Decimal Equivalents** **Latitude:** 47.6358 **Longitude:** 117.6794 **Accuracy Level:** Unknown

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Hazardous Waste Generator	HAZWASTE	(360) 407-7555	Inactive

Industrial Classification

SIC Code	SIC Code Description
4922	NATURAL GAS TRANSMISSION

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: USAF FAFB PR2 PS1 **Ecology Identifier:** 58757186

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location 92 CES CEVR 100 W ENT ST STE 155 **City:** SPOKANE **ZIP Code:** 99011-9404 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 9	**Latitude: Deg:** 47 **Min:** 38 **Sec:** 4.38 **Longitude: Deg:** 117 **Min:** 39 **Sec:** 35.46 **Decimal Equivalents** **Latitude:** 47.6345 **Longitude:** 117.6599 **Accuracy Level:** => 1/10 meter and < 1 meter

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Federal (Superfund) Cleanup St	TOXICS	(360) 407-7224	Active

Industrial Classification

SIC Code	SIC Code Description
	No SIC Code Information Available

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: West Plains Groundwater Contam Area

Ecology Identifier: 89233269

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location HWY 2 & GRAHAM RD **City:** AIRWAY HEIGHTS **ZIP Code:** 99001 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 7	**Latitude: Deg:** 47 **Min:** 38 **Sec:** 33.00 **Longitude: Deg:** 117 **Min:** 40 **Sec:** 7.00 **Decimal Equivalents** **Latitude:** 47.6426 **Longitude:** 117.6687 **Accuracy Level:** +/- 10 feet (3 meter)

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Voluntary Cleanup Sites	TOXICS	(360) 407-7224	Active

Industrial Classification

SIC Code	SIC Code Description
	No SIC Code Information Available

Mailing Address of Facility/Site

No Address Information Available at this Time

Facility/Site Detail

Facility/Site Name: Yellowstone Pipeline Co Fairchild Del Fa **Ecology Identifier:** 15488433

Facility/Site Location

Geographic Location	Latitude/Longitude
Street Address or Location 1/2 MI S HWY 2 ON GRAHAM RD **City:** SPOKANE **ZIP Code:** 99206 **County:** SPOKANE **Congressional District:** 5 **Legislative District:** 7	**Latitude: Deg:** 47 **Min:** 38 **Sec:** 4.00 **Longitude: Deg:** 117 **Min:** 40 **Sec:** 9.00 **Decimal Equivalents** **Latitude:** 47.6344 **Longitude:** 117.6692 **Accuracy Level:** Unknown

Display the location of this site and all other sites of interest to the Department of Ecology that are approximately within a one half mile radius. Display the location of this site only, but do it via a controllable version of the map.

Reason for Interaction with the Department of Ecology

Interaction Description	Responsible Organization	Ecology Contact Phone #	Status
Voluntary Cleanup Sites	TOXICS	(360) 407-7224	Active

Industrial Classification

SIC Code	SIC Code Description
46	PIPELINES, EXCEPT NATURAL GAS

Mailing Address of Facility/Site

No Address Information Available at this Time