PERIODIC REVIEW (FINAL)

L-BAR SITE
CSID 88
FSID 762

Prepared by
Washington State Department of Ecology
Eastern Regional Office
Toxics Cleanup Program
Spokane, WA

April 2012

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LIST OF ACRONYMS

CAP – Cleanup Action Plan
CUL – Cleanup Level
FB/FBR – Flux bar/Flux bar residue
FSQV – Freshwater Sediment Quality Values
MTCA – Model Toxics Control Act
N – Nitrogen
NPDES – National Pollution Discharge Elimination System
NWA- Northwest Alloys, Inc.
SWBU – Shallow Water Bearing Unit
TDS – Total Dissolved Solids

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1.0 INTRODUCTION

This document, prepared by the State of Washington Department of Ecology (Ecology), is the first periodic review of compliance monitoring data to evaluate the effectiveness of the remedial actions implemented at the L-Bar Site from 1996 to 2004. These remedial actions were implemented pursuant to the Model Toxics Control (MTCA) Cleanup Regulation, Chapter 173-340 WAC as amended in January 1996; all citations in this document refer to this MTCA edition.

Cleanup actions at this Site are in accordance with the requirements of Agreed Order No. DE 00TCPER-984 dated June 12, 2000 entered into between Northwest Alloys, Inc. (NWA) and Ecology. NWA implemented the remedial actions from 2001 to 2004 in accordance with the L-Bar Material Removal and Compliance Monitoring Work Plan as required by the Site's June 2000 Final Cleanup Action Plan (CAP). Earlier interim actions were also conducted from 1997 to 2000 under Agreed Order No. DE 94TC-E104. The cleanup actions implemented at the Site included source material removal, natural attenuation, and long term monitoring.

Cleanup levels for the site are based on the following: Method B for groundwater, Method –C Commercial for soils, Method B for the surface water in the West Ditch which is discharging to the Colville River, Method C for the surface water in the Main Ditch which did not discharge to the Colville, and Method C Commercial levels for soils and soil levels that are protective of surface water in the West Ditch and the Main Ditch.

Site periodic reviews are required because WAC 173-340-420(1) provides that:

> "If the department selects or approves a cleanup action that results in hazardous substances remaining at a site at concentrations which exceed Method A or Method B cleanup levels established under WAC 173-340-700 through 173-340-760 or if a conditional point of compliance have been established, the department shall review the cleanup action no less frequently than every five years after the initiation of such cleanup action to ensure that human health and the environment are being protected."

2.0 SUMMARY OF SITE CONDITIONS

2.1 SITE DESCRIPTION

The L-Bar Site (Site) is located approximately 2 miles south of Chewelah, WA in the Colville River Valley as shown in Figure 2.1.

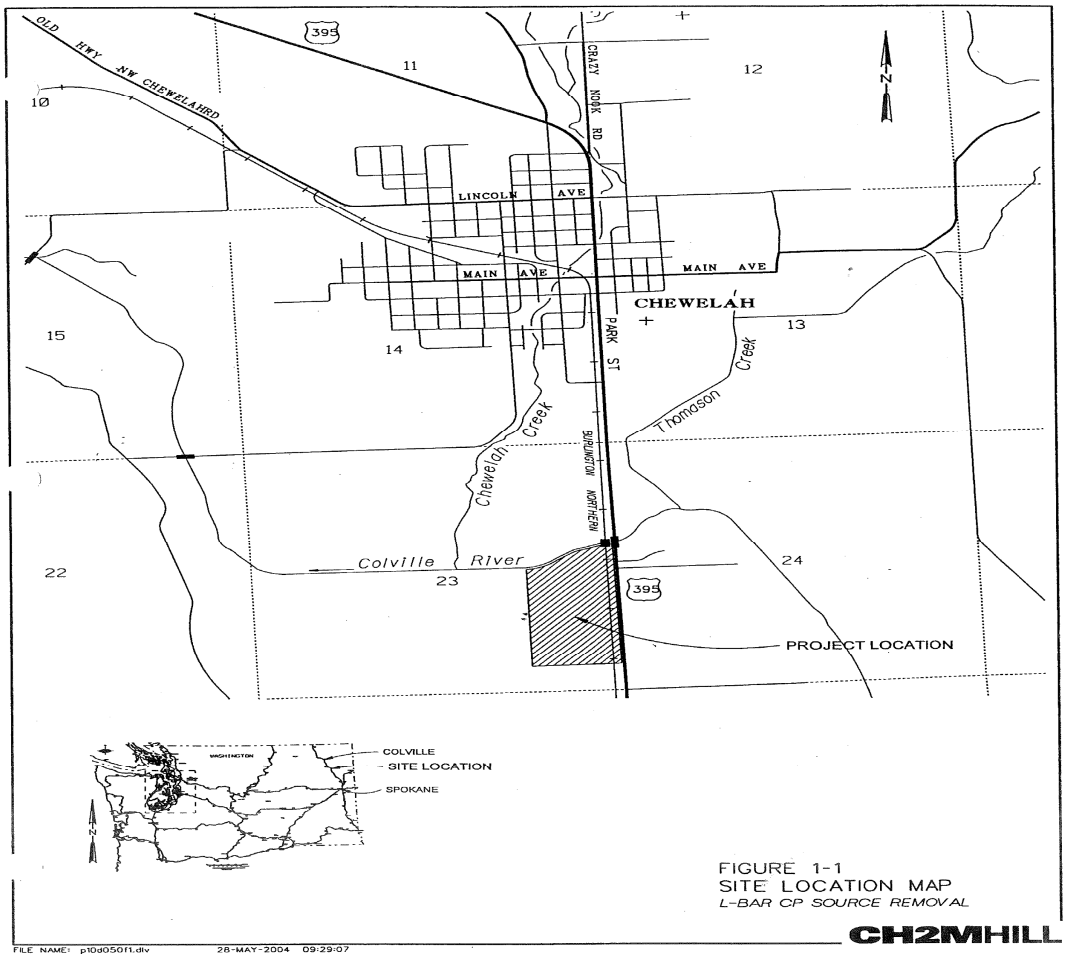


FIGURE 2.1
SITE LOCATION MAP

The Site occupies approximately 67 acres of industrial and agricultural land. The industrial area covers approximately 50 acres. An adjoining 17-acre agricultural field (the North Field) lies between the industrial area and the Colville River. The layout of the Site is described by the following as shown in Figure 2.2:

- A magnesite residue pile about 30 feet high and covering nearly 17 acres lies within the southwest quadrant of the Site.

- The West Ditch that provide drainage for the western part of the Site and continues to discharge to the Colville River to this date.
- The Main Ditch that provided drainage from the interior part of the Site and that previously discharged to the Colville River. As a result of an Emergency Enforcement Order issued in 1994, a dam was constructed such that the discharge to the river was stopped in 1994. In the summer of 2004, the ditch was covered and closed.
- Two lined storage ponds - the Evaporation Pond and the Holding Pond – that were used during the years of L-Bar's operation as part of the water management. Excess water from the holding pond was pumped to the evaporation pond. These ponds are still present on the Site with the Holding Pond continuing to serve as a collection and storage for storm water.
- The former covered Flux Bar Pile that was removed as part of the cleanup actions.
- The former plant buildings.

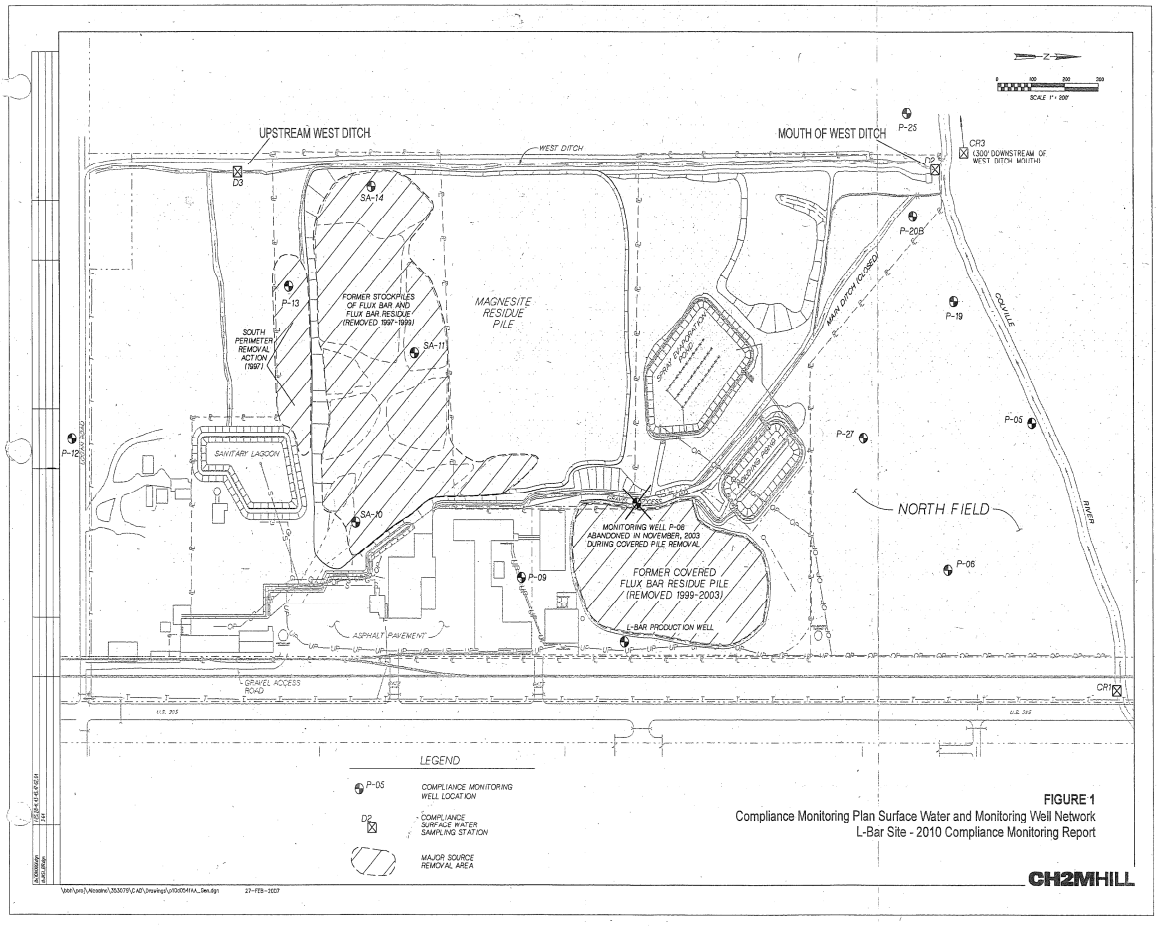


FIGURE 2.2
SITE MAP

2.2 SITE HISTORY

The Site has been associated with magnesium processing since the 1930s. Large quantities of magnesite ore were processed and stockpiled until 1967. In the mid-1970s, the facility was converted to recover magnesium from a magnesium processing byproduct commonly referred to as flux bar (FB). FB was supplied primarily by Northwest Alloys (NWA) from their magnesium plant near Addy, Washington, and sold to the facility owners. The magnesium recovery facility was owned and operated by Phoenix Resources Recovery, Inc. from 1977 to 1986. L-Bar Products, Inc. operated the facility from 1986 to 1991 when it closed down due to insolvency.

The recovery process involved crushing the raw FBs and screening the crushed materials to recover metallic magnesium granules. The remaining material was called flux bar residue (FBR). Magnesium, magnesium oxide, magnesium chloride, potassium chloride, calcium chloride, and lesser amounts of magnesium nitride and magnesium fluoride were the primary constituents of FBs and FBRs. These materials were very reactive with water; the reactions were exothermic and had caused several fires at the Site during the years of the plant's operation. The reaction of magnesium nitride with water released ammonia. The magnesium and potassium chloride salts were highly soluble in water and were easily leached from these materials into ground water. These materials also designated as "state-only dangerous waste" due to fish toxicity.

Ecology issued several Enforcement Orders (Orders) and penalties to L-Bar, for violations of air, water quality, and dangerous waste regulations while the plant was in operation. Some emergency actions and plant rehabilitations were undertaken to address the Orders. However, at the time of the plant's closure, it was estimated that more than 100,000 tons of materials (under the covered pile, on top of the magnesite pile, and in buildings) were left on Site. Past operating practices and inadequate storage of FB and FBR resulted in the leaching of soluble components of the materials into the soil, ground water and surface water.

The formal cleanup process under the authority of MTCA was initiated in 1994. NWA entered into an Agreed Order in 1995 that included provisions for conducting interim actions, a Remedial Investigation (RI), and a Feasibility Study (FS). The RI/FS included further site investigations and sampling, and evaluating cleanup alternatives for the Site. The RI/FS was completed in 1999. Interim actions under this Agreed Order that included removal of FBs and FBRs on top of the magnesite pile and from buildings were performed from 1996 to 1999.

Ecology issued a Draft Cleanup Action Plan (DCAP) in April 2000; after public comment and review, the Final Cleanup Plan (FCAP) was issued in June 2000 as part of Agreed Order No. DE 00TCPER-984 that required implementation of identified cleanup actions. Cleanup actions, including materials removal required under the FCAP, took place from 2000 through 2004. Required compliance monitoring resulting from these actions is still ongoing.

In 2005, NWA sold the L-Bar property to Ernie Smith Trust. NWA continues to have access rights to the property for compliance monitoring.

2.3 PHYSICAL SITE CHARACTERISTICS

2.3.1 Site Geology

The Site is in the center of the Colville River Valley. The uppermost soils underlying the Site represent a mixture of naturally deposited sediments and artificially placed fill as identified in the RI **(1)**. These soil units can be grouped into four lithologically distinct deposits:

- Fill/magnesite residue
- Recent alluvium
- Volcanic ash
- Glaciolacustrine silt and clay.

Fill deposits, predominantly magnesite pile residue, are found in the southern portion of the Site, in the L-Bar plant area, and in areas around the Holding Pond and Evaporation Pond, and along the eastern side of the Main Ditch. Recent alluvial sediments consisting of silty sand, silt, and intermittent organic-rich layers underlie the northern half of the Site (North Field) up to several feet thick. Volcanic ash was frequently encountered in the northern half of the Site at depths ranging from 3 to 6 feet below grade and typically lies atop a glaciolacustrine silt and clay. A very stiff to hard clayey silt up to 10 feet thick underlies the L-Bar Site and represents the upper member of a thick sequence of glaciolacustrine sediments.

2.3.2 Ground Water Hydrology

Ground water at the Site is present in three units:

- Shallow Water Bearing Unit (SWBU) – This is a thin, unconfined, locally discontinuous water-bearing zone, generally 1 to 3 feet thick that maintains a water table at or near land surface under normal seasonal conditions. However, during periods of intermittent drought, these shallow water-bearing zones may be discontinuous or locally absent.
- Intermediate Aquifer – This confined, locally developed water-bearing zone is at a depth of approximately 70 to 80 feet below ground surface and averages about 50 ft thick. This zone is separated by a clay aquiclude from the SWBU. A strong upward vertical gradient exists between this deeper confined aquifer unit and the SWBU.
- Deep Aquifer – This deeper confined, regionally distributed sand and gravel aquifer is encountered at a depth ranging from 190 to 360 feet bgs.

Ground water from either the Intermediate or Deep Aquifer is the primary source of potable drinking water for rural residents and commercial operations in the vicinity of the

L-Bar Site. No known water supply wells are completed within the SWBU in the immediate vicinity of the Site.

Ground water in the SWBU flows in a general northwesterly direction toward the Colville River under an average site-wide hydraulic gradient of 0.003 to 0.005 ft/ft. SWBU flow directions from 2010 compliance monitoring data are shown in Figures 2.3 and 2.4. Groundwater flow in the SWBU in the North Field is slow because of the low permeability of the alluvial sediments (consisting of silty sand, silt, and intermittent organic-rich layer) and volcanic ash in the area.

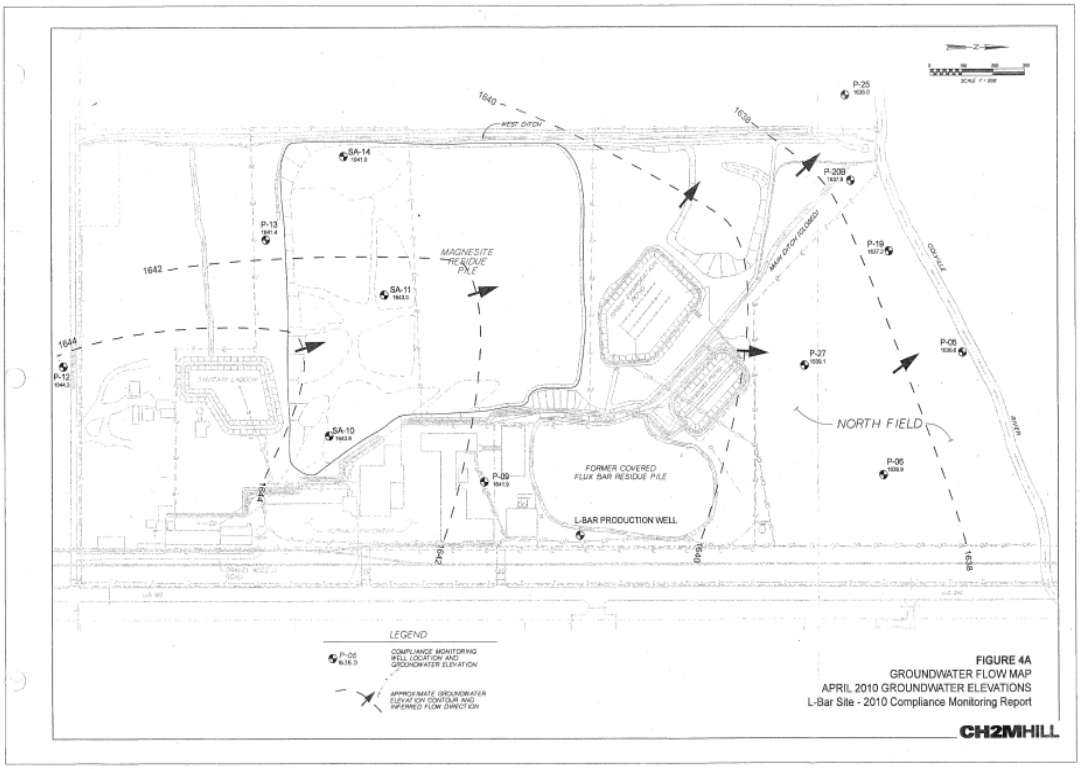


FIGURE 2.3
GROUNDWATER FLOW MAP – APRIL 2010

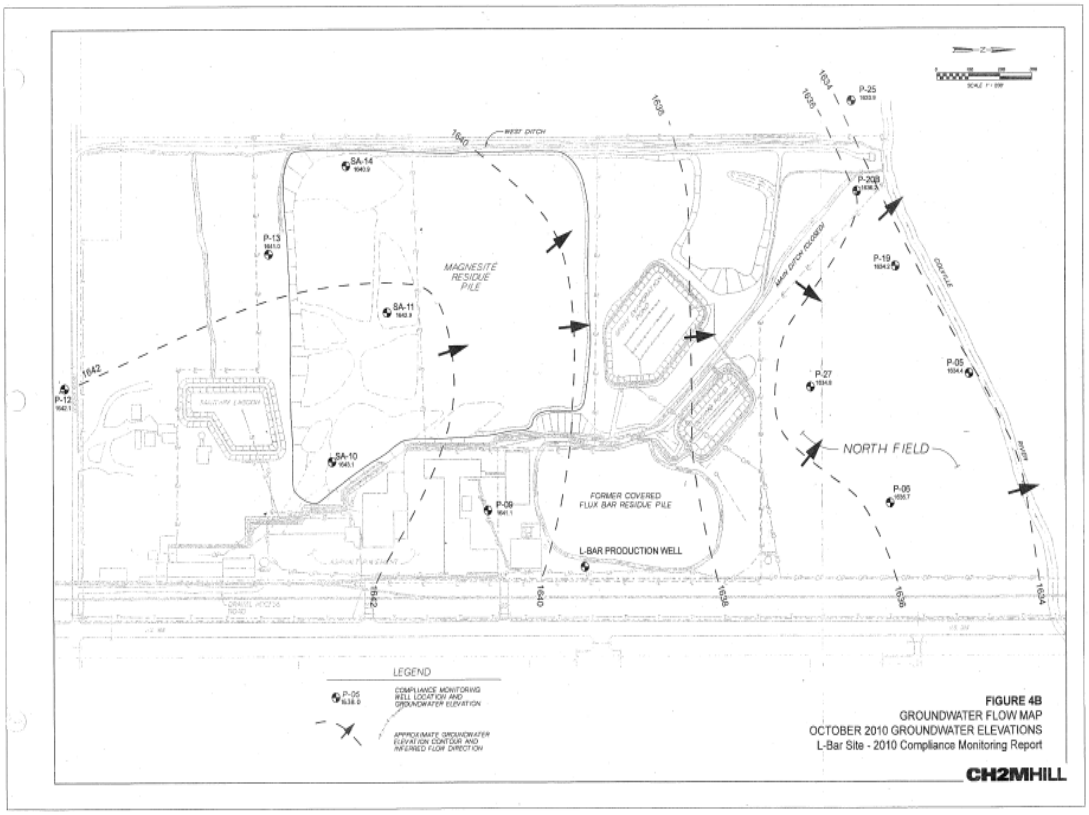


FIGURE 2.4
GROUNDWATER FLOW MAP – OCTOBER 2010

The ambient seasonal groundwater level changes generally range from 3 to 4 feet up to a maximum of about 4.8 feet. Groundwater levels measured during the RI were highest during the month of February and lowest around October. Generally, water levels in the North Field area and the area immediately east of the covered pile showed the greatest water level changes. SWBU water levels in the North Field are very near or at the ground's surface during the wet season. Seasonal flooding of the North Field has occurred over the years.

As shown in Figure 2.4, the groundwater levels and flow directions in the North Field area (near P-06 and P-27) may be influenced by the high evapotranspiration (ET) rates that occur in the summer and early fall. ET reduces infiltration and thus reduces groundwater levels and is believed to be the primary cause for the hydraulic influences observed during the October 2010 event **(5)**.

2.4 NATURE AND EXTENT OF CONTAMINATION

This section describes the nature and extent of contamination as presented in the RI Report **(1)**.

2.4.1 Groundwater

Groundwater contamination, resulting from the FB and FBR, is in the SWBU. No impacts from the FB and FBR were found in the intermediate and deep aquifers.

Based on RI **(1)** data, the following contaminants were identified as indicators (for establishing cleanup requirements) in the FCAP **(6)** for the SWBU:

- Chloride - This was measured in groundwater at a maximum concentration of 45,400 mg/L in the vicinity of the covered pile. The background groundwater chloride concentrations ranged up to 50.8 mg/L. The highest concentrations of chloride were found near the Main Ditch.

- Total Dissolved Solids (TDS) - TDS is a measure of the dissolved mineral content of water that includes carbonates, chlorides, sulfates, nitrates, sodium, potassium, calcium, and magnesium. It was measured in groundwater at a maximum concentration of 68,000 mg/L adjacent to the covered pile. The distribution of TDS in ground water was very similar to the distribution of chloride.

- Ammonia (as nitrogen or N) – Ammonia was detected at concentrations ranging from 0.4 to 1,030 mg/L. The highest concentrations were found near the Main Ditch.

- Nitrate (as N) - Nitrate isocontours presented in the RI Report **(1)** are similar in shape to the ammonia plume. Nitrate concentrations ranged from 0.165 to 40 mg/L. Nitrification of ammonia (the biological oxidation of ammonia into nitrite and then into nitrate) was the primary source of nitrate.

- Nitrite (as N) - This is generally an intermediate product of nitrification of ammonia.

- pH –pH values were highest in or adjacent to the magnesite pile residue.

- Metals: Barium, manganese, selenium, and thallium – Barium and manganese were the metals believed to be related to L-Bar materials.

2.4.2 Magnesite Residue

During the RI, a distinct chloride and/or ammonia leaching front was evident at approximately 7 to 15 feet below the interface between the magnesite residue and the FB material based on field screening results for chloride and ammonia. Trace metal and semi-metal concentrations in the magnesite residue materials below the leaching front were similar to those above the front, indicating that metals were not being leached or remobilized.

2.4.3 Unsaturated Zone Soils

Several unsaturated zone soil samples collected from the North Field and main plant areas contained elevated concentrations of chloride and ammonia. The elevated concentrations in the main plant area were found in areas where source material stockpiling occurred. In the North Field vadose zone soils, elevated levels of chloride and ammonia likely resulted from seasonal saturation of the soils by high ground water generated near the covered pile and/or seepage of the Main Ditch surface water into the SWBU.

Barium, manganese, selenium, and thallium are the soil indicators; barium and manganese are believed to be related to FBs and FBRs.

2.4.4 Surface Water

- Main Ditch: Chloride, ammonia, and TDS concentrations were highest at the headwaters of the Main Ditch and near the covered FBR pile.

- West Ditch: Chloride and ammonia concentrations were highest south of the magnesite pile where FB and FBRs materials were placed. These materials were removed in 1997 together with those from the top of the magnesite pile.

- Colville River: A slight increase from upstream to downstream concentrations was observed routinely for chloride and ammonia; however, none of the concentrations exceeded the surface water criteria.

2.5 INTERIM ACTIONS

Agreed Order No. 94TC-E104 provided for interim actions that would address water management and removal of on-site materials. An interim action involving the removal and off-site disposal of materials that were piled around and on top of the magnesite residue pile started in 1997 and was completed in 1999. These materials were characterized as “special wastes” or solid wastes under WAC 173-303, Dangerous Waste Regulations. The materials on top of the pile totaling 68,000 tons were removed, transported by railcars, and disposed of at a permitted landfill in Oregon.

3.0 CLEANUP ACTION PLAN (CAP)

Ecology issued the Final Cleanup Action Plan in June 2000 at the same time that NWA entered into an Agreed Order with Ecology to implement the identified cleanup actions.

3.1 REMEDIAL ACTION GOALS

The remedial action goals for the Site are the following:

- Protect beneficial uses of the Colville River;
- Reduce concentrations of contaminants in soil, SWBU, and ditches to identified cleanup levels at the designated points of compliance; and,
- Prevent or minimize leaching of contaminants from materials to environment.

3.2 CLEANUP STANDARDS

The two primary components of cleanup standards are (1) cleanup levels, and (2) points of compliance.

3.2.1 Cleanup Levels

Cleanup levels determine the concentration in which a particular hazardous substance does not threaten human health or the environment. Site cleanup levels were developed as follows:

- Groundwater: Method B cleanup levels were based on protection of drinking water, surface water, and irrigation water.
- Soils: Method C- Commercial cleanup levels were used for direct contact. Soil cleanup levels that are protective of groundwater were established at 100 times the groundwater cleanup.
- Surface Water:
  - West Ditch – Method B cleanup levels protective of drinking water, surface water, and irrigation (since this ditch discharges to the Colville River) were used.
  - Main Ditch – The Main Ditch did not discharge to the River. Method C cleanup levels for groundwater were used. This ditch was covered and closed in 2004; cleanup levels for this water conveyance are no longer applicable.
- Sediments
  - West Ditch - Cleanup levels were based on Method C Commercial for Soils, Protection of Ditch Water, and the FSQV (Freshwater Sediment Quality Values) in Washington State, July 1997.
  - Main Ditch – No cleanup levels were set as there were no indicators.

The following Table lists the cleanup levels that are currently applicable to the Site. Cleanup levels set for the Main Ditch are no longer applicable.

TABLE 3.1
SITE CLEANUP LEVELS (CULs)

INDICATOR	**CLEANUP LEVELS (CULs)**							
	GW, mg/L (except for pH)		SOIL, mg/Kg		WEST DITCH			
					SW, mg/L		SEDIMENTS, mg/Kg	
		Basis		Basis		Basis		Basis
Major Anions								
Chloride (Cl)	230	AWQC	23000	Protection of GW	230	AWQC		
Conventionals								
Ammonia	0.13	WAC 173-201A	13	Protection of GW	0.13	WAC 173-201A	13	Protection of SW
Nitrate	10	MCL, AWQC						
Nitrite	1	MCL						
pH	8.5 units	SMCL, AWQC						
TDS	1092	Background			500 (250 Cl)	SMCL and irrigation		
Trace Metals								
Barium	1	AWQC	100	Protection of GW				
Manganese	0.44	Background	44	Protection of GW				
Selenium	0.0082	Background	0.82	Protection of GW				
Thallium	0.00112	Method B formula	0.112	Protection of GW				

Note: GW – ground water, SF – Surface Water, AWQC – Ambient Water Quality Criteria, TDS- Total Dissolved Solids, MCL – Maximum Contaminant Lever, SMCL- Secondary Maximum Contaminant Level

3.2.2 Points of Compliance

For ground water, the point of compliance is throughout the Site. For this Site, where the affected groundwater flows into the Colville River, a conditional point of compliance that is located within the surface water as close as technically possible to the point or points where groundwater flows into surface water may be approved under the requirements listed in WAC 173-340-720(6)(d).

For soil, the point of compliance is throughout the Site.

The point of compliance for the West Ditch shall be at the point of discharge to the Colville River. For sediments in the West Ditch, the point of compliance is everywhere in the ditch.

3.3 SITE CLEANUP ACTION

The Site's selected cleanup actions identified in the final CAP include the following:

- Removal and off-site disposal of source materials in the covered pile that continue to leach contaminants to groundwater.
- Monitoring of ground water to demonstrate compliance with cleanup levels.
- Institutional Controls to set restrictions to the Site to maintain the integrity of cleanup actions undertaken.

4.0 SUMMARY OF CLEANUP ACTIONS

4.1 MATERIALS REMOVAL AND OFF-SITE DISPOSAL

Materials removal actions completed at the Site include the following:

- Interim action source removal activities began in June 1997, and focused on the characterization and removal of FB and FBR materials that were stockpiled atop and around portions of a 17-acre waste material pile referred to as the magnesite residue pile. Approximately 68,000 tons of weathered FB and FBR material were removed from the top and sides of the magnesite residue pile and disposed at an Ecology-approved solid waste disposal facility (Columbia Ridge Landfill, Arlington, Oregon) between May 1997 and December 1999.

- Full-scale source removal activities involving the Covered Pile and FB/FBR materials in plant buildings were conducted between 2000 and 2004. Over 133,000 tons of FB-related materials were excavated or removed and disposed off at an Ecology-approved waste disposal facility. The amount of source material removed from the covered pile area between July 2000 and December 2003 was approximately 129,000 tons. Clean, granular fill material was placed into the footprint of the former Covered Pile area following the excavation and removal of the source materials.

4.2 ADDITIONAL ACTIONS

- West Ditch: The West Ditch continues to discharge to the Colville River. This discharge was required to meet all substantive requirements of a NPDES Permit until June 2006.

- Closure of Main Ditch: During the summer of 2003, the Main Ditch was filled with clean, granular fill material, and graded to tie in with the existing grades along the perimeter of the ditch.

4.3 INSTITUTIONAL CONTROLS

A Restrictive Covenant for the L-Bar properties was recorded in 2001 which specifies limitations that include land use, land activities, groundwater use, notice of intent to convey interest in the property, and removal of limitations. A copy of this Restrictive Covenant is included as Appendix A.

4.4 COMPLIANCE MONITORING

Beginning in November 2000, routine ground water and surface water monitoring transitioned to compliance monitoring under the L-Bar Material Removal and Compliance Monitoring Work Plan (CH2M Hill, 2001a). Compliance monitoring well and surface water sampling locations, as of 2010, are shown in the following Figure 4.1:

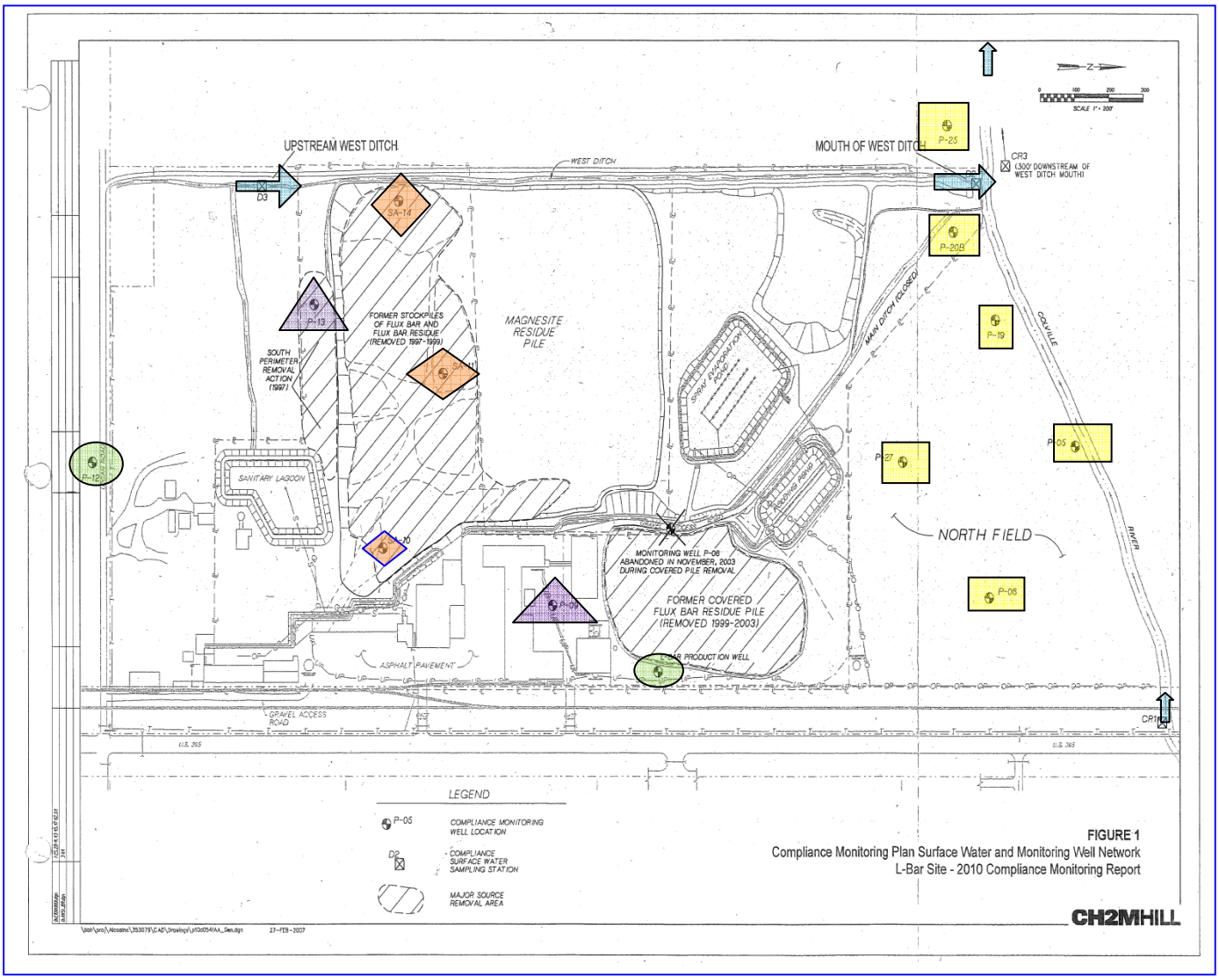


FIGURE 4.1
COMPLIANCE MONITORING WELL AND SURFACE WATER NETWORK

North Field Wells

Magnesite Residue Pile Wells

Plant Interior Wells

Background Wells

Surface Water Sampling Location

4.4.1 Groundwater Compliance Monitoring

Since November 2000, groundwater samples for performance compliance monitoring have been collected semiannually from 13 monitoring wells (see Figure 4-1) for the Site indicators. Compliance monitoring wells are grouped as follows:

Site Background: P-12 and Production Well (PW)
Site Interior: P-09 and P13
Magnesite Residue Pile: SA-10, SA-11, SA-14
North of Site: P-05, P-06, P-19, P-20B, P-25, and P-27

Up to 2006, North of Site Wells P-05, P-19, and P-20B were also monitored twice per season (one year was divided into 3 seasons) for compliance with the NPDES Substantive Requirements as discussed below.

4.4.2 Surface Water Compliance Monitoring

Beginning in 2000, in addition to surface water performance compliance monitoring, monitoring of surface water was also conducted for compliance with the NPDES Substantive Requirements discharge limits and for final ammonia discharge limits modeling/evaluation. Surface water samples were collected twice per month along several locations in the Colville River and in the West Ditch. In order to estimate ground water flux to the river, groundwater sampling was also conducted twice per season (one year was divided into 3 seasons) in P05, P-19, and P-20B. In June 2006, Ecology conducted an evaluation of the surface water collected to determine the need to modify the NPDES substantive permit requirements identified for the West Ditch discharge [Ecology, Surface Water Data Review, L-Bar Site, June 28, 2006 **(7)]**. The data indicated that there was no future potential for the ammonia and chloride in the West Ditch discharge to exceed surface water quality standards in the Colville River. As a result, NPDES substantive requirements monitoring were terminated in June 2006.

The following locations remain for surface water performance compliance monitoring:

Station D2 – mouth of the West Ditch (discharge to the River)
Station D3 – upstream in the West Ditch
Station CR1 – Colville River at the Hwy 395 Bridge (Upstream of D2)
Station CR3 - Colville River, about 300 feet downstream from D2

Surface water cleanup levels were not set for the Colville River; Stations CR1 and CR3 serve to provide supporting data on whether water quality criteria are being exceeded in the river.

5.0 COMPLIANCE MONITORING DATA REVIEW

This section evaluates groundwater and surface water data collected from April 2004 (right after completion of materials removal activities at the Site) through October 2010. Appendix B provides a summary of the data.

5.1 GROUNDWATER

The indicators for ground water identified in the CAP are: Chloride, Ammonia-N, Nitrate-N, Nitrite-N, pH, TDS, barium, manganese, selenium, and thallium. Selenium and thallium are not related to the FB/FBRs but are possibly related to the magnesite pile. The data analyses that follow are only for the indicators that are related to the FB and FBR. This will provide an assessment on the performance of the removal actions undertaken at the Site.

Thus, selenium and thallium are not included in the data analysis. Data provided in Appendix B show that Selenium was detected in ground water above the cleanup levels but at low concentrations in the magnesite pile wells. Thallium concentrations were all non-detects; however, the Method Detection Limit (MDL) used in all the analysis were above two times the cleanup level identified in the final CAP. (Note: For nondetects, the concentrations are assumed to be ½ of the MDL for compliance evaluation). Thus, it is not possible to do an assessment of compliance with the cleanup level with the data available.

The discussions that follow for each of the monitoring areas will include the following:

- A table showing maximum and minimum concentrations for indicators that exceed the cleanup level. (Blank entries in tables stand for 'no exceedances'.)
- Concentration-time charts showing seasonal variations and observed trends.
- Comparisons with cleanup levels.
- Discussions of contaminant trends mostly based on trendlines from the concentration-time charts.

Background Wells (P-12 and PW)

Concentrations of the indicators are below the cleanup levels. A summary of the ground water concentrations in the background wells is found in Appendix B. Chloride concentrations range from 2.1 to 4.9 mg/L in P-12 and 0.5 to 1.9 in the Production Well (PW). Ammonia, nitrate, nitrite, manganese, and selenium concentrations are all or mostly nondetects in these two background wells; the few detected concentrations are very low. Because cleanup levels are not being exceeded in these background wells, no maximum-minimum concentration tables and concentration-time charts are included for this area.

Interior Wells (P-09 and P-13)

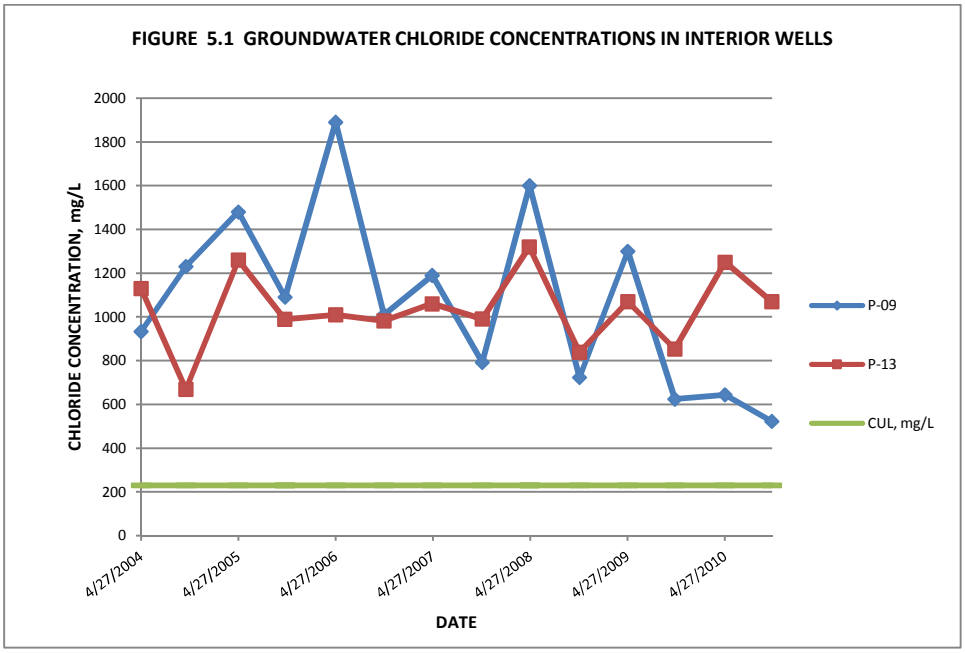
The following table shows maximum and minimum concentrations of the FB/FBRs related indicators that exceeded groundwater cleanup levels in the interior wells.

Table 5.1
Indicators Exceeding Groundwater CULs in Interior Wells

Indicator	Chloride		Ammonia		TDS		Manganese	
CUL, mg/L	230		0.13		1092.4		0.44	
Well	Max	Min	Max	Min	Max	Min	Max	Min
P-09	1890	522	7.7	0.022	3860	1410	2.68	0.261
P-13	1320	669	66.2	33.4	5340	3970	3.12	2.19

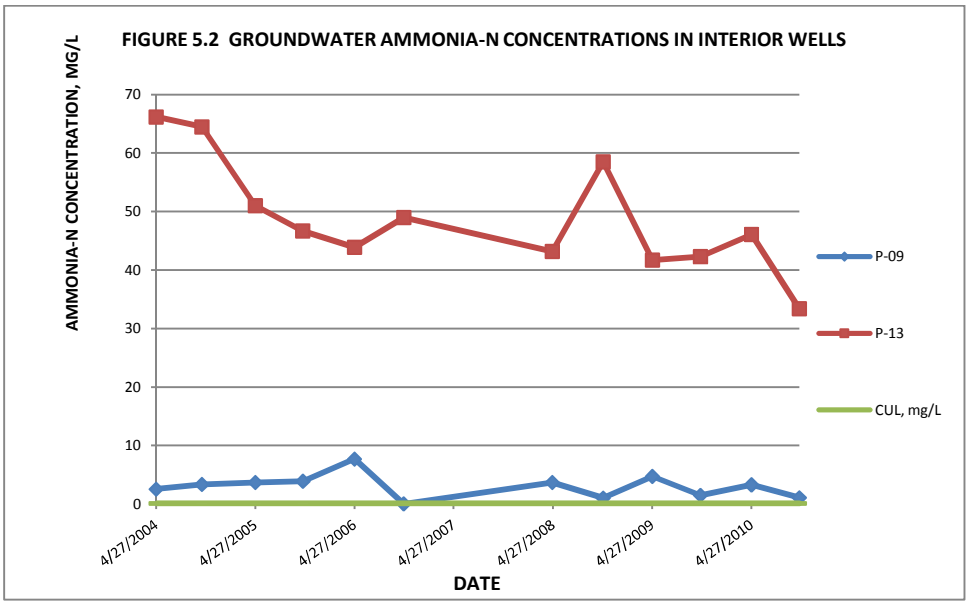
The following are concentration-time charts and data assessment for the indicators shown in the above table.

Chloride



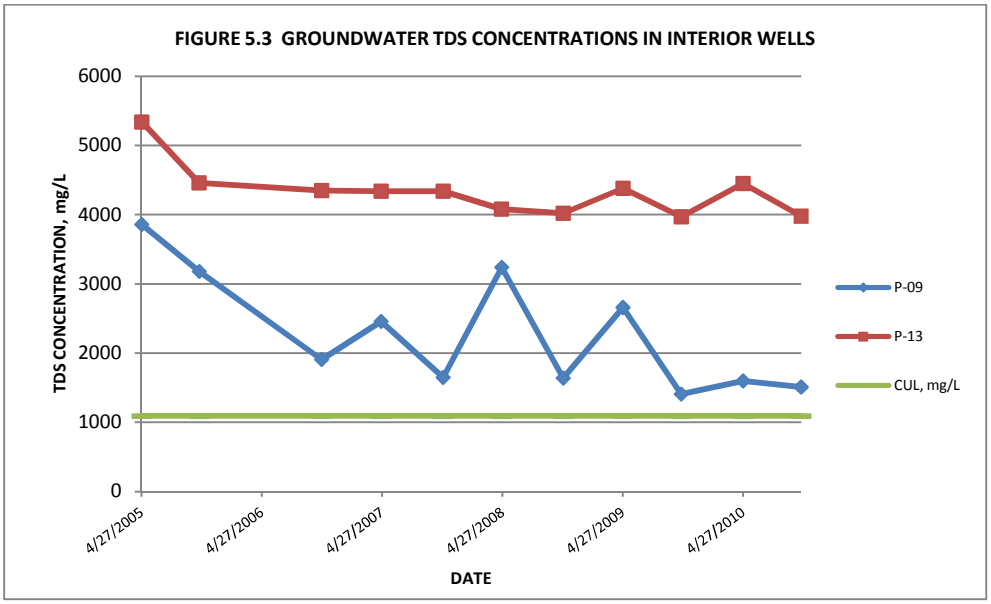
- Concentrations of chloride are above the cleanup level in both interior wells.
- In P-09, concentrations are showing a decreasing trend. This decrease is a result of the cleanup of the plant areas and possibly the removal of materials from the buildings.
- In P-13, concentrations do not show a significant trend. This well is located immediately south of the magnesite pile. Concentrations in this well significantly decreased after the removal of materials from the immediate area south of the magnesite pile from 1997 through 1999; however, since 2004, concentrations appear to have not changed much.

Ammonia



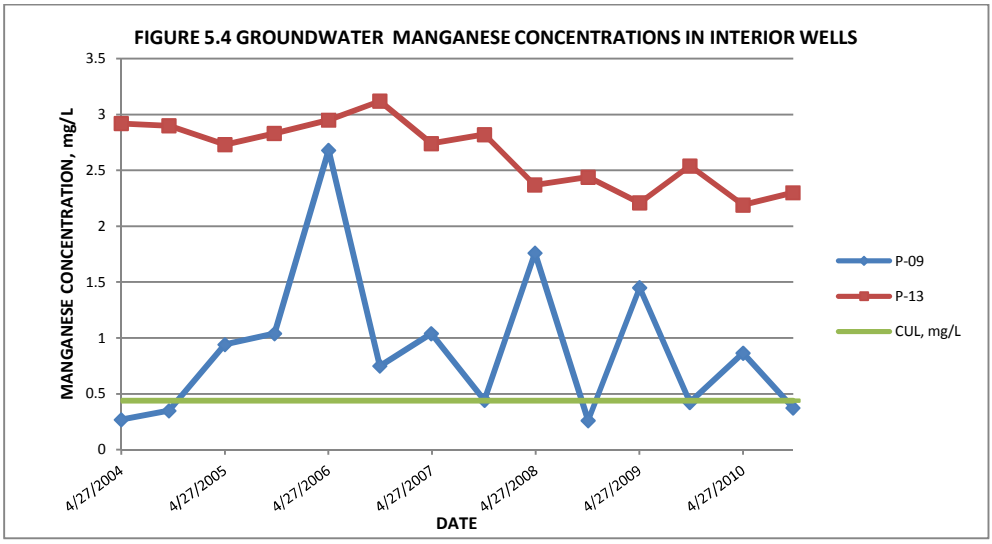
- Ammonia concentrations in P-13 are much higher than in P-09 and are showing a decreasing trend.
- No significant ammonia concentration trend is observed in P-09.

TDS



- TDS concentrations in both wells are above cleanup levels but show decreasing trends.

Manganese



- Manganese concentrations are much higher in P-13 but exhibit a decreasing trend.
- Manganese concentrations in P-09, after exhibiting increases from 2004 to 2005 appear to be decreasing since 2006.

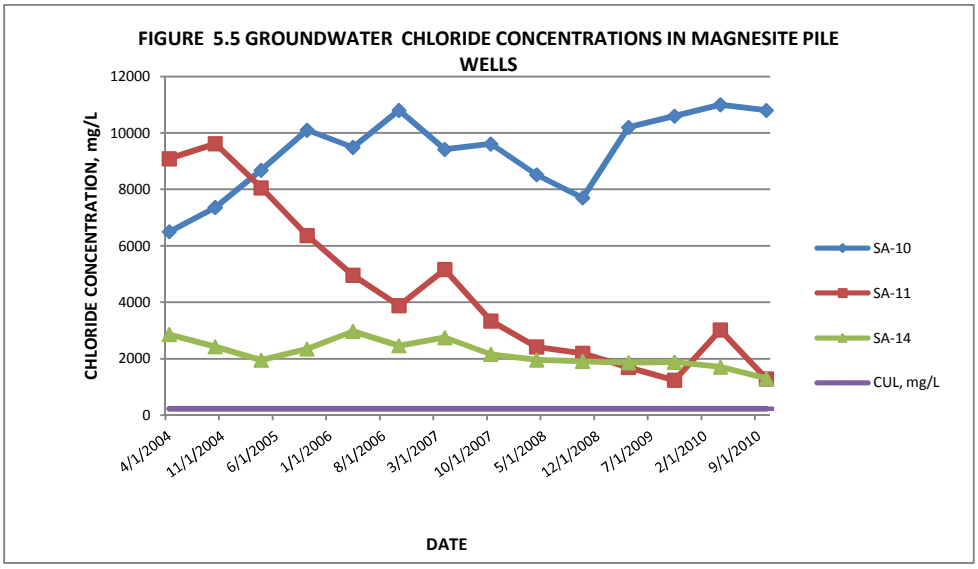
Magnesite Pile Wells (SA10, SA11, SA14)

Indicators exceeding the cleanup levels in the magnesite pile wells are shown in the table below.

Table 5.2
Indicators Exceeding Groundwater CULs in Magnesite Pile Wells

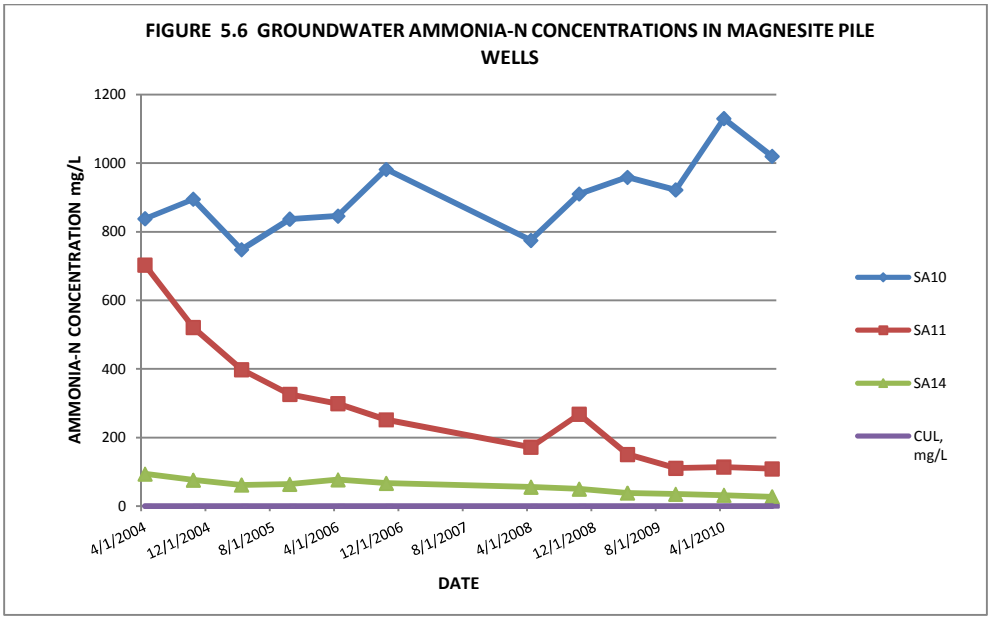
Indicator	Chloride		Ammonia-N		pH		TDS		Manganese	
CUL, mg/L	230		0.13		8.5		1092.4		0.44	
Well	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
SA-10	11000	6500	1130	748			37200	28700	7.91	1.86
SA-11	9620	1240	703	109	9.38	6.55	22600	6300		
SA-14	2970	1300	94	27.4	10.08	6.3	8340	4430		

Chloride



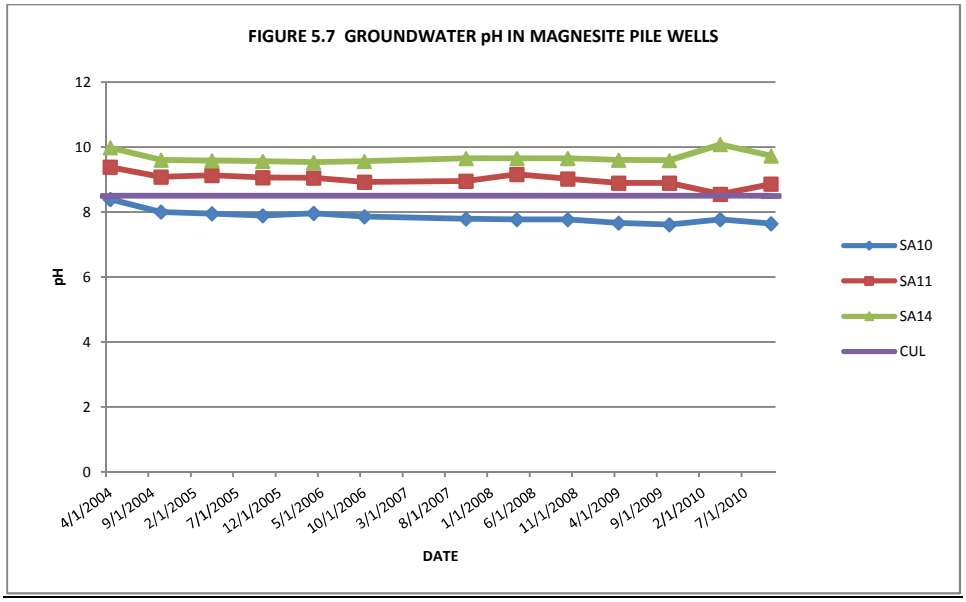
- Chloride concentrations show a significant decrease in SA-11 and a slightly decreasing trend in SA-14. The decreases in SA-11 and SA-14 are a result of the removal of materials from the top of the magnesite pile. Concentrations in SA-10 are increasing despite the removal of FB/FBR materials from the top of the magnesite pile.

Ammonia



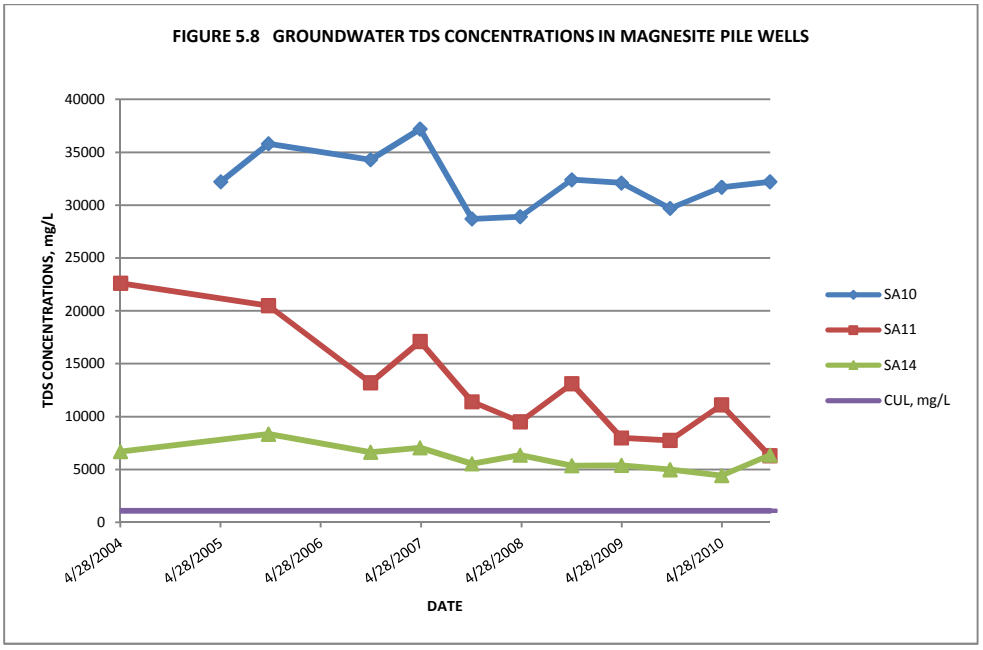
- Ammonia concentration trends behave exactly the same as the chlorides. Concentrations have decreased significantly in SA-11 and slightly decreased in SA-14 but are increasing in SA-10.

pH



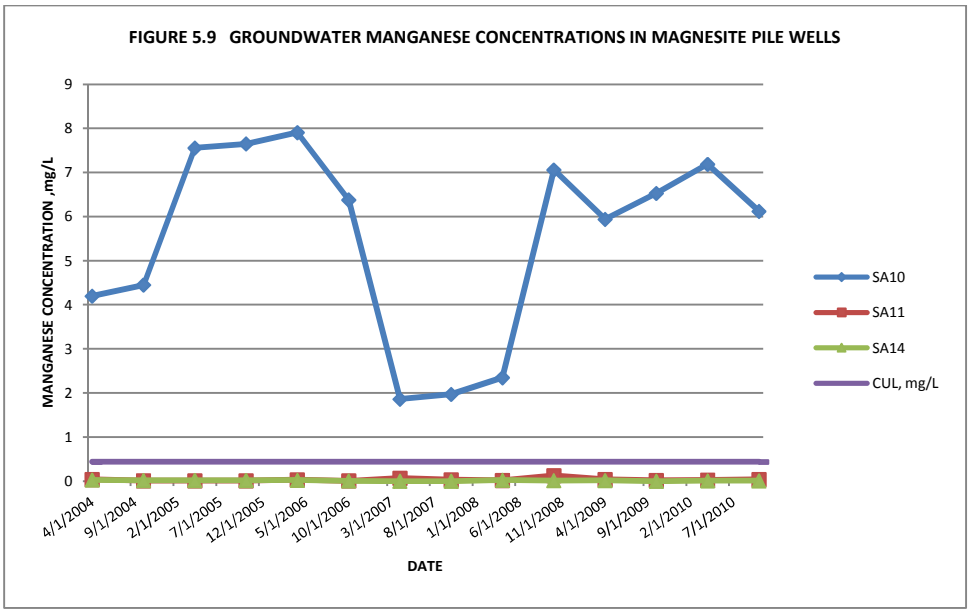
- pH cleanup levels are being exceeded in SA-11 and SA-14. pH results are below the cleanup level in SA-10. No significant trends are observed.

TDS



- TDS concentrations are above the cleanup level in all wells and behave almost like the chloride and ammonia trends.
- TDS concentrations are decreasing in SA-11, and slightly decreasing in SA-10 and SA-14.

Manganese



- Manganese concentrations exceed the cleanup level only in SA-10. Concentrations in SA-11 and SA-14 are all below the cleanup level. No observable trend is clear for the manganese concentrations.

North Field Wells (P-05, P-06, P-19, P-20B, P-25, P-27)

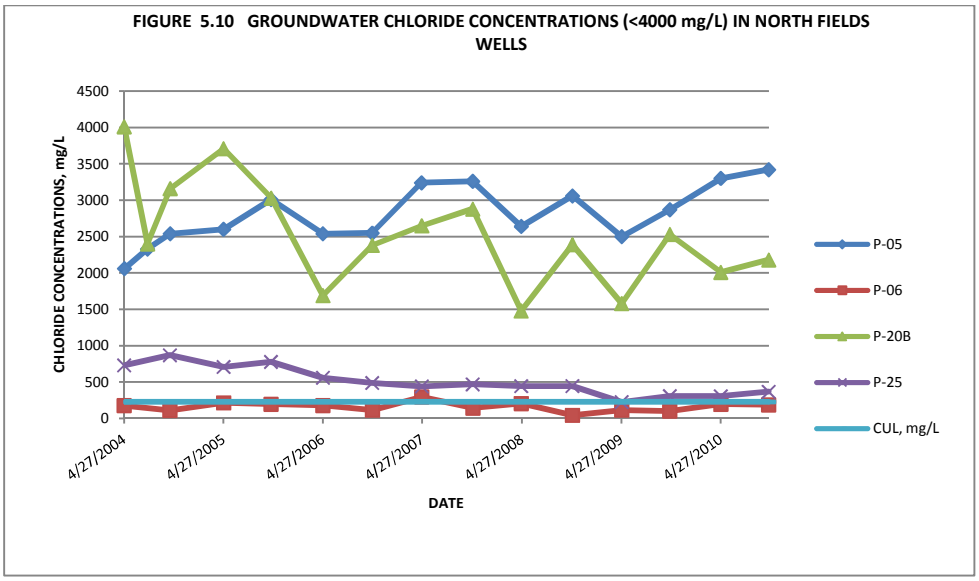
The table below shows where cleanup levels of the indicators were exceeded in the North Field.

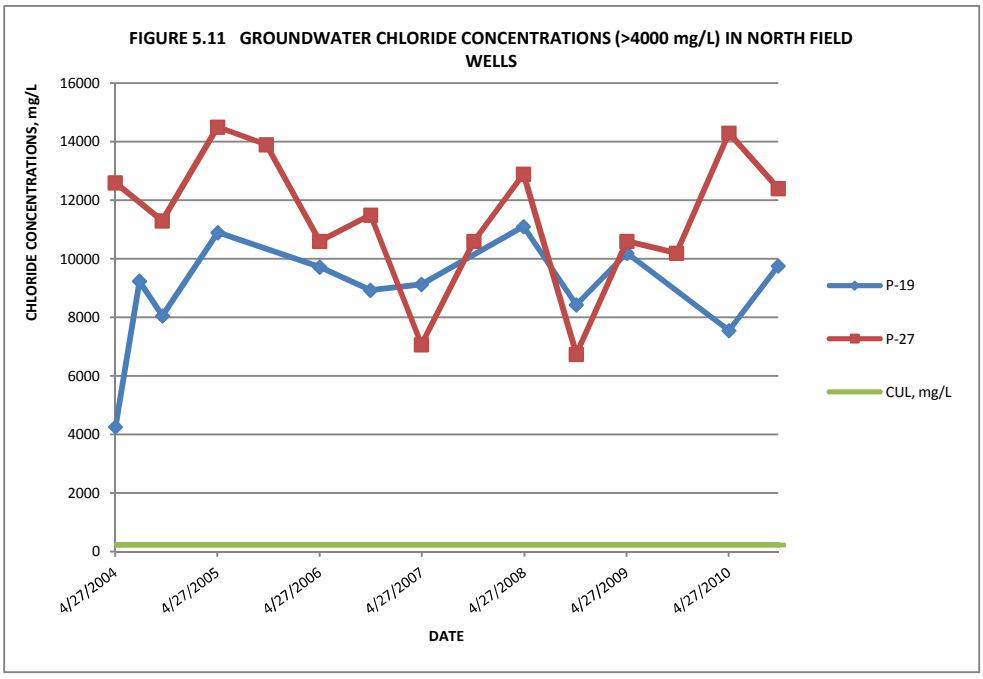
Table 5.3
Indicators Exceeding Groundwater CULs in North Field Wells

Indicator	Chloride		Ammonia-N		Nitrate-N		TDS		Barium		Manganese	
CUL, mg/L	230		0.13		10		1092.4		1		0.44	
Well	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
P-05	3420	2060	0.137	.05U			19200	4580			3.3	0.172
P-06	296	44.6	0.883	0.05							2.64	0.377
P-19	11100	4260	1.27	0.05U			22500	13800			4.99	1.09
P-20B	4010	1480	67	7.84	47.4	9.36	9340	3920			3.05	0.0692
P-25	870	227	0.88	0.43			2610	1700			13.1	6.75
P-27	14500	6740			37.8	1	35000	15800	5.51	2.47		

Chloride

The two concentration-time graphs (one for <4000 mg/L concentrations and one for higher concentrations) are shown below.





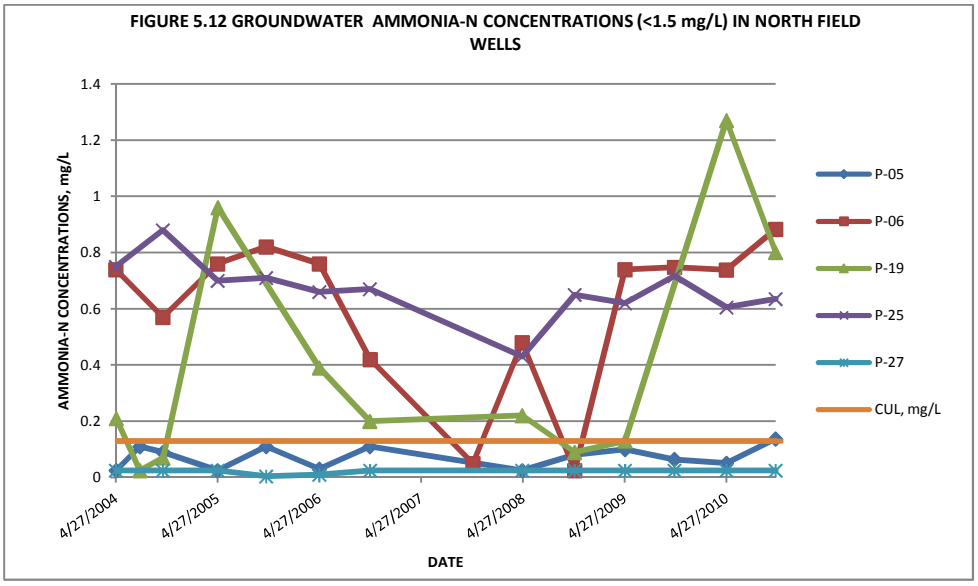
- Concentrations are high in P-27 and P-19. Concentrations are highest in P-27 and show a wide range of variability. Chloride concentrations in P-19 increased after 2004 and have since then not shown any significant change.

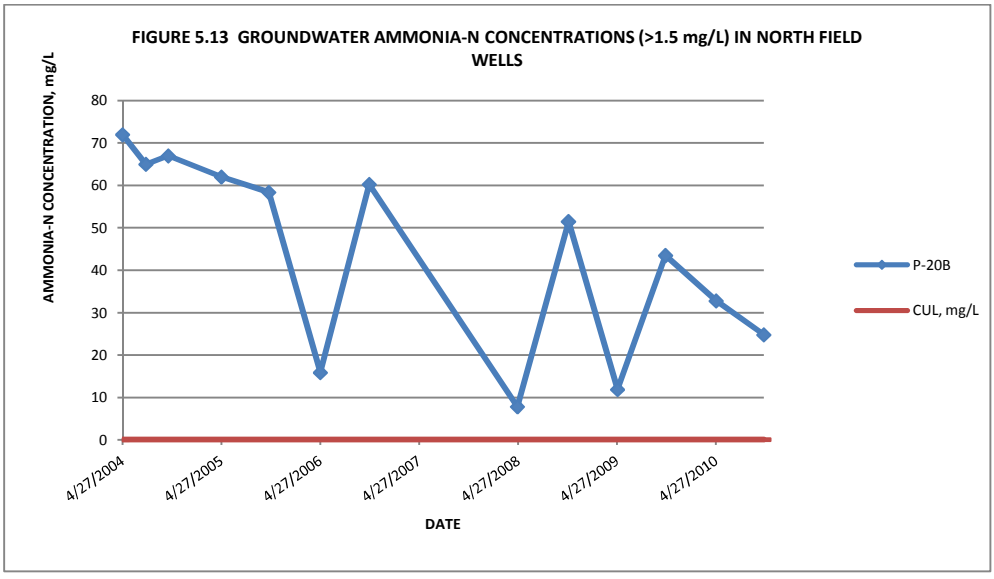
- Chloride concentrations in P-06 are mostly below the cleanup level; only one concentration at 296 mg/L exceeded the cleanup level of 230 mg/L in April 2007 and concentrations have been below the cleanup level up to 2010.

- Concentrations in P-05 exceed the cleanup level and are showing an increasing trend.

- Chloride concentrations are decreasing in P-20B and P-25.

Ammonia





- Ammonia concentrations exceed the cleanup level in P-06, P-19, and P-20B, and P-25. The highest concentrations are in P-20B.

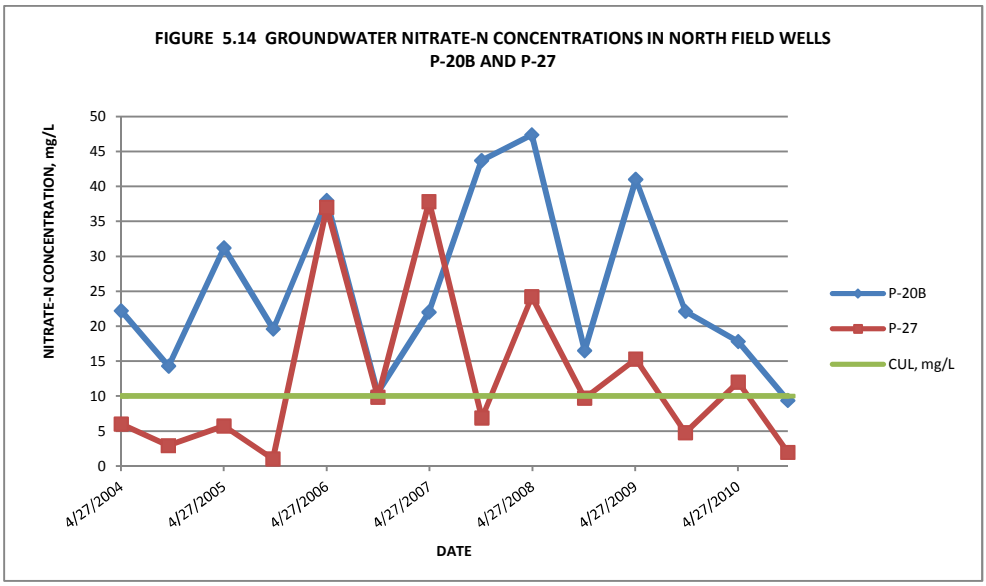
- Concentrations in P-20 B and P-25 have been decreasing since 2004.

- Since 2004, ammonia concentrations in P-05 were below the cleanup level except for a slight exceedance measured as 0.137 mg/L in October 2010. The data do not show a significant trend for this assessment period.

- Ammonia concentrations in P-06 and P-19 show a wide range of variability.

- Ammonia concentrations in P-27 were mostly nondetects. This well has the highest chloride concentrations. Thus, it appears ammonia in this location seems to be undergoing nitrification as evidenced by the elevated concentrations of nitrate in this well compared to some of the other wells (except for the highest nitrate concentrations in P-20B).

Nitrate

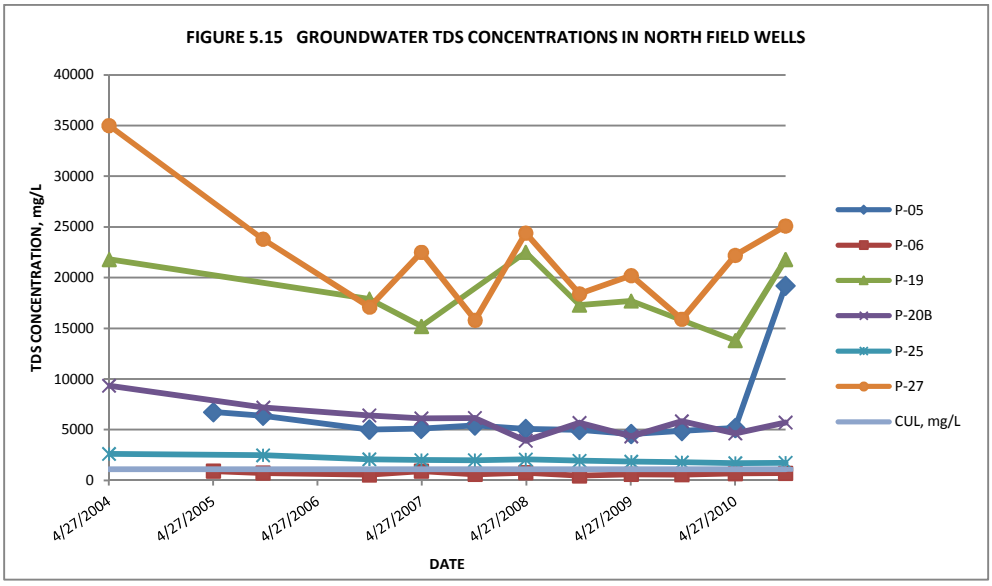


- Nitrate exceeded cleanup levels in P-20B and P-27.

- Ammonia concentrations are highest in P-20B; the high nitrate concentrations in this well are a result of nitrification of the ammonia. Nitrate concentrations are decreasing since 2008.

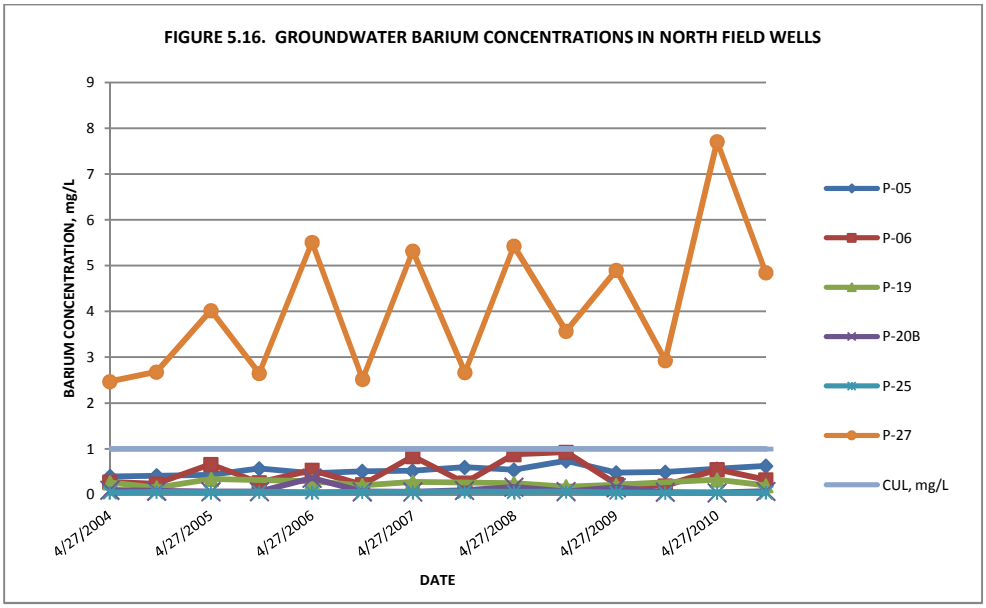
- P-27 nitrate concentrations increased after 2005 but have started to decrease since 2007. Ammonia concentrations in P-27 are mostly nondetects; the elevated nitrate in this well is showing the nitrification of ammonia in this well.

TDS



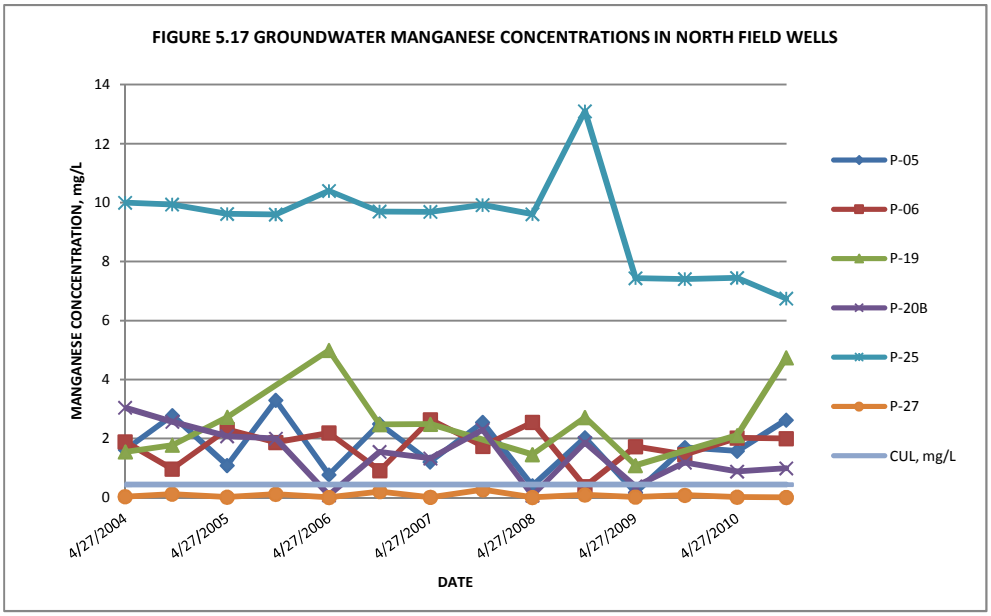
- Like chloride the highest concentrations are in P-27 and followed by those in P-19.
- TDS in P-06 are below the cleanup levels.
- TDS concentrations in most wells show a decreasing trend until 2010 when increasing concentrations are observed.

Barium



- Barium concentrations exceed the cleanup level only in P-27 and exhibit an increasing trend. Concentrations of barium in all other wells are below the cleanup level.

Manganese



- Manganese concentrations are highest in P-25 but show a decreasing trend.

- Manganese concentrations exceed the cleanup level in all North Field wells except in P-27. The concentrations in the well exhibit a decreasing or slightly decreasing trend in these wells.

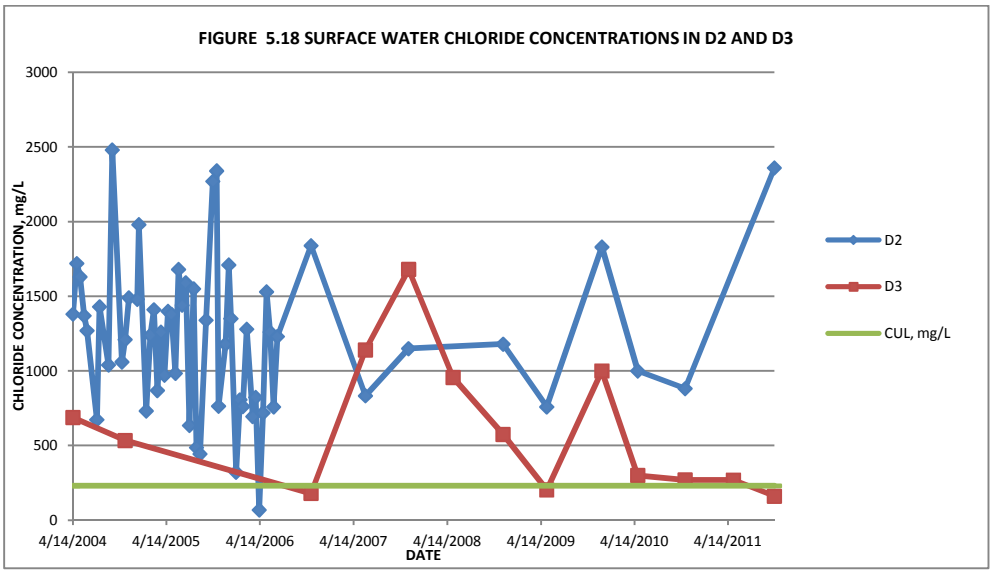
- Manganese concentrations are below the cleanup level in P-27. It is noted that this is the only well where barium exceeds the cleanup level.

5.2 SURFACE WATER

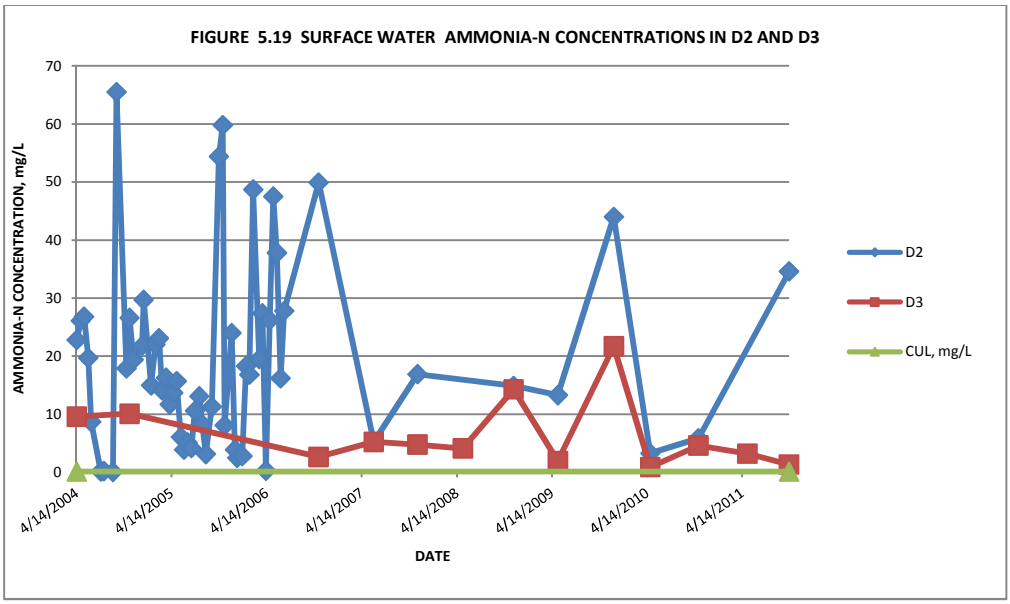
Table 5.4
Indicators Exceeding Surface Water CULs in D2 and D3

	Chloride		Ammonia-N	
CUL, mg/L	230		0.13	
Location	Max	Min	Max	Min
D2	2480	69.1	65.5	0.07
D3	1680	161	21.7	0.91

Chloride



- Chloride concentrations in D3 are decreasing. Concentrations in D2 are not showing any trend.



- Ammonia concentrations show an overall decreasing trend in D2 although the concentrations are increasing since 2010. Concentrations in D3 are much lower than in D2 but have not shown a significant trend.

5.3 OTHER DATA REVIEW

NWA conducted independent data evaluations in the following reports:

- CH2M Hill, L-Bar Site Compliance Monitoring and Evaluation Report 1996-2006, September 2007.
- CH2M Hill, L-Bar Site Compliance Monitoring and Evaluation Report 1996-2010, September 2011 **(5)**.

The September 2011 Report **(5)** recommended the following:

- Supplemental site characterization that may consist of an electromagnetic (EM) terrain conductivity survey to determine if residual FB/FBR materials can be identified within the magnesite pile. Results from the EM survey would be used to determine if supplemental source removal actions are needed.

- Continued monitoring and reporting with proposed changes to sampling frequencies for Nitrate (as N), Nitrite (as N), Barium, Manganese, Selenium, and Thallium from semi-annual every year to semi-annual every five years.

6.0 PERIODIC REVIEW

WAC 173-340-420(2) requires that:

"When evaluating whether human health and the environment are being protected during periodic review, the factors the department shall consider include:

(a) The effectiveness of ongoing or completed cleanup actions;
(b) New scientific information for individual hazardous substances or mixtures present at the site;
(c) New applicable state and federal laws for hazardous substances of mixtures present at the site;
(d) Current and projected site use;
(e) Availability and practicability of higher preference technologies; and
(f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

The department shall publish a notice of all periodic reviews in the site register and provide an opportunity for public comment."

6.1 EFFECTIVENESS OF COMPLETED CLEANUP ACTIONS

The completed cleanup actions were primarily removal of materials from atop the magnesite pile and the covered pile. This action has resulted in the following:

- Interior Wells P-09, P-13: Although chloride, ammonia, TDS, and manganese continued to exceed cleanup levels in the interior wells, these indicators showed a decreasing or slightly decreasing trend in P-09 and P-13. These decreases in P-09 resulted from the cleanup of the plant areas and removal of materials from the buildings and magnesite pile. Slight decreases in P-13 may be attributed to the removal of FB/FBR materials from the magnesite pile and surrounding adjacent areas.

- Magnesite Pile Wells SA-10, SA-11, SA-14: Exceedances to cleanup levels were observed for the following indicators in these wells: chloride, ammonia, pH, TDS, Manganese, and Selenium. The removal of the materials atop of the magnesite pile resulted in the decreasing concentrations of chloride, ammonia, and TDS SA-11 and SA14. However, concentrations of chloride, ammonia, and TDS are increasing in SA-10. It may be possible that FB/FBRs are still present in the area near SA-10.

- North Field Wells: Chloride, ammonia, and TDS concentrations in P-20B and P-25 were decreasing. For wells east of the Main Ditch in the North Field, no significant trends were observed for the indicators except for increasing chloride and barium concentrations in P-05. Elevated chloride concentrations were observed in P-27 and P-19. Elevated ammonia concentrations were observed in P-20B but exhibited a decreasing trend. Manganese concentrations in the North

Field wells that exceed cleanup levels exhibited a deceasing trend. It is possible that the observed "increasing" or "no" trends of indicators in the North Field were results of delayed effects of disturbances that occurred during the removal activities of the covered pile. These delayed effects were due to the slow groundwater flow rate within the low permeability soils the SWBU in the area as discussed in Section 2.3.2. Concentrations of indicators should start to decrease once these delayed effects are attenuated.

- Surface Water: Decreasing chloride and ammonia concentrations in D3 are a result of the materials removal from the magnesite pile. However, no clear trends for these indicators are observed in D2.

Thus, except for the area around SA-10, the removal of the FB/FBRs from the top of the magnesite pile has contributed to improving water quality to the magnesite pile area, the interior wells area and the west ditch. Although cleanup levels still exceed in some wells, these levels are expected to decrease over time. Additional Site investigation efforts may be needed to better understand the increasing concentration levels in the vicinity of SA-10.

The effect of the removal of the covered pile have shown mixed results so far in the North Field mainly because of delayed effects of the removal activities that are still being observed. It is expected that concentrations in the North Field will start to show decreasing trends in the future.

The CAP anticipates a restoration time frame of 20 to 30 years. This projected restoration time frame appears to be achievable if groundwater concentrations that exceed the cleanup levels will start to exhibit decreasing trends in the near future.

6.2 NEW SCIENTIFIC INFORMATION FOR INDIVIDUAL HAZARDOUS SUBSTANCES OR MIXTURES PRESENT AT THE SITE

There is (are) no new pertinent scientific information for the contaminants related to the Site.

6.3 NEW APPLICABLE STATE AND FEDERAL LAWS FOR HAZARDOUS SUBSTANCES PRESENT AT THE SITE

MTCA cleanup levels for the indicators have not changed since remedial actions were completed at the Site in 2004.

6.4 CURRENT AND PROJECTED SITE USE

The Site is used only for commercial or industrial use except for one parcel of land that is used for agricultural purposes. There is no projected change in the future use of the Site. Should the Site be purchased and developed, the limitations in the Restrictive Covenants

(Exhibit A) will prevent a use of the property that may expose hazardous materials remaining at the Site.

6.5 AVAILABILITY AND PRACTICABILITY OF HIGHER PREFERENCE TECHNOLOGIES

The remedy implemented was already of high preference.

6.6 AVAILABILITY OF IMPROVED ANALYTICAL TECHNIQUES TO EVALUATE COMPLIANCE WITH CLEANUP LEVELS

The analytical techniques used in the analysis for the Site indicators, except for thallium, are adequate for compliance with cleanup levels assessment. The MDL used for thallium needs to be lowered so compliance with the cleanup level can be assessed in the future.

7.0 CONCLUSIONS

- Site cleanup levels have not been met although some improvements to groundwater and surface water quality have been shown. Chloride, ammonia, and TDS concentrations are still quite elevated compared to their cleanup levels.

- Concentration increases in magnesite pile well SA-10 indicate that additional sources of FB/FBRs may still be present in the area, as determined in NWA's 2011 Compliance Monitoring & Data Evaluation Report **(5)** mentioned in Section 5.3.

- Concentrations of indicators in the North Field area east of the Main Ditch do not indicated a clear trend during this assessment period. Elevated concentrations or increases have been observed along with the seasonal variations. These appear to be the delayed effects of excavation-related disturbances that occurred during removal of materials from the covered pile because the ground water flow in this area is very slow. However, these concentrations are expected to start decreasing due to seasonal flushing and dilution and also natural degradation.

- Shallow groundwater in the North Field discharges to the Colville River. Although indicators in this groundwater exceed cleanup levels, continued monitoring of the Colville River upstream and downstream of the Site has shown that impacts from this groundwater are negligible. Surface water standards have not been violated in the river.

- Cleanup levels are still being exceeded at the Site. In a few cases, concentrations appear to be increasing. However, the existing Restrictive Covenant is active and remains effective in protecting human health and the environment from exposure to hazardous substances and protecting the integrity of the cleanup actions.

- The cleanup actions completed at the Site continue to be protective of human health and the environment. The data show improvements to Site groundwater quality, and results of the source removal cleanup action at the Site are already being observed. A restoration time frame of 20 to 30 years was established because the very tight soils in the North Field result in very slow groundwater flow in the area. In the meantime, the Restrictive Covenant that is in place for the properties continues to prevent exposures at the Site.

8.0 RECOMMENDATIONS

- Continue groundwater and surface water monitoring in accordance with the following frequencies: Yearly semi-annual monitoring for field parameters (Temperature, pH, conductivity) and indicators (chloride, ammonia-N, and TDS) as proposed by NWA in the 1996-2010 Data Evaluation Report **(5)**; semi-annual monitoring for indicators with less elevated concentrations (Nitrate-N, Nitrite-N, Barium, Manganese, Selenium, and Thallium) shall be conducted two times per year, every other year [instead of every 5 years as proposed by NWA **(5)**].

- The MDL for thallium analysis should not exceed 2 times the cleanup level. If this is not achievable, the next periodic review should take into consideration the current cleanup level in relation to its PQL/MDL.

- NWA should implement the recommendation in the 2011 Compliance Monitoring & Data Evaluation Report to conduct supplemental site investigation in the area of SA-10 to determine if source materials are still present, and to conduct additional materials removal, if necessary.

9.0 REFERENCES

1. CH2M HILL, L-Bar Phase I Remedial Investigation Final Report, August 1998.

2. CH2M HILL, L-Bar Material Removal and Compliance Monitoring Work Plan, January 2001.

3. CH2M HILL, Interim Action Source Removal Summary Report – Magnesite Residue Pile, L-Bar Site, October 2001.

4. CH2M HILL, Source Removal Summary Report- Covered Pile and Plant Buildings, L-Bar Site, October 2004.

5. CH2M HILL, L-Bar Site Compliance Monitoring and Data Evaluation Report, 1996-2010, September 2011.

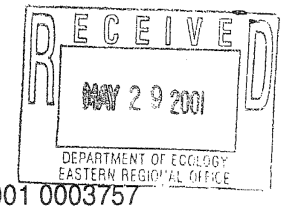
6. Department of Ecology, Final Cleanup Action Plan, June 2000.

7. Department of Ecology, Surface Water Data Analysis, L-Bar Site, June 28, 2006.

APPENDIX A – RESTRICTIVE COVENANT

WHEN RECORDED RETURN TO:

Ozzie Wilkinson
Northwest Alloys
P O Box 115
Addy, Wa 99101



Auditor File #: 2001 0003757

Recorded at the request of:

STEVENS COUNTY TITLE COMPANY

on 04/27/2001 at 14:50

Total of 7 page(s) Fee: $ 64.00

STEVENS COUNTY, WASHINGTON

TIM GRAY, AUDITOR

AGAGNON

DOCUMENT TITLE:

Restrictive Covenants

ORDER/REF:

GRANTOR(S):

1. Northwest Alloys

GRANTEE(S):

1. The Public
2.

LEGAL DESCRIPTION:

Section : 23
Township : 32
Range : 40

Additional Legal Description on page 5 & 6 of document.

ASSESSOR'S PROPERTY TAX PARCEL ACCOUNT NUMBER(S):

Parcel No. : 2600950 (inc. 2600500), 2600700
Parcel No. : 2601050, 2600800, 2600000

The Recorder will rely on the information provided on the form. The staff will not read the document to verify the accuracy or completeness of the indexing information provided hereon.

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STEVENS COUNTY, WASHINGTON

RESTRICTIVE COVENANT

L-BAR SITE – CHEWELAH, WA

TAX PARCEL NOs. 2600950 (includes 2600500), 2600700, 2601050, 2600800, and 2600000

The property that is the subject of this Restrictive Covenant is the subject of remedial action under Chapter 70.105D RCW. The work that will be done to clean up the property and conduct long-term operation and maintenance (hereafter the "Cleanup Action") is described in Agreed Order No. DE 00TCPER-984 and in attachments to the Order and in documents referenced in the Order. This Restrictive Covenant is required by the Department of Ecology under Ecology's rule WAC 173-340-440 because the Cleanup Action on the Site will result in Method C Commercial cleanup levels for chloride, ammonia, barium, manganese, selenium, and thallium in soils that exceed Method B residential cleanup levels, and a conditional point of compliance is established for ground water.

The undersigned, Northwest Alloys, Inc., is the fee owner of real property (hereafter "the Property") in Stevens County, State of Washington (legal description attached), that is subject to this Restrictive Covenant . Northwest Alloys, Inc. makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1. The Property shall be used only for industrial or commercial land uses, as described in WAC 173-340-740(1)(c), and defined in and allowed under any applicable Stevens County zoning regulations, except for Tax Parcel No. 2600000 which shall be used only for agricultural purposes unless specifically authorized otherwise, in writing, by Ecology. Such a change in use must be in accordance with applicable law and may be approved by Ecology only after public notice and comment.

Section 2. No changes in current land use activities (i.e., industrial and agricultural) shall occur that may result in the release or exposure to the environment of contaminated soil or create a new exposure pathway without prior written approval from Ecology.

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Section 3. Shallow site groundwater from the Shallow Water Bearing Unit (SWBU) is not suitable for potable water supply purposes based on its limited yield. Results of the RI and subsequent routine monitoring indicate that the SWBU on site locally contains indicator hazardous substances (chloride, ammonia, nitrate, nitrite, TDS, barium, manganese, selenium and thallium) that exceed MTCA groundwater cleanup levels. Therefore, withdrawal of shallow site groundwater is not allowed unless specifically approved in writing by Ecology. No new water supply well(s) can be drilled on the property to obtain water from deeper confined water-bearing zones/aquifers (located at depths greater that 70 feet bgs) until prior notification of such intended activities is provided to, and approved in writing by, the Department of Ecology, and a well drilling and installation plan is developed which describes the procedures and measures that will be taken to prevent potential water quality impacts due to site-related indicator hazardous substances.

Section 4. Any activity on the Property that may result in the release or exposure to the environment of a hazardous substance or creates a new exposure pathway for a hazardous substance that remains on the Property as part of the Cleanup Action is prohibited without prior written approval from Ecology.

Section 5. Any activity on the Property that may interfere with the integrity of the Cleanup Action and continued protection of human health and the environment is prohibited.

Section 6. The Owner of the Property must give thirty (30) days advance written notice to Ecology of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Cleanup Action on the Property.

Section 7. The Owner must restrict leases to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions herein on the use of the Property.

Section 8. The Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 9. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Cleanup

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Action; to take samples, to inspect remedial actions conducted at the Property, and to inspect records that are related to the Cleanup Action.

Section 10. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Restrictive Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only if Ecology, after public notice and comment, concurs.

Gerald A. Turnbow
[NAME OF PROPERTY OWNER]

4/6/01
[DATE SIGNED]

DATED THIS 06TH DAY OF APRIL 2001. NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, RESIDING IN STEVENS COUNTY, COLVILLE, WASHINGTON.

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STEVENS COUNTY, WASHINGTON

EXHIBIT A

PARCEL 1:

That part of the E1/2 of the SE1/4 of Section 23, Township 32 North, Range 40 East, W.M., in Stevens County, Washington, described as follows:

Commencing at the Southeast corner of said Section 23; thence North 0°09'21" East along the East line thereof for 235.73 feet; thence South 89°55'25" West for 95.64 feet to the West right of way of the Burlington Northern-Santa Fe Railroad, and to the Southeast corner of a parcel designated as Short Plat SP 8-81 and the Point of Beginning; thence South 89°55'25" West along the South line of said parcel for 60.94 feet; thence North 0°04'35" West along the West line of said parcel for 28.0 feet to the Southeast corner of a tract described in Real Estate Contract recorded under Auditor's File No. 9005553; thence North 89°31'42" West along the South line thereof for 526.04 feet to the Southwest corner of said tract; thence North 0°09'21" East along the West line thereof for 294.0 feet to the Northwest corner of said tract; thence continuing North 0°09'21" East for 52.51 feet to a rebar; thence North 82°32'34" East for 163.17 feet to a rebar; thence South 87°27'04" East for 226.01 feet to a rebar; thence North 0°09'17" East for 177.65 feet to a rebar; thence North 38°40'55" West for 205.62 feet to a rebar; thence South 89°55'12" West for 42.95 feet to a rebar; thence North 19°22'08" West for 126.74 feet to the South line of a tract described in Quit Claim Deed recorded under Auditor's File No. 480347; thence North 87°12'29" East along said South line for 48.02 feet to the Southeast corner of said tract; thence North 0°04'35" West along the East line thereof, and the West line of a tract described under Auditor's File No. 423384, known as the Celestial Homes Tract for 1056.55 feet; thence North 89°55'25" East along the North line of the Celestial Homes Tract for 362.39 feet to the West right of way of the Burlington Northern-Santa Fe Railroad; thence South 0°04'35" East along said right of way for 1900 feet, more or less, to the Point of Beginning.

PARCEL 2:

Together with that part of the E1/2 of the SE1/4 of Section 23, Township 32 North, Range 40 East, W.M., in Stevens County, Washington, described as follows:

Beginning at the Southeast corner of said Section 23; thence South 89°56'18" West along the South line thereof for 1324.80 feet; thence North 0°11'43" East along the West line of said E1/2 of the SE1/4 for 2142.34 feet to the Point of Beginning; thence North 89°55'24" East for 506.22 feet; thence North 43°49'34" West 628 feet, more or less, to the center of the Colville River; thence Southwesterly along the center of said Colville River for 80 feet, more or less, to the West line said E1/2 of the SE1/4; thence South 0°11'43" West for 30 feet, more or less, to a 5/8 inch rebar with an aluminum cap; thence continuing South 0°11'43" West along said West line for 391.64 feet to the Point of Beginning.

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PARCEL 3:

That portion of the E1/2 of the SE1/4 of Section 23, Township 32 North, Range 40 East, W.M., in Stevens County, Washington, described as follows:

Commencing at the Northeast corner of said E1/2 of the SE1/4 of Section 23; thence South along the East line thereof for 1028.31 feet; thence North 89°09'23" West for 463.83 feet to the West line of property described under Auditor's File No. 423384, hence forth called the Celestial Homes Property and the true point of beginning; thence North 0°14'51" West along the West line of the Celestial Homes Property to the Northwest corner of said property; thence South 89°43' West to the West line of the NE1/4 of the SE1/4 of Section 23; thence South along said West line to a point which bears North 89°09'23" West from the point of beginning; thence South 89°09'23" East 875 feet more or less to the point of beginning.

PARCEL 4:

That part of the E1/2 of the NE1/4 and that part of the E1/2 of the SE1/4, in Section 23, Township 32 North, Range 40 East, W.M., in Stevens County, Washington, lying South of the center of the Colville River, lying West of the Burlington Northern Railroad right of way and lying North and East of the following described line:

Beginning at the Northeast corner of said SE1/4; thence South 0°09'21" West along the East line thereof, for 494.91 feet; thence South 89°55'25" West, at right angles to said railroad right of way, for 102.76 feet to the Northeast corner of a tract described under Auditor's File No. 423384; henceforth called the CELESTIAL HOMES PROPERTY and Point of Beginning; thence South 89°55'25" West, along the North line of said CELESTIAL HOMES PROPERTY, for 362.39 feet; to the Northwest corner thereof; thence continuing South 89°55'25" West along the North line of a tract described in Statutory Warranty Deed, recorded under Auditor's File No. 8706830, for 351.95 feet to the Southeast corner of tract described in Statutory Warranty Deed, recorded under Auditor's File No. 9008605; thence North 43°49'34" West, along the Northeasterly line of said tract, for 630 feet, more or less, to the center of the Colville River.

END OF EXHIBIT A

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STEVENS COUNTY, WASHINGTON

TO: Stevens County Auditor's Office
Recording Department

I am requesting an emergency nonstandard recording for an additional fee as provided in RCW 36.18.010. I understand that the recording processing requirements may cover up or otherwise obscure some part of the text of the original document.

Bertha Matteson
signature of requestor

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APPENDIX B – DATA SUMMARY

March 2004 to October 2010

TABLE B-1: BACKGROUND WELLS (P-12 AND PW) GROUNDWATER RESULTS

Chloride	P-12	PW
4/27/2004	2.7	1
10/12/2004	2.1	0.5
4/27/2005	2.9	1
10/18/2005	3.7	0.5
4/27/2006	3.6	0.8
10/25/2006	3.4	1
4/24/2007	3.9D	1D
10/29/2007	4.1D	0.8D
4/23/2008	3.6	0.9
10/28/2008	3.9	1
4/27/2009	4.3	1.9
10/21/2009	3.5	0.76
4/27/2010	2.91	0.52
10/20/2010	4.91	

Ammonia-N	P-12	PW
4/27/2004	0.01U	0.05U
10/12/2004	0.01U	0.01U
4/27/2005	0.05U	0.05U
10/18/2005	0.01U	0.01U
4/27/2006	0.01U	0.006J
10/25/2006	0.05U	0.017J
4/23/2008	0.02J	0.019J
10/28/2008	0.05U	0.09
4/27/2009	0.05U	0.05U
10/21/2009	0.05U	0.05U
4/27/2010	0.05U	0.05U
10/20/2010	0.05U	

Nitrate-N	P-12	PW
4/27/2004	0.2U	0.2U
10/12/2004	0.2U	0.2U
4/27/2005	0.2UX	0.2UX
10/18/2005	0.1U	0.1U
4/27/2006	0.07	0.05U
10/25/2006	0.05U	0.05U
4/24/2007	0.09	0.05U
4/24/2007	0.1UD	0.1UD
10/29/2007	0.2	0.05U
4/23/2008	0.12	0.05U
10/28/2008	0.27	0.05U
4/27/2009	0.1	0.05U
10/21/2009	0.052	0.05U
4/27/2010	0.1U	0.1U
10/20/2010	0.05U	

Nitrite-N	P-12	PW
4/27/2004	0.2U	0.2U
10/12/2004	0.1U	0.1U
4/27/2005	0.2UX	0.2UX
4/27/2006	0.01U	0.01U
10/25/2006	0.05U	0.05U
4/24/2007	0.05U	0.05U
4/24/2007	0.1UD	0.1UD
10/29/2007	0.05U	0.05U
4/23/2008	0.05U	0.05U
10/28/2008	0.05U	0.05U
4/27/2009	0.05U	0.05U
10/21/2009	0.05U	0.05U
4/27/2010	0.1U	0.1U
10/20/2010	0.05U	

Table B-1 cont…

pH	P-12	PW
4/27/2004	7.85	7.96
10/12/2004	7.89	7.92
4/27/2005	7.79	7.81
10/18/2005	7.74	7.89
4/27/2006	7.97	8.04
10/25/2006	8.33	8.44
4/24/2007	6.17	6.27
10/29/2007	7.74	8.03
4/23/2008	7.99	7.93
10/28/2008	7.64	8.11
4/27/2009	7.68	7.97
10/21/2009	7.71	7.94
4/27/2010	7.84	8.14
10/20/2010	7.65	

TDS	P-12	PW
4/27/2004	460	
4/27/2005		208
10/18/2005	556	320
4/27/2006		
10/25/2006	555	221
4/24/2007	451	186
10/29/2007	530	227
4/23/2008	443	296
10/28/2008	503	251
4/27/2009	489	263
10/21/2009	500	250
4/27/2010	499	228
10/20/2010	553	

Barium	P-12	PW
4/27/2004	0.0661	0.0963
10/12/2004	0.0833	0.0815
4/27/2005	0.07	0.073
10/18/2005	0.0849	0.0811
4/27/2006	0.076	0.075
10/25/2006	0.0839	0.0822
4/24/2007	0.0828	0.0885
4/24/2007		
10/29/2007	0.0857	0.104
4/23/2008	0.066	0.0729
10/28/2008	0.065	0.0802
4/27/2009	0.0726	0.125
10/21/2009	0.0724	0.12
4/27/2010	0.0781	0.084
10/20/2010	0.0859	

Manganese	P-12	PW
4/27/2004	0.005U	0.0352
10/12/2004	0.0026B	0.0069
4/27/2005	0.005U	0.006
10/18/2005	0.0087	0.006
4/27/2006	0.005U	0.01
10/25/2006	0.0053	0.0097
4/24/2007	0.005U	0.005U
10/29/2007	0.005U	0.0122
4/23/2008	0.005U	0.005U
10/28/2008	0.005U	0.0088
4/27/2009	0.0066	0.005U
10/21/2009	0.005U	0.0261
4/27/2010	0.0053	0.0125
10/20/2010	0.0022	

Table B-1 cont…

Selenium	P-12	PW
4/27/2004	0.005U	0.005U
10/12/2004	0.005U	0.005U
4/27/2005	0.005U	0.005U
10/18/2005	0.01UN	0.01UN
4/27/2006	0.005U	0.005U
10/25/2006	0.01U	0.01U
4/24/2007	0.1U	0.1U
10/29/2007	0.1U	0.1U
4/23/2008	0.005U	0.005U
10/28/2008	0.1U	0.1U
4/27/2009	0.1U	0.1U
10/21/2009	0.1U	0.1U
4/27/2010	0.02U	0.02U
10/20/2010	0.02U	

Thallium	P-12	PW
4/27/2004	0.005U	0.005U
10/12/2004	0.005U	0.005U
4/27/2005	0.005U	0.005U
10/18/2005	0.02U	0.02U
4/27/2006	0.005U	0.005U
10/25/2006	0.005U	0.005U
4/24/2007	0.2U	0.2U
10/29/2007	0.15U	0.15U
4/23/2008	0.02U	0.02U
10/28/2008	0.2U	0.2U
4/27/2009	0.2U	0.2U
10/21/2009	0.1U	0.1U
4/27/2010	0.01U	0.01U
10/20/2010	0.01U	

Data Qualifiers Definitions

D The reported result is from Dilution
i The MRL/MDL has been elevated due to matrix interference
J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL
N The Matrix Spike sample recovery is not within control limits. See case narrative.
U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL
X See case narrative

TABLE B-2. INTERIOR WELLS (P-09 AND P-13) GROUNDWATER RESULTS

Chloride	P-09	P-13
4/27/2004	933	1130
10/12/2004	1230	669
4/27/2005	1480	1260
10/18/2005		989
10/19/2005	1090	
4/27/2006	1890	1010
10/25/2006	1010	982
4/24/2007	1190D	1060D
10/29/2007	792D	991D
4/23/2008		1320
4/24/2008	1600	
10/28/2008	723	838
4/27/2009	1300	1070
10/21/2009	624	853
4/27/2010	644	1250
10/20/2010	522	1070

Ammonia-N	P-09	P-13
4/27/2004	2.56	66.2
10/12/2004	3.35	64.5
4/27/2005	3.7	51
10/18/2005		46.7
10/19/2005	3.9	
4/27/2006	7.7	43.9
10/25/2006	0.022J	49
4/24/2008	3.7	43.2
10/28/2008	1.04	58.5
4/27/2009	4.73	41.7
10/21/2009	1.51	42.3
4/27/2010	3.29	46.1
10/20/2010	1.09	33.4

Nitrate-N	P-09	P-13
4/27/2004	0.2	0.5
10/12/2004	2Ui	3.8
4/27/2005	0.2UX	0.6X
10/18/2005		5.9
10/19/2005	0.1U	
4/27/2006	0.05U	0.87
10/25/2006	0.79	5.3
4/24/2007	0.09	0.05U
4/24/2007	0.5UiD	0.5UiD
10/29/2007	2.6	1.38
4/23/2008		0.83
4/24/2008	0.05U	
10/28/2008	0.53	2.41
4/27/2009	0.05U	0.05U
10/21/2009	0.24	1.7
4/27/2010	0.5Ui	2Ui
10/20/2010	0.122	6.62

Nitrite - N	P-09	P-13
4/27/2004	0.9	0.2U
10/12/2004	2Ui	2Ui
4/27/2005	0.2UX	0.2UX
10/18/2005		0.12
10/19/2005	0.01U	
4/27/2006	0.01U	0.12
10/25/2006	0.05U	0.39
4/24/2007	0.07	0.33
4/24/2007	2UiD	2UiD
10/29/2007	0.05U	0.13
4/23/2008		0.17
4/24/2008	0.05U	
10/28/2008	0.05U	0.05
4/27/2009	0.05U	0.07
10/21/2009	0.05U	0.141
4/27/2010	1Ui	2Ui
10/20/2010	0.05U	0.509

Table B-2 cont…

pH	P-09	P-13
4/27/2004	8.77	7.48
10/12/2004	8.29	7.47
4/27/2005	7.77	7.44
10/18/2005		7.49
10/19/2005	7.86	
4/27/2006	7.51	7.46
10/25/2006	8.24	6.97
4/24/2007	6.29	5.95
10/29/2007	8.13	7.34
4/23/2008		7.56
4/24/2008	7.4	
10/28/2008	8.09	7.31
4/27/2009	7.59	7.44
10/21/2009	7.99	7.38
4/27/2010	7.91	7.48
10/20/2010	8.43	7.26

TDS	P-09	P-13
4/27/2005	3860	5340
10/18/2005		4460
10/19/2005	3180	
10/25/2006	1910	4350
4/24/2007	2460	4340
10/29/2007	1650	4340
4/23/2008		4080
4/24/2008	3240	
10/28/2008	1640	4020
4/27/2009	2660	4380
10/21/2009	1410	3970
4/27/2010	1600	4450
10/20/2010	1510	3980

Barium	P-09	P-13
4/27/2004	0.126	0.0582
10/12/2004	0.221	0.0678
4/27/2005	0.278	0.057
10/18/2005		0.064
10/19/2005	0.297	
4/27/2006	0.762	0.053
10/25/2006	0.26	0.0641
4/24/2007	0.287	0.053
10/29/2007	0.213	0.057
4/23/2008		0.0471
4/24/2008	0.475	
10/28/2008	0.152	0.041
4/27/2009	0.385	0.0507
10/21/2009	0.159	0.0433
4/27/2010	0.223	0.0533
10/20/2010	0.126	0.0583

Manganese	P-09	P-13
4/27/2004	0.269	2.92
10/12/2004	0.349	2.9
4/27/2005	0.942	2.73
10/18/2005		2.83
10/19/2005	1.04	
4/27/2006	2.68	2.95
10/25/2006	0.749	3.12
4/24/2007	1.04	2.74
10/29/2007	0.443	2.82
4/23/2008		2.37
4/24/2008	1.76	
10/28/2008	0.261	2.44
4/27/2009	1.45	2.21
10/21/2009	0.424	2.54
4/27/2010	0.865	2.19
10/20/2010	0.375	2.3

Table B-2 cont…

Selenium	P-09	P-13
4/27/2004	0.005U	0.02U
10/12/2004	0.005U	0.005U
4/27/2005	0.005U	0.005U
10/18/2005		0.01UN
10/19/2005	0.04U	
4/27/2006	0.01U	0.005U
10/25/2006	0.01U	0.01U
4/24/2007	0.1U	0.1U
10/29/2007	0.1U	0.1U
4/23/2008		0.005U
4/24/2008	0.005U	
10/28/2008	0.1U	0.1U
4/27/2009	0.1U	0.1U
10/21/2009	0.1U	0.1U
4/27/2010	0.02U	0.02U
10/20/2010	0.02U	0.02U

Thallium	P-09	P-13
4/27/2004	0.005U	0.005U
10/12/2004	0.005U	0.005U
4/27/2005	0.005U	0.005U
10/19/2005	0.02U	0.02U
4/27/2006	0.01U	0.005U
10/25/2006	0.005U	0.005U
4/24/2007	0.2U	0.2U
10/29/2007	0.15	0.15U
4/24/2008	0.005	0.02U
10/28/2008	0.2	0.2U
4/27/2009	0.2	0.2U
10/21/2009	0.1	0.1U
4/27/2010	0.01	0.01U
10/20/2010	0.01	0.01U

Data Qualifiers Definitions

D The reported result is from Dilution
i The MRL/MDL has been elevated due to matrix interference
J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL
N The Matrix Spike sample recovery is not within control limits. See case narrative.
U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL
X See case narrative

TABLE B-3. MAGNESITE PILE WELLS (SA-10, SA-11, AND SA-14) GROUNDWATER RESULTS

Chloride	SA-10	SA-11	SA-14
4/28/2004	6500	9090	2860
10/13/2004	7360	9620	2430
4/28/2005	8680	8060	1950
10/19/2005	10100	6370	2350
4/27/2006	9490	4960	2970
10/26/2006	10800	3880	2460
4/24/2007	9420	5160	2750
10/30/2007	9610	3340	2160
4/23/2008	8520	2420	1960
10/28/2008	7700	2190	1910
4/27/2009	10200	1690	1860
10/21/2009	10600	1240	1880
4/27/2010	11000	3020	1710
10/20/2010	10800	1290	1300

Ammonia-N	SA10	SA11	SA14
4/28/2004	838	703	94
10/13/2004	895	521	76.4
4/28/2005	748	398	62
10/19/2005	837	326	64.2
4/27/2006	846	299	77.3
10/26/2006	982	252	67
4/23/2008	775	172	56
10/28/2008	910	268	50.1
4/27/2009	959	151	38.4
10/21/2009	922	111	35.3
4/27/2010	1130	114	32
10/20/2010	1020	109	27.4

Nitrate-N	SA10	SA11	SA14
4/28/2004	0.2U	2.9	0.2U
10/13/2004	5Ui	2.6	5Ui
4/28/2005	0.2X	2.8X	0.2UX
10/19/2005	5Ui	5Ui	2Ui
4/27/2006	0.48	0.98	0.1
10/26/2006	0.23	0.61	0.11
4/24/2007	0.05U	0.1UiD	0.05U
4/24/2007	0.1UiD	0.43	1UiD
10/30/2007	0.05U	0.05U	0.05U
4/23/2008	0.05U	0.05U	0.05U
10/28/2008	0.14	0.07	0.05
4/27/2009	0.05U	0.05U	0.18
10/21/2009	0.075	0.05U	0.05U
4/27/2010	10Ui	2	2.5Ui
10/20/2010	0.05U	0.05U	0.05U

Nitrite-N	SA10	SA11	SA14
4/28/2004	0.23	0.38	0.27
10/13/2004	20Ui	50Ui	5Ui
4/28/2005	0.3X	0.2UX	0.2UX
10/19/2005	0.47	0.1	0.14
4/27/2006	0.5	0.06	0.44
10/26/2006	0.48	0.09	0.41
4/24/2007	0.53	0.08	0.53
4/24/2007	5UiD	5UiD	1UiD
10/30/2007	0.89	0.22	0.35
4/23/2008	1.1	1.05	0.47
10/28/2008	0.69	0.47	0.34
4/27/2009	0.81	0.11	0.31
10/21/2009	1.15	0.265	0.333
4/27/2010	20Ui	5Ui	2.5Ui
10/20/2010	1.15	0.14	0.221

Table B-3 cont…

pH	SA10	SA11	SA14
4/28/2004	8.39	9.38	9.98
10/13/2004	8	9.08	9.6
4/28/2005	7.95	9.13	9.58
10/19/2005	7.89	9.06	9.56
4/27/2006	7.96	9.05	9.53
10/26/2006	7.86	8.92	9.56
10/30/2007	7.79	8.95	9.65
4/23/2008	7.77	9.16	9.65
10/28/2008	7.77	9.02	9.65
4/27/2009	7.66	8.89	9.6
10/21/2009	7.61	8.89	9.59
4/27/2010	7.77	8.55	10.08
10/20/2010	7.64	8.86	9.73

TDS	SA10	SA11	SA14
4/28/2004		22600	6700
4/28/2005	32200		
10/19/2005	35800	20500	8340
10/26/2006	34300	13200	6640
4/24/2007	37200	17100	7050
10/30/2007	28700	11400	5540
4/23/2008	28900	9510	6360
10/28/2008	32400	13100	5360
4/27/2009	32100	7980	5400
10/21/2009	29700	7750	4980
4/27/2010	31700	11100	4430
10/20/2010	32200	6300	6350

Barium	SA10	SA11	SA14
4/28/2004	0.0573	0.0448	0.0158
10/13/2004	0.039	0.027	0.013
4/28/2005	0.051	0.027	0.013
10/19/2005	0.0444	0.0217	0.013
4/27/2006	0.054	0.026	0.015
10/26/2006	0.0454	0.025	0.017
4/24/2007	0.0332	0.0316	0.0189
10/30/2007	0.0382	0.0252	0.0164
4/23/2008	0.0368	0.0198	0.0178
10/28/2008	0.0472	0.0327	0.0134
4/27/2009	0.0702	0.0213	0.0177
10/21/2009	0.0463	0.0166	0.0135
4/27/2010	0.0612	0.0245	0.0155
10/20/2010	0.061	0.0211	0.0162

Manganese	SA10	SA11	SA14
4/28/2004	4.2	0.0396	0.0282
10/13/2004	4.45	0.0098	0.02
4/28/2005	7.56	0.0127	0.02
10/19/2005	7.65	0.0091	0.0205
4/27/2006	7.91	0.032	0.024
10/26/2006	6.38	0.0069	0.0073
4/24/2007	1.86	0.0698	0.005U
10/30/2007	1.97	0.0319	0.005U
4/23/2008	2.35	0.0202	0.0231
10/28/2008	7.06	0.125	0.0152
4/27/2009	5.94	0.0372	0.0156
10/21/2009	6.53	0.0188	0.005U
4/27/2010	7.19	0.0254	0.0118
10/20/2010	6.12	0.0371	0.0086

Table B-3 cont…

Selenium	SA10	SA11	SA14
4/28/2004	0.02U	0.127	0.0374
10/13/2004	0.05U	0.125	0.047
4/28/2005	0.02U	0.11	0.06
10/19/2005	0.04U	0.08U	0.04U
4/27/2006	0.05	0.053	0.044
10/26/2006	0.04U	0.061	0.057
4/24/2007	0.1U	0.1U	0.1U
10/30/2007	0.1U	0.1U	0.1U
4/23/2008	0.02U	0.0481	0.052
10/28/2008	0.1U	0.1U	0.1U
4/27/2009	0.1U	0.1U	0.1U
10/21/2009	0.1U	0.1U	0.1U
4/27/2010	0.02U	0.021	0.032
10/20/2010	0.02U	0.02U	0.028

Thallium	SA-10	SA-11	SA-14
4/28/2004	0.01U	0.01U	0.01U
10/13/2004	0.01U	0.01U	0.01U
4/28/2005	0.005U	0.005U	0.005U
10/19/2005	0.02U	0.02U	0.02U
4/27/2006	0.01U	0.01U	0.01U
10/26/2006	0.01U	0.01U	0.01U
4/24/2007	0.2U	0.2U	0.2U
10/30/2007	0.2U	0.2U	0.2U
4/23/2008	0.02U	0.02U	0.02U
10/28/2008	0.2U	0.2U	0.2U
4/27/2009	0.2U	0.2U	0.2U
10/21/2009	0.1U	0.1U	0.1U
4/27/2010	0.01U	0.01U	0.01U
10/20/2010	0.01U	0.01U	0.01U

Data Qualifiers Definitions

D The reported result is from Dilution
i The MRL/MDL has been elevated due to matrix interference
J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL
N The Matrix Spike sample recovery is not within control limits. See case narrative.
U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL
X See case narrative

TABLE B-4. NORTH FIELD WELLS (P-05, P-06, P-19, P-20B, P-25, and P-27) GROUNDWATER RESULTS

Chloride	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		177		4010	732	12600
4/28/2004	2060		4260			
7/22/2004	2330		9240	2400		
10/12/2004		112			870	11300
10/13/2004	2540		8050	3160		
4/27/2005	2600	216		3710	709	14500
4/28/2005			10900			
10/18/2005	3010	198			779	13900
10/19/2005				3030		
4/27/2006	2540	179	9720	1690	561	10600
10/25/2006	2550		8930	2380	490	
10/26/2006		115				11500
4/24/2007	3240					
4/25/2007		296	9130	2650	442	7070
10/29/2007	3260			2880	470	
10/30/2007		144				10600
4/24/2008	2640	207	11100	1480	445	12900
10/29/2008	3060	44.6	8430	2390	447	6740
4/28/2009	2500	115	10200	1580	227	10600
10/22/2009	2870	102		2530	309	10200
4/27/2010	3300	198	7550	2010	307	14300
10/20/2010	3420	188	9760	2180	369	12400

Ammonia-N	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		0.74		72	0.75	0.05U
4/28/2004	0.05U		0.21			
7/22/2004	0.11		0.05U	65		
10/12/2004		0.57			0.88	0.05U
10/13/2004	0.09		0.07	67		
4/27/2005	0.05U	0.76		62	0.7	0.05U
4/28/2005			0.96			
10/18/2005	0.11	0.82			0.71	0.004J
10/19/2005				58.4		
4/27/2006	0.03	0.76	0.39	15.9	0.66	0.01
10/25/2006	0.11		0.2	60.3	0.67	
10/26/2006		0.42				0.05U
10/30/2007		0.05				
4/24/2008	0.05U	0.48	0.22	7.84	0.43	0.05U
10/29/2008	0.08	0.05U	0.09	51.5	0.65	0.05U
4/28/2009	0.1	0.74	0.13	11.9	0.62	0.05U
10/22/2009	0.064	0.748		43.5	0.717	0.05U
4/27/2010	0.051	0.738	1.27	32.8	0.605	0.025
10/20/2010	0.137	0.883	0.801	24.8	0.635	0.025
4/27/2010	0.051	0.738	1.27	32.8	0.605	0.05U
10/20/2010	0.137	0.883	0.801	24.8	0.635	0.05U

Table B-4 cont…

Nitrate-N	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		0.2U		22.2	0.2 U	6
4/28/2004	0.2U		5.4			
10/12/2004		0.2U			0.1 Ui	2.9
10/13/2004	5Ui		5Ui	14.3		
4/27/2005	0.2UX	0.2 UX		31.2X	0.2 UX	5.7X
4/28/2005			2.7X			
10/18/2005	2Ui	0.1U			0.5 Ui	2Ui
10/19/2005				19.6		
4/27/2006	0.05U	0.05U	1.47	38	0.28	37
10/25/2006	0.05U		0.44	10.5	0.05 U	
10/26/2006		0.07				9.84
4/24/2007	0.05U					
4/24/2007	0.5UiD					
4/25/2007		0.05U	0.94	22D	0.05 U	37.8D
10/29/2007	0.05U			43.7D	0.05 U	
10/30/2007		0.13				6.88D
4/24/2008	0.05U	0.05U	1.61	47.4	0.05 U	24.2
10/29/2008	0.05U	0.08	0.05U	16.5	0.07	9.69
4/28/2009	0.06	0.05U	2.04	41	0.05 U	15.3
10/22/2009	0.05U	0.05U		22.1	0.05 U	4.76
4/27/2010	1Ui	0.1U	10Ui	17.8	0.1 U	12i
10/20/2010	0.05U	0.05U	0.053	9.36	0.063	1.94

Nitrite-N	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		0.2U		0.2U	0.2 U	0.2U
4/28/2004	0.01		0.01			
10/12/2004		0.1U			2 Ui	50Ui
10/13/2004	5Ui		20Ui	5Ui		
4/27/2005	0.2UX	0.2UX		0.5X	0.2 UX	0.2UX
4/28/2005			0.2UX			
10/18/2005	0.01U	0.01U			0.01 U	0.01U
10/19/2005				0.02		
4/27/2006	0.01U	0.01U	0.06	0.95	0.01	0.01U
10/25/2006	0.05U		0.05U	0.05U	0.05 U	
10/26/2006		0.01U				0.01U
4/24/2007	0.05U					
4/24/2007	2UiD					
4/25/2007		0.05U	0.05U	0.94	0.09	0.05U
10/29/2007	0.05U			0.14	0.05 U	
10/30/2007		0.05U				0.05U
4/24/2008	0.05U	0.05U	0.05U	0.68	0.05 U	0.05U
10/29/2008	0.05U	0.05U	0.05U	0.05U	0.05 U	0.05U
4/28/2009	0.05U	0.05U	0.05U	0.34	0.05 U	0.05U
10/22/2009	0.05U	0.05U		0.082	0.05 U	0.05U
4/27/2010	5Ui	0.1U	20Ui	2Ui	0.1 U	20Ui
10/20/2010	0.05U	0.05U	0.05U	1.24	0.05 U	0.05U

Table B-4 cont…

pH	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		7.25		7.14	6.97	7.24
4/28/2004	7.1		6.7			
7/22/2004						
10/12/2004		7.46			7.02	7.19
10/13/2004	7.29		6.78	7.23		
4/27/2005	7.11	7.2		7.04	6.89	7.12
4/28/2005			6.86			
10/18/2005	7.15	7.18			6.98	7.13
10/19/2005				7.06		
4/27/2006	7.36	7.34	6.82	7.78	7.13	7.33
10/25/2006	7.6		7.15	7.21	7.51	
10/26/2006		7.85				7.55
4/24/2007	6.99					
4/25/2007		7.13	6.79	7.08	6.95	7.07
10/29/2007	7.01			6.66	6.99	
10/30/2007		7.06				7
4/24/2008	7.27	7.16	6.77	7.55	7.04	7.16
10/29/2008	7.15	7.76	6.67	7.12	7.12	7.11
4/28/2009	7.33	7.18	6.67	7.35	6.95	7.09
10/22/2009	6.94	7.05		7.01	6.78	6.92
4/27/2010	7.07	7.17	6.93	7.11	6.98	7.02
10/20/2010	7.03	7.12	6.6	6.96	7.07	6.97

TDS	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004				9340	2610	35000
4/28/2004			21800			
4/27/2005	6730	910				
10/18/2005	6380	725			2480	23800
10/19/2005				7190		
10/25/2006	5020	552	17900	6410	2080	
10/26/2006						17100
4/24/2007	5100					
4/25/2007		913	15200	6120	2000	22500
10/29/2007	5430			6160	1990	
10/30/2007		593				15800
4/24/2008	5080	763	22500	3920	2060	24400
10/29/2008	4980	460	17300	5670	1940	18400
4/28/2009	4580	593	17700	4340	1850	20200
10/22/2009	4890	556		5840	1780	15900
4/27/2010	5170	669	13800	4640	1700	22200
10/20/2010	19200	705	21800	5710	1740	25100

Table B-4 cont…

Barium	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		0.275		0.101	0.0513	2.47
4/28/2004	0.4		0.266			
10/12/2004		0.233			0.0626	2.68
10/13/2004	0.414		0.155	0.081		
4/27/2005	0.432	0.661		0.07	0.057	4.02
4/28/2005			0.338			
10/18/2005	0.572	0.265			0.0608	2.65
10/19/2005				0.0678		
4/27/2006	0.466	0.535	0.291	0.363	0.055	5.51
10/25/2006	0.512		0.204	0.0664	0.0624	
10/26/2006		0.219				2.52
4/24/2007	0.52					
4/25/2007		0.839	0.281	0.0629	0.0619	5.32
10/29/2007	0.597			0.0961	0.0662	
10/30/2007		0.255				2.67
4/24/2008	0.541	0.879	0.247	0.167	0.064	5.43
10/29/2008	0.741	0.929	0.177	0.0722	0.0677	3.57
4/28/2009	0.482	0.228	0.214	0.157	0.0479	4.9
10/22/2009	0.495	0.192		0.0583	0.0385	2.93
4/27/2010	0.563	0.552	0.326	0.0458	0.0443	7.71
10/20/2010	0.627	0.328	0.203	0.0751	0.0479	4.85

Manganese	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		1.89		3.05	10	0.0325
4/28/2004	1.62		1.55			
10/12/2004		0.969			9.94	0.12
10/13/2004	2.78		1.78	2.57		
4/27/2005	1.09	2.31		2.08	9.62	0.016
4/28/2005			2.73			
10/18/2005	3.3	1.87			9.6	0.116
10/19/2005				2		
4/27/2006	0.773	2.19	4.99	0.082	10.4	0.0062
10/25/2006	2.5		2.48	1.55	9.7	
10/26/2006		0.919				0.206
4/24/2007	1.21					
4/25/2007		2.64	2.49	1.33	9.69 D	0.025U
10/29/2007	2.55			2.3	9.92 D	
10/30/2007		1.74				0.266
4/24/2008	0.401	2.55	1.46	0.0692	9.61	0.006
10/29/2008	2.03	0.377	2.72	1.86	13.1	0.0908
4/28/2009	0.172	1.73	1.09	0.381	7.44	0.0202
10/22/2009	1.7	1.46		1.19	7.41	0.0782
4/27/2010	1.58	2.02	2.11	0.884	7.45	0.015
10/20/2010	2.63	2	4.74	0.993	6.75	0.0077

Table B-4 cont…

Selenium	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		0.005U		0.02U	0.005 U	0.02U
4/28/2004	0.01U		0.01U			
10/12/2004		0.005U			0.005 U	0.02U
10/13/2004	0.02U		0.02U	0.02U		
4/27/2005	0.005U	0.005U		0.005U	0.005 U	0.02U
4/28/2005			0.02U			
10/18/2005	0.01UN	0.01UN			0.01 UN	0.025UN
10/19/2005				0.04U		
4/27/2006	0.01U	0.005U	0.01U	0.0104	0.005 U	0.01U
10/25/2006	0.01U		0.01U	0.01U	0.01 U	
10/26/2006		0.01U				0.01U
4/24/2007	0.1U					
4/25/2007		0.1U	0.1U	0.1U	0.1 U	0.1U
10/29/2007	0.1U	0.1U		0.1U	0.1 U	
10/30/2007						0.1U
4/24/2008	0.005U	0.005U	0.02U	0.011	0.005 U	0.02U
10/29/2008	0.002U	0.002U	0.01U	0.0095	0.002 U	0.01U
4/28/2009	0.1U	0.1U	0.1U	0.1U	0.1 U	0.1U
10/22/2009	0.1U	0.1U		0.1U	0.1 U	0.1U
4/27/2010	0.02U	0.02U	0.02U	0.02U	0.02 U	0.02U
10/20/2010	0.02U	0.02U	0.02U	0.02U	0.02 U	0.02U

Thallium	P-05	P-06	P-19	P-20B	P-25	P-27
4/27/2004		0.005U		0.005U	0.005 U	0.005U
4/28/2004	0.01U		0.01U			
10/12/2004		0.005U			0.005 U	0.005U
10/13/2004	0.01U		0.01U	0.01U		
4/27/2005	0.005U	0.005U		0.005U	0.005 U	0.005U
4/28/2005			0.005U			
10/18/2005	0.02U	0.02U			0.02 U	0.02U
10/19/2005				0.02U		
4/27/2006	0.01U	0.005U	0.01U	0.005U	0.005 U	0.01U
10/25/2006	0.005U		0.005U	0.005U	0.005 U	
10/26/2006		0.01U				0.01U
4/24/2007	0.2U					
4/25/2007		0.2U	0.2U	0.2U	0.2 U	0.2U
10/29/2007	0.15U			0.15U	0.15 U	
10/30/2007		0.2U				0.2U
4/24/2008	0.005U	0.005U	0.005U	0.005U	0.005 U	0.005U
10/29/2008	0.00003U	0.00003U	0.0002U	0.00016	0.00003	0.0002U
4/28/2009	0.2U	0.2U	0.2U	0.2U	0.2 U	0.2U
10/22/2009	0.1U	0.1U		0.1U	0.1 U	0.1U
4/27/2010	0.01U	0.01U	0.01U	0.01U	0.01 U	0.01U
10/20/2010	0.01U	0.01U	0.01U	0.01U	0.01 U	0.01U

Data Qualifiers Definitions

D The reported result is from Dilution
i The MRL/MDL has been elevated due to matrix interference
J The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL
N The Matrix Spike sample recovery is not within control limits. See case narrative.
U The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL
X See case narrative

TABLE B-5
SURFACE WATER RESULTS IN D2 AND D3

D2	Ammonia-N	Chloride	Flow
4/14/2004	22.8	1380	12.2
4/29/2004	26.1	1720	10.0
5/12/2004	26.8	1630	4.0
5/28/2004	19.7	1370	13.2
6/8/2004	8.7	1270	10.5
7/16/2004	0.16	673	9.9
7/27/2004	0.24	1430	3.0
8/31/2004	0.07	1040	1.0
9/14/2004	65.5	2480	6.4
10/22/2004	17.9	1060	56.8
11/3/2004	26.6	1210	15.4
11/18/2004	19.4	1490	12.0
12/21/2004	21.8	1480	25.5
12/27/2004	29.7	1980	20.8
1/25/2005	15.0	732	68.6
2/10/2005	22.0	1240	34.3
2/24/2005	23.1	1410	15.9
3/9/2005	14.1	869	42.5
3/23/2005	16.3	1260	31
4/6/2005	11.7	972	37.6
4/20/2005	13.7	1400	22.6
5/3/2005	15.7	1380	9
5/19/2005	6.08	984	19.3
5/31/2005	3.9	1680	6.8
6/14/2005	5.11	1440	8.5
6/28/2005	4.2	1590	10.3
7/12/2005	10.6	635	21.9
7/29/2005	13.1	1550	6.4
8/9/2005	8.3	486	16.8
8/23/2005	3.16	444	18
9/15/2005	11.3	1340	1.7
10/12/2005	54.4	2270	4.7
10/27/2005	59.8	2340	17.6
11/3/2005	8.1	764	18.8
11/30/2005	24	1180	19.3
12/13/2005	3.9	1710	2.7
12/21/2005	2.5	1350	1

D2	Ammonia-N	Chloride	Flow
1/10/2006	2.8	322	455
1/25/2006	18.3	807	63.2
2/6/2006	16.8	762	128.7
2/21/2006	48.7	1280	28.2
3/16/2006	19.5	694	89.3
3/28/2006	27.4	823	ns
4/11/2006	0.29	69.1	ns
4/25/2006	26.2	719	ns
5/9/2006	47.5	1530	37.0
5/23/2006	37.8	1260	ns
6/6/2006	16.2	759	38
6/20/2006	27.8	1230	56.8
10/30/2006	49.9	1840	12.1
5/30/2007	5.27	833	6.3
11/14/2007	16.9	1150	8.8
11/17/2008	14.9	1180	17.2
5/6/2009	13.3	759	53.0
12/7/2009	44	1830	10.1
4/26/2010	3.28	1000	15.5
10/28/2010	5.86	882	17.2
10/11/2011	34.6	2360	43.9

Table B-5 cont….

D3	Ammonia-N	Chloride	Flow, gpm
10/22/2001	0.27	242	not sampled
3/19/2002	13.0	474	not sampled
4/2/2002	18.5	590	not sampled
11/18/2002	14	368	not sampled
4/8/2003	11.8	453	not sampled
10/13/2003	21	1,040	not sampled
4/14/2004	9.6	688	not sampled
11/3/2004	10.1	534	not sampled
10/30/2006	2.66	180	1.2
5/30/2007	5.25	1140	not sampled
11/14/2007	4.78	1680	9.1
5/6/2008	4.12	956	no movement
11/17/2008	14.3	575	no movement
5/6/2009	1.94	203	no movement
12/7/2009	21.7	1000	frozen, no movement
4/26/2010	0.91	300	little to no movement
10/28/2010	4.62	270	little to no movement
5/4/2011	3.23	269	little to no movement
10/11/2011	1.36	161	little to no movement