



## Estimates of Ground-Water Contaminant Loading to the Colville River in the Vicinity of L-Bar Products, Inc.

### Summary

- The hydrogeologic evaluations and estimates in this report are based on historic data only. No new data were collected for the project. The historic data are somewhat intermittent and data quality control is questionable. Numerous unknowns about the geology, hydrology, and ground-water flow necessitated the use of numerous assumptions, explained on page 8.
- The L-Bar Products, Inc. facility is undergoing a Model Toxics Control Act (MTCA) investigation and cleanup. Evaluation of the new data generated by the remedial investigation will likely result in substantially different conclusions than contained in this report. The MTCA investigation began in mid 1995 and, according to Roland (1995), by October 1995 "qualitative and quantitative knowledge of the ground-water/surface-water system is evolving rapidly".
- Due to the abundance of ditches, sumps, drain fields, and other ground-water flow control structures on the L-Bar Products, Inc. site and the poor historic records concerning those structures, it is impossible, with available data, to evaluate the present ground-water flow characteristics at the L-Bar Products facility. However...
- Natural ground-water flow characteristics can be estimated based on historic data (Appendices 1 - 4) and basic ground-water hydraulics.
- Under natural ground-water flow conditions:
  - Ground-water velocity ( $v$ ) ranges from 0.47 ft/yr to 4.7 ft/yr.
  - Natural ground-water travel time from the northwest side of the sludge-bar residue pile to the Colville River (about 1000 ft) ranges from 210 years to 2100 years.

- Chloride loading to the Colville River via leakage from ditch D1 (using a leakage rate of 5 gpm, and an average chloride concentration of 12,000 mg/L) is about 330 Kg/day.
- Chloride loading to the Colville River via ground water ranges from 1.7 to 17 Kg/day -- 0.5 to 5 percent of the loading from ditch D1.
- Chloride loading to the Colville River via ground water is relatively insignificant compared to the loading occurring from ditch D1 and other possible human-enhanced sources such as irrigation return flows and ditch D2 transmitting contaminants from the south end of the L-Bar site.
- Ammonia loading to the Colville River via ground water is relatively insignificant compared to the loading occurring from ditch D1.

## Recommendations

The ground-water flow direction and rate must be clearly defined at the L-Bar Products, Inc. facility to understand the movement of contaminants at the site. Abundant ground-water flow control structures at the site make ground-water flow complex and difficult to define. Historic monitoring of ground-water quality and water levels has been too site-specific. The contaminant plume has moved off-site, and monitoring wells are needed between the site and the Colville River to monitor the plume's present location and progress. The following recommendations would help fill these data needs. According to Roland (1995) many of these recommendations are being initiated as part of the on-going remedial investigation.

- In addition to continued ground-water quality monitoring on the L-Bar site, similar to that done in the past, monitoring wells should be installed in the fields north and northwest of the site. All monitoring wells used should meet standard quality assurance/quality control (QA/QC) protocol. If old, previously-used monitoring wells do not meet QA/QC protocol, new wells should be constructed, in equivalent sites, to replace the old wells.
  - The soils and geology penetrated by each newly constructed monitoring well should be described in detail.
  - Detailed "as-built" diagrams should be recorded for each monitoring well.
  - All monitoring wells should be surveyed for accurate location (using state plane coordinates) and elevation above MSL.
  - Water levels should be measured once per month (or quarterly, at the very least) in all monitoring wells. Measurements should be recorded to 0.01 feet and should occur at approximately the same time each month.

- Aquifer (slug) tests should be performed at appropriate locations around the site and in the two adjacent fields, between the site and the river, to establish values for such aquifer and soil characteristics as: hydraulic conductivity (K), porosity (n), transmissivity (T), storage coefficient (S), and soil-moisture holding capacity.
- Ground-water-flow control structures on the site need to be identified and mapped. These structures influence ground-water flow on-site and possibly off-site as well. The influence of these structures must be identified if we hope to define ground-water contaminant transport from the site.
- The potential for contamination of the confined aquifer should be more thoroughly examined. The deep L-Bar production well is a potential contaminant pathway and should be specifically evaluated in this regard. Bardach (1990) concluded that there are other possible connections between L-Bar contaminants and the confined aquifer. Since the confined aquifer is a very important water-supply source in the area, it would be prudent to investigate all possible contaminant pathways.

## Introduction

This hydrogeologic evaluation and estimate of contaminant loading, from ground water, was done in support of the Colville River Total Maximum Daily Limit (TMDL) evaluation

### Acknowledgements

The following people provided valuable assistance with this project and deserve my grateful thanks: Ozzie Wilkinson of NW Alloys was very helpful with all my requests for data and information and deserves special thanks for arranging my dead-of-winter tour of the L-Bar site. Charles Kessler, on contract to NW Alloys, answered my many questions and always went the extra mile to provide the data and information I needed. Teresita Bala and John Roland of Ecology's Eastern Regional Office both provided prompt information with a smile (at least it sounded like a smile over the phone) and a good measure of patience. John Roland also provided a peer review and valuable information about the status and preliminary findings of the on-going remedial investigation of the L-Bar facility. Paul Grabau of Re-Tec in Seattle provided his valuable perspective about the complexities of ground-water flow at the site -- for which I am very grateful. Denis Erickson with Ecology's Environmental Investigations and Laboratory Services (EILS) program provided much appreciated technical advice. And Art Larson and Greg Pelletier, also with EILS, provided thoughtful peer review of this document.

## Background

The L-Bar Products, Inc. facility is located in Stevens County, about two miles south of Chewelah, Washington on the west side of State Highway 395. From 1977 to 1991, the facility recovered magnesium from sludge bars, a waste product of a magnesium reduction process, supplied mostly by Northwest Alloys in Addy, Washington. Sludge bars, consisting mainly of spent flux of magnesium and potassium chloride, were crushed and ground to powder at the L-Bar site and magnesium granules were screened out (WDOE, 1994). The waste product generated by this process, called sludge-bar residue, is classified as state dangerous waste, based on its toxicity to fish. Sludge bars and sludge-bar residue contain high amounts of chloride and react with water, forming ammonia.

Approximately 50,000 yd<sup>3</sup> of sludge-bar residue, consisting primarily of potassium, calcium, magnesium, and sodium chlorides and magnesium oxides, is stored on-site in a covered pile (In-Situ, 1988). This residue pile (Figures 1 & 2) is the main source of contamination to ground water in the area, although there are smaller, uncovered piles of sludge-bar residue on the southern end of the site (Bala, 1995). Before partial cleanup of the site in 1992 & 1993, there were numerous other possible sources of ground-water contamination. Also, the main residue pile was not covered until 1985, so precipitation and runoff infiltrating through the pile was probably a major source of early ground-water contamination.

Ground-water-quality data have been collected sporadically at the L-Bar facility since 1979. From 1979 through 1984, L-Bar Products, Inc. collected samples from the water-table aquifer using monitoring wells 1, (MW 1) 2, 3, and 4 (TH 2, 3 & 4) (Appendix 1, Figure 1). They also collected samples from their on-site, confined-aquifer water-supply well (known as the "Deep Well" and later as the "L-Bar Production Well") during the same period (Appendix 2). In 1987, In-Situ, Inc., under contract to L-Bar Products, Inc., collected monthly water samples from numerous test holes (TH "A" through TH "P", Appendix 1 and Figures 1 & 2) which were constructed specifically for that purpose. Many of those test holes have since been destroyed.

Subsequently, In-Situ, Inc. published a hydrologic report describing their investigations (In-Situ, 1988). Bardach (1990) conducted a hydrogeologic evaluation, based on the In-Situ data and other existing data, of the Colville River aquifer system near the L-Bar site. No significant amount of ground-water quality data has been generated for the site since 1987. Charles Kessler began collecting surface-water samples, under contract to NW Alloys, in March 1994 and has continued that effort into 1995 (Appendix 3).

# Site Conditions

## Hydrogeology

The Colville River valley at the L-Bar facility is filled with thick glacial, glaciolacustrine, and alluvial deposits. Geologic logs from water wells in the vicinity of the site indicate a soil/alluvial layer from 6 to 8 feet thick at the surface. This soil is underlain by a 15 to 25 foot layer of brown clay. Blue clay, over 100 feet thick underlies the brown clay layer. This blue clay unit is consistently present in well logs throughout the Colville River valley. The brown clay and blue clay units are probably one contiguous clay layer with the brown clay representing the weathered, oxidized portion, and the blue clay representing the un-oxidized portion. Although it varies in thickness and thins rapidly toward the edges of the valley, the blue clay appears to be an aquiclude in the vicinity of the L-Bar site and in much of the Colville River valley.

A laterally consistent, confined, sand and gravel aquifer lies below the blue clay at a depth of 120 to 150 feet or more. As the principle aquifer in the vicinity, the confined aquifer provides most or all of the area's ground-water supplies, including that of the city of Chewelah. Head pressures in the confined aquifer are greatest toward the center of the Colville River valley, where the blue clay aquiclude is thickest, and lessen as the blue clay thins toward the edges of the valley.

## Soils

There are two soil types at the L-Bar site. Most of the L-Bar facility is located on *Colville silt loam*, a very deep, artificially drained soil which formed on mixed alluvium (Donaldson, and others, 1982). The slope is 0 to 3 percent and the soil extends to a depth of 60 inches or more. The permeability of the soil is moderate, the soil moisture holding capacity is very high, and runoff is very slow. The water table is typically at a depth of 2 to 4 feet during the months of February to June but, based on historic water levels (In-Situ, 1988), is occasionally closer to the surface at the L-Bar site (Appendix 4). According to Donaldson & others (1982), the soil is occasionally subject to prolonged flooding during the months of February to May. However, I have seen no records of flooding in the area mapped as *Colville silt loam* at the L-Bar site -- probably because of the artificial drain system on the site.

*Bossburg muck*, a very deep, poorly drained soil, lies to the north and northwest of the L-Bar site, between the facility and the Colville River. The soil typically lies in bottom lands adjacent to lakes and ponds, and, in this case, a slow-moving river. The soil extends to a depth of 60 inches or more and consists of dark gray muck, silt loam and organic matter. The permeability is moderate, the soil-moisture holding capacity is very high, and runoff is very slow. The water table is typically at or near the surface from February to May and the soils are subject to frequent, prolonged flooding during the same season (Donaldson & others, 1982). This is definitely the case north of the L-Bar site, where low-lying areas of the field are often flooded by the water table as well as the river.

## **Water-Table Aquifer**

The water-table aquifer is eight to ten feet thick and is composed of the soils described above as well as, possibly, part of the underlying brown clay unit. The water level in the aquifer fluctuates from between zero to four feet below land surface, depending on the season and location on the site. Therefore, the saturated thickness of the water-table aquifer probably ranges between six and ten feet, depending on the season. For this analysis, I have assumed an average saturated thickness of eight feet. This shallow, water-table aquifer is the aquifer of concern with regard to ground-water contamination and transport of contaminants to the Colville River.

## **Confined Aquifer**

Based upon the geology described in local well logs, an apparent strong upward, vertical ground-water flow gradient, and ground-water quality data from the aquifer, I believe the lower, confined aquifer is well protected from L-Bar site contamination by the thick aquiclude of blue clay, described above. Although the deep L-Bar production well is a potential contaminant pathway to the confined aquifer, historic data does not seem to indicate any contamination in the aquifer. Water-quality data and better defined geology from the remedial investigation may indicate differently, however.

## **Factors Affecting Ground-Water Flow Rates and Contaminant Transport**

In estimating ground-water flow rates and contaminant loading I assumed natural ground-water flow. However, natural ground-water flow within the L-Bar site has been radically altered by flow control structures constructed at the facility. A variety of structures are known to exist on the site (Figure 1):

- 1) There are two de-watering sumps in the vicinity of the sludge-bar residue pile (Figure 1).
- 2) The main drainage ditch (D1) extends from the SE corner of the L-Bar facility to its outlet at the Colville River in the NW corner of the site (Figure 1). This ditch probably acts as a conduit for ground-water flow to the river. It may also be connected to a network of french-drain-type drainage systems designed to drain ground water from the site.
- 3) There are an unknown number of gravel-lined drain systems which artificially drain the Colville silt loam soils -- either by funneling flow to the D1 ditch or to the de-watering sumps.
- 4) There is a ground-water-flow barrier wall around the sludge-bar residue pile, the holding pond, and two of the buildings adjacent to the south side of the residue pile (Figure 1). This wall was constructed in an attempt to restrict flow from the highly contaminated areas on-site.
- 5) A secondary drainage ditch (D2) drains the south end of the site and runs along the west border to the Colville River (Figure 1). It discharges to the river at approximately the same location as the main ditch (D1).

Although these structures are known to exist, historic records for the site are poor and there is confusion about the presence and locations of subsurface ground-water control structures (Kessler, 1995 and Grabau, 1995). There is evidence (Grabau, 1995) that undocumented ground-water control structures exist on-site. For instance, segments of gravel-lined drain systems have recently been discovered under the facility parking lots.

In contrast to ground-water flow on the site, off-site ground water should flow down slope toward the river in a more natural flow pattern. But even off-site, certain factors may affect ground-water flow to the river. The fields to the north and northwest of the site are irrigated during the summer growing season. A modified flood irrigation method is used, where irrigation lines are left in place until part of the field is flooded and then the lines are moved to the next location (Kessler, 1995). This dry-season flooding probably provides recharge to the shallow aquifer and may raise the water level during a time when, under normal conditions, there would be no recharge.

Irrigation return flows to the river may carry contaminated water to the river -- particularly from the field east of ditch D1 where analyses of flood waters in the field have shown very high Cl<sup>-</sup> values. Ditch D1 may be a major source of the contaminated water in this field. Damming ditch D1, to stop the flow of contaminated flow to the Colville River, may have raised the water level in the ditch, relative to the adjacent ground water, creating a situation where the ditch acts as a line-source of contaminated ground-water recharge at certain times of the year.

## Methods

This evaluation is based on historic data only. No new data were collected for the project. The on-going remedial investigation at the site is generating considerable new data that was not available for my evaluations. Therefore it is likely that subsequent evaluations of that data will result in substantially different conclusions than contained in this report. All data sources are discussed in the "background" section above. Quality assurance/quality control concerns are addressed below as are assumptions and equations used in arriving at the estimates of ground-water flow, discharge, travel time, and chloride loading to the river.

### Quality Assurance/Quality Control

I found no quality-assurance/quality-control records regarding data collected before 1993. In fact, Teresita Bala and John Roland of the Eastern Regional Office have indicated (personal communication) that little or no attention was paid to quality assurance in the data collection efforts that occurred before 1993. In spite of this, I have assumed that, for the purposes of my evaluation, the probable absence of quality assurance procedures will not significantly affect my analysis or conclusions.

I base this assumption on the fact that the concentrations of chloride and ammonia (the contaminants of interest) are so high that quality-assurance errors would make no difference in the overall picture. To elaborate, on-site chloride concentrations in ground water, between the sludge-bar residue pile and the Colville River, average about 17,000 mg/L -- 68 times the maximum contaminant level (MCL) established by the state of Washington. Ammonia concentrations in Ditch D1 range from 136 to 621 mg/L (Appendix 3). These extremely high chloride and ammonia concentrations have been repeatable over a period of 16 years.

All historic data compiled in Appendices 1 - 4 were proof-read 100% for conformity with the data in the original sources.

### **Assumptions About Aquifer Characteristics**

The following assumptions were made in order to estimate flow characteristics of the water-table aquifer:

- Hydraulic Conductivity (K) ranges between 0.1 ft/day and 1 ft/day (Freeze and Cherry, 1979, p. 29; Heath, 1984, p. 12 & 13).
- Aquifer porosity is 40%. This value was used by In-Situ (1988) and Bardach (1990) and seems reasonable for sandy clay (Heath, 1984, p. 7).
- The average saturated thickness of the water-table aquifer is eight feet and the saturated thickness is constant with time.
- The ground-water gradients are the same now as they were in 1987.
- The ground-water quality is the same now as it was in 1987.
- The Colville River fully penetrates the aquifer and all ground water discharges to the river, with no underflow. Given the depth of the river channel and the thinness of the aquifer, this seems to be a valid assumption.
- The Colville River is a gaining stream in the vicinity of the L-Bar site. This may not be true at all times of the year, but is probably a good assumption for most of each year.
- The aquifer is homogeneous and isotropic. This is certainly not strictly true, but in an overall sense, is probably not a bad assumption. It is possible, however, that there are alluvial sand/gravel lenses or channels intermixed with the soil. If so, it could have a profound effect on ground-water flow direction and rate. Preliminary findings of the remedial investigation have identified some sand-bearing lenses and possible fluvial depositional patterns in the water-table aquifer (Roland, 1995).



## Equations Used

The basic principle by which all estimates were made is Darcy's Law:

$$Q=KA(dh/dL)$$

Where:     Q = discharge from the aquifer to the river (ft<sup>3</sup>/day)  
              K = hydraulic conductivity (ft/day)  
              A = Cross sectional area of discharge to the river (ft<sup>2</sup>)  
              dh/dL = hydraulic gradient

Appendix 5 shows equations and parameter values used to estimate cross-sectional area of discharge, average hydraulic gradient, average chloride concentration, and chloride loading to the river.

## Results

### Aquifer Flow Characteristics, Estimated Ground-Water Flow Velocity, and Travel Time

Based on the geology and soil descriptions, the water-table aquifer should have very poor water transmitting characteristics. Assuming that the aquifer underlying the L-Bar site is composed predominantly of silt loam, silty clay loam, and muck (Donaldson & others, 1982), I estimate the natural ground-water flow velocity to be in the range of 0.0013 to 0.013 ft/day (0.47 to 4.75 ft/yr, respectively). Given a shallow ground-water slope averaging 0.5% (Figure 2), and a down-slope distance from the sludge-bar residue pile to the river of about 1000 feet, I estimate the ground-water travel time to range through a factor of 10, from 210 to 2100 years. Until tests are conducted to determine the hydraulic conductivity (K) of the water-table aquifer, we must rely on a wide range in K for flow calculations.

### Pollutant Loading, Via Ground Water, to the Colville River

#### *Chloride (Cl)*

Assuming natural ground-water flow conditions across the L-Bar site, I estimate that ground-water discharge (Q) from the site to the river ranges between  $3.9 \times 10^{-5}$  and  $3.9 \times 10^{-4}$  ft<sup>3</sup>/sec (Appendix 5). Based on an average ground-water chloride (Cl<sup>-</sup>) concentration (between the residue pile and the river) of 17,400 mg/L, the Cl<sup>-</sup> loading to the river, under natural ground-water flow conditions, would range from 1.7 to 17 kg/day. Based on my seasonal water-level contour maps (Figure 2 illustrates the map for February 1987), I identified an 840-foot segment of the river where I believe most of the ground-water that passes through the highly contaminated area near the residue pile discharges to the stream. The location of the ground-water discharge area

migrates somewhat with the seasons but, generally, extends about 450 feet downstream and 400 feet upstream of the D1 ditch discharge point. The ground-water flow to this stream segment probably includes 60 to 80 percent of all the ground water that migrates across the L-Bar site. The remaining 20 to 40 percent flows in a westerly direction, across the southern end of the site (Figure 2), and probably discharges to the Colville River at points below the mouth of Chewelah Creek. Travel distances in this area are quite long, and if my flow rate estimates are correct, there should be no contaminant loading to the river in this down-stream reach for the foreseeable future. The remedial investigation should provide data to confirm or refute these estimates.

### *Ammonia (NH<sub>3</sub> as N)*

I have not attempted estimates of ammonia (NH<sub>3</sub>) loading via ground water because no water quality analyses for ammonia in ground water have been done for the L-bar site. There are a few wells (G, H, J, K, M, and N) on the south and west sides of the site (In-Situ, 1988) with pH values ranging from about 8.3 to 9.9 (Appendix 1), and in these areas NH<sub>3</sub> would likely persist in the ground water. However, given the travel times for ground water and pH values that tend to range in the sixes and sevens in most areas, it seems likely that ammonia produced on-site would revert, with time and distance from the source, to ammonium (NH<sub>4</sub><sup>+</sup>) and would be assimilated by biologic processes before reaching the river. This assertion seems to be supported by the surface water data (Appendix 3, pgs 13 & 17) where on April 26, 1994 the ammonia concentration at D1 was 287.93 mg/L but only 2.35 mg/L in the adjacent field approximately 200 feet away. However, Roland (1995) states that the remedial investigation has identified ammonia in ground water. He suggests that, based on this information, it is too early to draw conclusions about the transport of ammonia through ground water.

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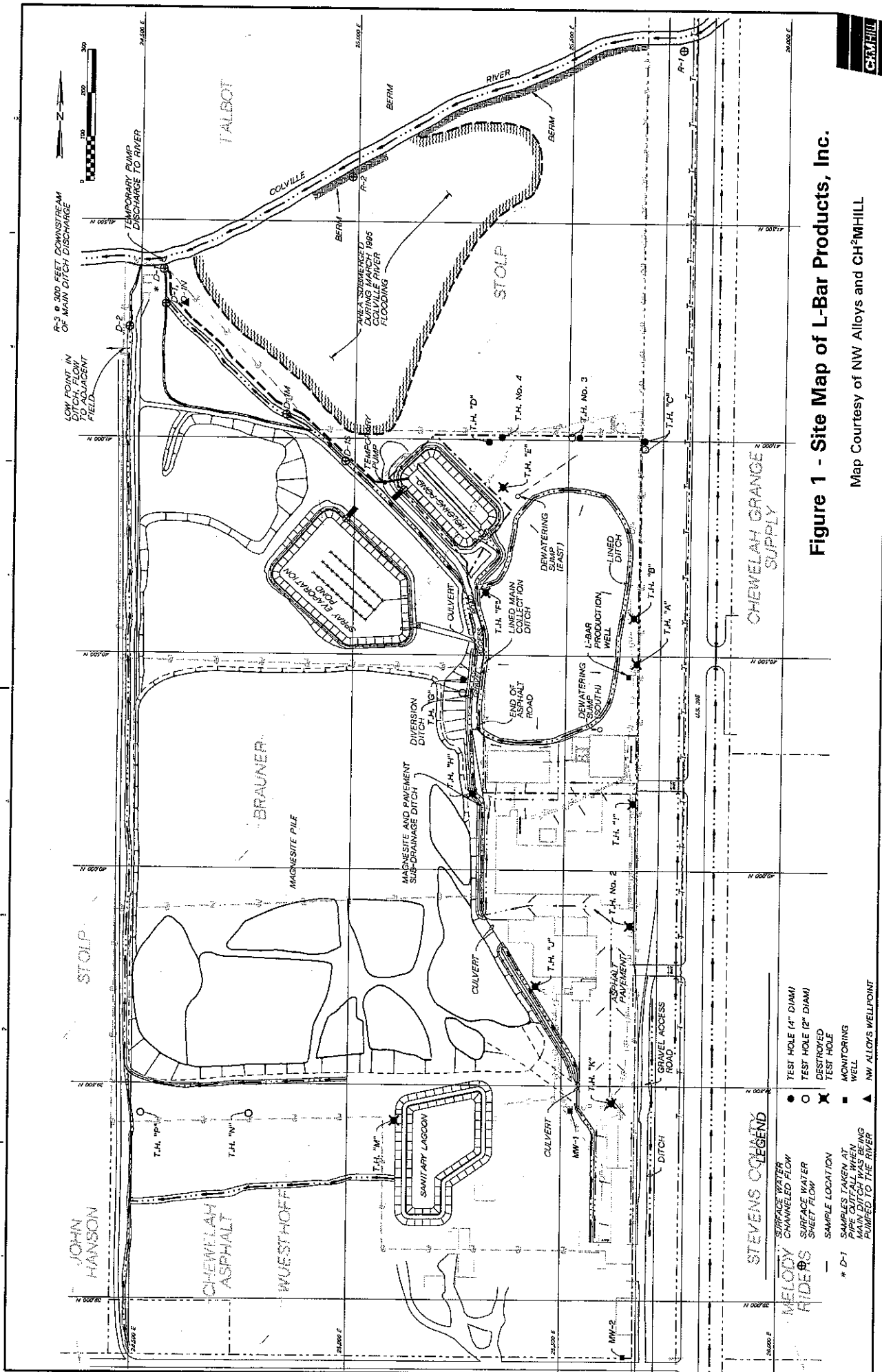
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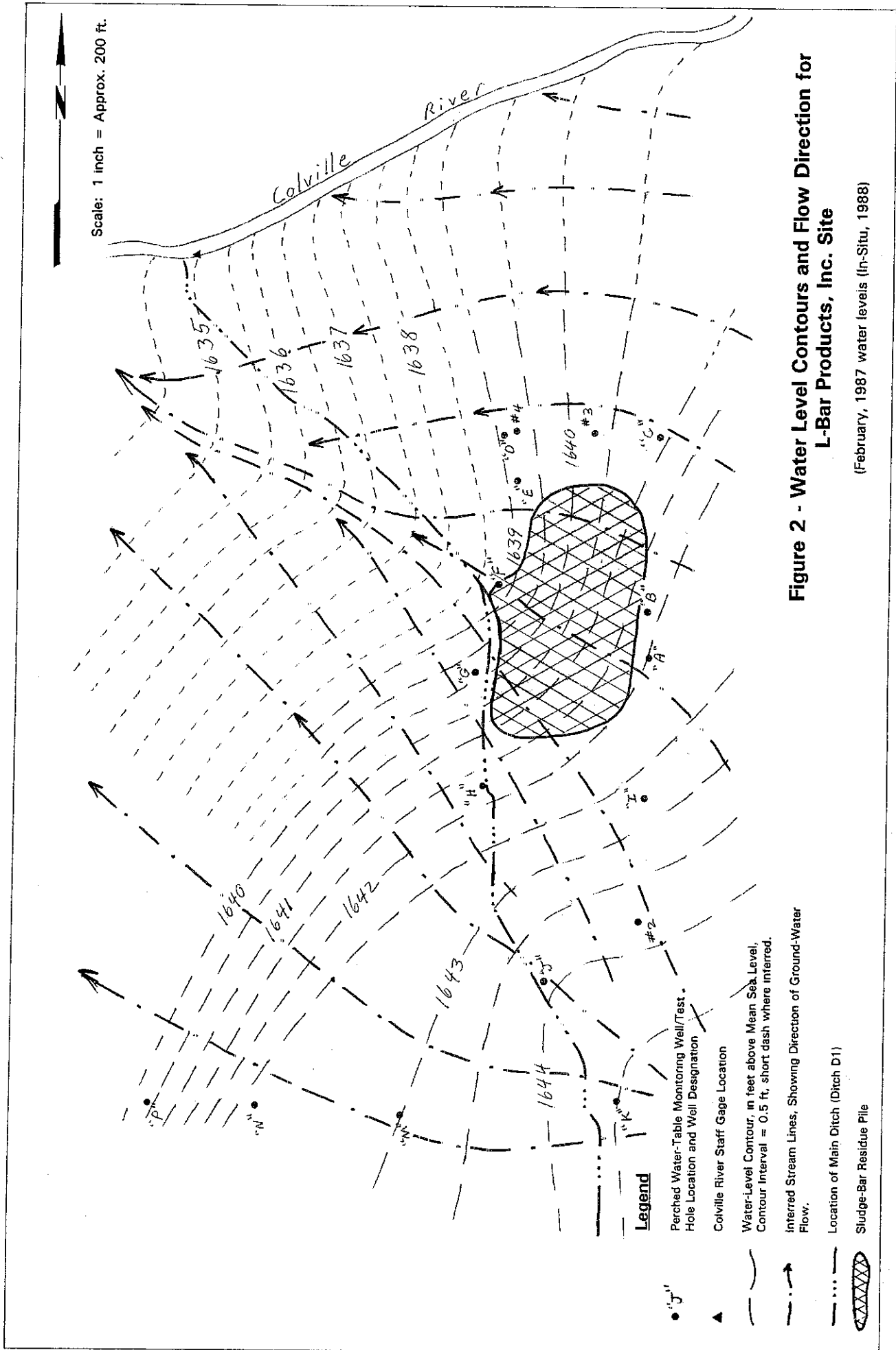
**Figure 1 - Site Map of L-Bar Products, Inc.**

Map Courtesy of NW Alloys and CH<sup>2</sup>MILL



**STEVENS LEGEND**

- SURFACE WATER
- CHANNELLED FLOW
- SURFACE WATER
- SHEET FLOW
- TEST HOLE (1" DIAM)
- TEST HOLE (2" DIAM)
- DESPOYED
- TEST HOLE
- SAMPLE LOCATION
- SAMPLES TAKEN AT MAIN DITCH WASTEWATER PUMPED TO THE RIVER
- MONITORING WELL
- NW ALLOYS WELLPOINT



## Appendix 1 - Ground-Water Quality Data for Water-Table Aquifer at the L-Bar Facility

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOLIDS (TDS, mg/L)
TH "A"	1/31/87	2	7.57	10940	437	866	274	22.3	3050	6740
	2/28/87	9.5	7.14	11370	636	843	268	19.7	3460	7270
	3/30/87	6	7.21	10250	557	872	241	19.1	3420	6580
	4/24/87	10.5	7.36	10360	574	774	227	32.6	3270	7800
	5/25/87	9	7.22	11220	647	834	327	35.8	3750	7910
	6/29/87	14.5	6.95	15670	1060	1030	481	10.2	4850	13700
	7/31/87	14.5	7.1	13250	940	882	428	16	4440	8130
	8/30/87	15.5	6.99	8270	458	544	169	23	2860	5730
	9/30/87	14	6.87	8250	461	513	117	15.8	2620	6480
	10/30/87	10	7.03	8020	463	596	222	17.4	2620	6050
	12/5/87	3.5	8.19	6460	186	626	94	115	2180	5360
	1/4/88	-1.5	7.27	7500	234	776	136	207	2550	5810
	TH "B"	1/31/87	1	7.27	16730	483	1162	561	476	5110
2/28/87		3.5	7.2	15300	388	1130	519	496	4430	9370
3/30/87		6.5	7.2	11440	263	844	321	474	3280	6440
4/24/87		11.5	7.16	9930	260	682	249	384	3000	6430
5/25/87		11	7.11	14740	545	940	700	420	5050	10600
6/29/87		18	6.99	14490	825	1150	1010	566	5750	12700
7/31/87		16	6.54	16260	673	1050	720	502	5680	10400
8/30/87		17	6.3	13210	546	765	499	395	4230	8650
9/30/87		16	6.5	15130	560	811	602	454	4240	12200
10/30/87		11.5	6.63	14090	589	875	553	441	4340	12800
12/5/87	4	6.58	15110	618	1190	316	604	5230	9800	
TH "C"	1/31/87	2	7.59	9790		754	326	60.6	2920	6840
	2/28/87	3.5	7.4	9170		679	245		2580	5570

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOLIDS (TDS, mg/L)
	3/30/87	6	7.34	8150	351	607	168	56.6	2350	5000
	4/24/87	11	7.61	4340	178	313	90.9	38.4	1090	2860
	5/25/87	10.5	7.47	7140	360	493	196	33.7	1980	5260
	6/29/87	12	7.25	7930	433	496	198	20.3	2160	6380
	7/31/87	12.5	6.92	7700	451	517	197	19.7	2490	4810
	8/30/87	13	6.86	13400	615	926	254	144	4420	12200
	9/30/87	14	6.73	17200	783	1080	564	161	5050	12100
	10/30/87	11.5	6.87	17350	911	1080	638	125	6350	15800
	12/5/87	5.5	6.88	16550	885	1170	748	144	5450	10200
	1/4/88	2	7.04	13480	624	954	429	85.6	3000	10000
TH "D"										
	1/31/87	1.5	7.58	11380	370	1010	406	37.8	3180	8030
	2/28/87	3.5	7.7	7190	190	621	206		2100	4800
	3/30/87	6	7.64	5300	126	467	120	20.3	1420	3130
	4/24/87	10.5	7.52	6670	185	510	185	39.9	1880	4190
	5/25/87	10	7.71	5980	200	487	177	38.6	1820	4150
	6/29/87	13	7.44	4920	268	294	100	20.3	1140	3800
	7/31/87	12.5	7.09	5220	378	336	135	15.7	1520	3400
	8/30/87	13	7.07	4200	389	234	93.7	8.9	1150	3410
	9/30/87	14	6.99	3070	361	192	43.2	6	1000	2770
	10/30/87	10.5	7.68	4680	448	279	75.2	4.4	1650	3850
	12/5/87	4	7.23	33600	2010	2370	1850	231	10200	33300
	1/4/88	0	7.04	18400	732	1220	785	117	6020	16500
TH "E"										
	1/31/87	2.5	6.73	60200	2760	1760	5370	3880	19400	45800
	2/28/87	4.5	6.9	64500	2680	1450	5050	3380	18200	43300
	3/30/87	7	6.5	71800	2580	1600	4960	3070	18300	35100
	4/24/87	10	6.65	67700	3050	1930	5710	3840	23900	48200
	5/25/87	10	6.55	90100	4170	2470	8800	6010	30300	70300
	6/29/87	14	6.14	100450	5510	2840	11200	8160	32900	106000
	7/31/87	13	6.07	105800	5610	3010	11700	7260	33500	89000



SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOLIDS (TDS, mg/L)
	8/30/87	14	6.03	104200	5670	2890	9170	8090	43100	95100
	9/30/87	12	5.82	118800	5500	2850	11600	8220	41300	95500
	10/30/87	11	6.41	121000	5780	2900	11600	8450	45900	84800
	12/5/87	5	6.52	96000	4930	2530	9700	6990	31200	68600
	1/4/88	5	6.12	77600	5390	2750	10800	7850	33600	85600
TH "F"	1/31/87	2	6.47	131300	3270	4020	9740	13300	42200	101000
	2/28/87	5	6.83	122800	3680	3860	9060	11800	40000	96000
	3/30/87	6	6.58	68000	1430	1640	4390	6540	19900	38200
	4/24/87	12	6.74	77500	1920	2090	4990	8840	28300	55800
	5/25/87	10.5	6.64	99300	2400	2990	6780	11500	35900	73600
	6/29/87	17	6.26	110230	3590	3060	6780	12100	35800	122000
	7/31/87	17	7.99	120300	3210	3370	8400	11600	39500	86800
	8/30/87	19	6.32	104200	3410	3350	8300	15700	48200	89600
	9/30/87	17	6.08	127800	3490	3290	9070	11700	45000	74800
	10/30/87	13	7.1	134600	3550	3220	9640	11400	42400	82000
	12/5/87	5	6.82	102100	3560	3260	9870	11500	32600	83300
	1/4/88	0	6.45	73700	3440	2940	9220	11700	35000	86800
TH "G"	1/31/87	2	9.21	18520	54.8	811	461	2770	5340	11300
	2/28/87	4.5	8.73	18060	38.7	730	547	2630	4620	11000
	3/30/87	6.5	8.47	22900	169	1020	619	3100	6690	13900
	4/24/87	14	9.08	12280	57.5	495	392	2160	3270	8200
	5/25/87	12.5	9.24	17950	46.2	687	668	2720	5050	12200
	6/29/87	19	8.93	19050	44.2	960	634	3850	7110	15800
	7/31/87	16	8.78	24900	47.4	1080	850	4220	9320	18400
	8/30/87	16.5	9.05	23900	24	1070	726	3700	7770	18600
	9/30/87	14	8.69	28300	36.8	1210	982	4070	7830	19900
	10/30/87	10	8.44	32100	53.8	1350	671	4430	8520	23700
	12/5/87	5.5	8.58	28300	46.1	1320	783	4220	7920	21200
	1/4/88	0	8.56	19800	71.7	901	746	2980	5110	13400

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILS (TDS, mg/L)	
TH "H"	1/31/87	5	9.86	22600	30.9	734	477	3520	5340	14200	
	2/28/87	6	9.49	22600	19.5	756	609	3600	5240	13800	
	3/30/87	7	9.44	28810	27.6	1250	414	4400	8250	18200	
	4/24/87	11	9.33	30800	36.7	1480	569	4670	9420	22700	
	5/25/87	11.5	9.69	29700	29.4	1120	756	4710	8080	19600	
	6/29/87	16.5	9.55	18790	36.5	980	466	4010	6190	16200	
	7/31/87	15	9.45	19950	25.4	802	537	3510	6430	13700	
	8/30/87	17	9.43	22000	19.5	1170	372	3560	8480	16700	
	9/30/87	15	9.37	24500	19.1	1040	562	3880	7170	14900	
	10/30/87	13	9.46	22400	17.3	878	541	3860	6080	16500	
	12/5/87	7	9.29	22700	28.1	1160	488	3320	5450	17200	
	1/4/88	1	9.03	28000	37.6	1450	538	4090	7700	19400	
	TH "I"	1/31/87	2	7.42	9890	541	682	266	6.8	2560	7150
		2/28/87	5	7.09	10040	357	731	310	18.7	2700	5770
3/30/87		6	6.73	10390	502	720	246	5.9	3280	6800	
4/24/87		12	7.44	10330	419	725	243	15.3	3410	8600	
5/25/87		11	7.24	10100	444	702	276	12.7	3030	6660	
6/29/87		17	6.92	9820	468	684	282	10.9	2910	6990	
7/31/87		18	6.84	9030	465	640	284	14.4	3190	6500	
8/30/87		15.5	6.89	8630	456	587	228	15.7	2620	7190	
9/30/87		13	7.01	8800	347	590	187	7.5	2510	5180	
10/30/87		9.5	7.37	8390	328	637	236	6.4	2850	7340	
12/5/87	5	6.76	7440	419	587	264	5.8	2370	6360		
1/4/88	0	6.65	7330	467	629	265	6.5	1840	6230		
TH "J"	1/31/87	1	9.92	6880	43.3	631	48.6	350	1530	5650	
	2/28/87	3.5	9.61	6400	49.4	571	62.4	343	1510	4530	
	3/30/87	5.5	9.66	4750	69.6	433	29.1	270	897	3470	
	4/24/87	6.5	9.41	5990	44.3	535	60.9	284	1520	4810	

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILDS (TDS, mg/L)
	5/25/87	10	9.87	5280	55.2	454	67	350	1290	3780
	6/29/87	16	9.56	6270	67	420	76.4	373	1240	4710
	7/31/87	16	9.31	5450	57.6	456	59.9	332	1460	3890
	8/30/87	15	9.38	7540	43.8	632	72.9	571	2110	5450
	9/30/87	15	9.37	6980	53.8	539	53.1	508	1770	5580
	10/30/87	11	9.47	6430	87.9	592	59.6	515	1650	4450
	12/5/87	6	9.36	6760	65.8	702	90.5	544	2010	6410
	1/4/88	0	9.44	5590	88	783	80	462	1380	5900
TH "K"	1/31/87	0	9.31	7890	9.1	835	142	271	1820	6150
	2/28/87	4.5	9.14	7830	9.8	835	128	202	1710	5430
	3/30/87	6.5	9.14	6420	13.9	757	106	159	1480	5150
	4/24/87	12	9.31	4860	8.4	573	136	109	918	3820
	5/25/87	11	9.57	4570	6	510	146	101	918	3700
	6/29/87	18	9.2	4430	7.5	484	156	90.2	714	4070
	7/31/87	19.5	9.25	4250	5.6	481	173	86.1	693	3570
	8/30/87	20.5	8.47	8890	9.2	1078	151	210	2510	6730
	9/30/87	18	8.71	8170	15.2	903	99.2	181	2020	5350
	10/30/87	12	8.89	7280	8.3	832	150	134	2120	5430
	12/5/87	4.5	7.9	29700	41.4	1350	170	503	7600	35100
	1/4/88	0.5	7.63	24700	42.6	1370	160	265	8700	23800
TH "M"	1/31/87	-1	9.89	6950	25.3	532	207	704	1130	5040
	2/28/87	3.5	9.4	5560	9.9	444	177	212	879	3750
	3/30/87	6.5	9.52	6350	20.1	493	183	557	1100	4800
	4/24/87	14.5	8.9	4960	21.8	398	171	499	742	3840
	5/25/87	13	8.87	4340	21.5	328	187	424	505	3370
	6/29/87	18.5	8.98	4590	11.6	302	198	314	377	3060
	7/31/87	21	8.45	3700	24	282	230	289	303	2740
	8/30/87	21	8.28	4270	22.8	298	198	315	526	3020
	9/30/87	18	8.33	3730	24	256	152	251	236	4160

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILDS (TDS, mg/L)
	10/30/87	11	8.66	3850	15.6	318	204	257	601	2790
	12/5/87	3.5	8.96	8210	15.2	614	255	1100	2010	6920
	1/4/88	-1	8.65	5850	19.3	530	182	638	1170	5090
<b>TH "N"</b>										
	1/31/87	1.5	9.64	14570	20.4	924	203	2320	3470	10200
	2/28/87	6.5	9.33	17740	23.6	963	234	2660	4620	11500
	3/30/87	6	9.04	22100	27.5	1000	234	3200	5430	15700
	4/24/87	12.5	8.9	23200	31.1	1110	267	3800	7010	15100
	5/25/87	9	8.93	22400	33.3	1110	250	3560	5990	15200
	6/29/87	15.5	8.64	18950	35.5	1180	259	3110	5750	15400
	7/31/87	16.5	8.54	18930	31.8	1150	281	3000	5230	13400
	8/30/87	17	8.73	20800	17.4	1140	227	3140	6250	16200
	9/30/87	16	8.37	19140	29	1130	186	3020	5760	12300
	10/30/87	12	8.31	18150	29	1120	241	3180	5590	12800
	12/5/87	6	8.41	24800	21.6	1290	284	3610	5450	16100
	1/4/88	-1	8.55	17500	37.2	1410	306	4480	7090	20500
<b>TH "P"</b>										
	1/31/87	1	8.8	1742	85.4	140	42.3	3.8	58	1180
	2/28/87	4	8.1	1680	68.3	133	57.7	3.9	67	1060
	3/30/87	5.5	7.74	1816	70.9	123	41.1	4.6	46	1080
	4/24/87	11.5	7.77	1810	78.2	124	71	11.1	72	1320
	5/25/87	9	7.73	1660	99.9	133	72.6	3.9	68	1290
	6/29/87	18.5	7.39	2080	112	131	72	4	69	1460
	7/31/87	14	7.36	1920	123	141	87.9	9.2	108	1390
	8/30/87	16	7.4	2030	140	143	76.3	6.8	89	1260
	9/30/87	14	7.32	2040	109	133	57.6	2.8	108	1580
	10/30/87	10	7.48	1830	137	138	72.7	3.2	210	1470
	12/5/87	5	7.52	2080	136	159	103	1.2	310	1870
	1/4/88	-1	7.52	1400	140	170	97.5	20.9	179	1540
<b>MW #1</b>										
	Jul-79		7.89		49	168	700	330	121.5	1130

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILDS (TDS, mg/L)
	Aug-79		7.87		120	220	500	210	61.2	1084
	Sep-79		7.7		68.5	360.5	210	240	1099	1598
	Oct-79		7.81		65	255	160	140	650	26.6
	Feb-80		8.39		5	193	199	347	956	2402
	Mar-80		8.96		41	304	2494	3763	15280	29256
	Jul-80		8.15		21	438	1513	2780	9744	19470
	Oct-80		8.15		102	592	3298	3487	9732	19118
	Oct-81		7.91		56	856	1375	602	4460	8898
	Dec-81		7.67		110	515	592	230	2516	5544
	Jan-82		7.8		89	466	701	206	2007	4246
	Feb-82		7.86		89	262	188	149	919	2574
	Mar-82		7.62		185	374	273	177	1485	3610
	May-82		7.61		119	457	321	228	1643	4254
	Jun-82		7.62		128	553	360	230	1949	4646
	Aug-82		7.78		121	640	419	242	2220	5616
	Sep-82		7.75		112	620	402	233	2208	6476
	Nov-82		7.07		160	659	488	417	2478	5752
	Dec-82		7.19		172	668	531	527	2726	6800
	Jan-83		7.2		169	732	594	620	2954	8518
	Mar-83		7.32		169	688	560	467	2803	7138
	May-83		7.31		178	691	549	468	2798	7304
	Sep-83		7.99		63	281	529	682	2052	4988
	Feb-84									
	Mar-84		7.97		31	68	111	153	381	958
	Apr-84		8.03		19	90	148	215	548	1520
	May-84		7.65		49	244	125	243	555	2062
	Jun-84		7.86		49	256	136	261	614	2320
	Jul-84		7.98		48	268	135	264	627	2364
	Aug-84		7.93		49	271	136	266	573	2402
	Sep-84		8.15		38	298	129	278	566	2422
	Oct-84		7.48		52	338	107	268	432	2386

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILDS (TDS, mg/L)
TH #2	Jul-79		7.42		53	41	12	48	1	292
	Aug-79		7.3		49	49	13	21	1.9	340
	Sep-79		8.02		15.5	89.5	29.1	33.5	62.1	502
	Oct-79		8.41		29	45.5	26.5	5	16.2	348
	Feb-80		8.18		1	525	97	11.5	332	5
	Mar-80		8.36		3	397	189	103	451	2454
	Jul-80		7.92		31	340	61	40	332	2482
	Oct-80		8.02		66	423	25	89	769	3216
	Oct-81		7.87		94	708	419	240	2388	5134
	Dec-81		7.88		67	158	118	83	608	1638
	Jan-82		8.12		69	197	144	103	723	1756
	Feb-82		7.88		84	291	210	166	967	3054
	Mar-82		7.8		97	309	228	156	1144	3346
	May-82		7.41		134	508	349	233	1789	4764
	Jun-82		7.49		144	585	372	239	1974	5734
	Aug-82		7.51		146	649	432	250	2257	5408
	Sep-82		7.37		131	617	403	232	2233	6624
	Nov-82		7.07		153	652	488	416	2502	5592
	Dec-82		7.15		174	667	525	470	2748	6980
	Jan-83		7.19		173	700	592	616	2986	8102
	Mar-83		7.36		169	685	559	506	2756	6946
	May-83		7.28		179	704	551	470	2750	6406
	Sep-83		7.5		107	536	392	386	2111	6532
	Feb-84		7.12		85	424	220	390	1072	3760
	Mar-84		7.18		33	155	78	152	369	1372
	Apr-84		7.43		46	201	101	208	524	1986
	May-84		7.81		21	108	184	271	614	1202
	Jun-84		7.9		22	132	229	341	795	1992
	Jul-84		7.86		21	137	238	374	795	2166
	Aug-84		7.9		33	164	262	464	871	2580

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILDS (TDS, mg/L)
	Sep-84		8.16		48	206	284	568	983	2976
	Oct-84		7.75		50	274	296	730	1182	3684
	1/31/87	0.5	7.51	5340	89.2	642	39.7	82.5	703	4000
	2/28/87	4.5	7.07	5210	108	628	51.7	65.3	1040	3880
	3/30/87	6	7.33	8480	84	638	38.2	26.3	1020	4570
	4/24/87	13	7.64	6440	98	630	47.5	189	957	4840
	5/25/87	12	7.49	5930	98.6	642	51.6	225	1000	4930
	6/29/87	18.5	7.09	7650	156	954	75.7	737	2070	9430
	7/31/87	20	6.96	9230	170	975	97.1	644	2290	6440
	8/30/87	18.5	6.94	8370	150	927	68.6	465	2400	7100
	9/30/87	16	6.88	9940	116	859	49.9	472	2620	5890
	10/30/87	11	8.25	8770	128	892	68.8	483	2510	6110
	12/5/87	4	7.21	13560	137	1210	125	898	3310	11600
	1/4/88	0.5	7.17	6930	126	849	68.9	143	1380	5030
TH #3	Jul-79		7.49		74	87	24	17	28.5	638
	Aug-79		7.34		77	92	27	2	29.2	728
	Sep-79		7.46		90.5	97.5	31.5	5	48.3	714
	Oct-79		7.52		63	89	41.5	2.5	42	684
	Feb-80		7.36		31	127	37.1	0.9	37.4	624
	Mar-80		8.92		18	128	155	66	483	1862
	Jul-80		7.63		33	135	22	4	19	804
	Oct-80		7.75		40	137	16	32	82	918
	Feb-82		8.15		31	200	40	5	102	1158
	Mar-82		8.23		33	209	41	5	117	1294
	May-82		8.34		34	213	40	5	114	1298
	Jun-82		8.45		33	221	45	8	136	1348
	Jan-83		8.15		41	173	34	6	128	1112
	Mar-83		8.35		32	182	43	5	148	1198
	May-83		8.43		31	179	39	10	154	1246
	Feb-84		7.84		34	201	44	6	234	1298

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILDS (TDS, mg/L)
	Mar-84		7.94		40	212	50	9	271	1470
	Apr-84		8.21		37	190	42	9	238	1310
	May-84		8.09		36	203	39	11	248	1256
	Jun-84		8.05		36	208	48	9	265	1460
	Jul-84		8.25		43	213	45	13	275	1516
	1/31/87	2	7.88	5340	93.8	484	60.8	28.3	1230	3900
	2/28/87	4.5	7.5	6000	113	523	81.8	58.1	1390	3970
	3/30/87	6.5	7.37	6540	135	558	86	11.5	1830	4630
	4/24/87	11	7.44	6500	158	589	99	92.7	1970	5620
	5/25/87	10.5	7.5	6850	148	599	116	98.2	2150	5210
	6/29/87	12	7.33	6650	164	557	92.6	47.9	1670	4730
	7/31/87	13	6.05	5790	151	541	90	12.5	1460	3310
	8/30/87	14	7.17	5680	150	508	71.5	15.6	2020	3800
	9/30/87	12	7.17	5620	157	505	69.7	8	1650	3320
	10/30/87	11	7.41	5160	157	505	69.7	8	1650	3320
	12/5/87	6	7.31	5110	161	544	96.6	15	1440	3120
	1/4/88	2	7.3	5050	156	573	105	30.8	1760	3670
TH #4	Mar-80		7.72		70	155	25	9	48	896
	Jul-80		7.36		45	116	43	36	10	742
	Feb-82		8.3		49	114	43	24	28	782
	Mar-82		8.31		51	114	45	22	29	820
	May-82		8.14		49	115	42	25	29	814
	Jun-82		8.31		50	118	46	25	31	822
	Jan-83		7.83		106	79	38	4	38	822
	Mar-83		8.12		107	78	32	3	26	768
	May-83		8.26		103	80	37	9	44	764
	Feb-84		7.71		104	113	41	7	99	1018
	Mar-84		7.85		103	112	41	6	102	1118
	Apr-84		8.03		108	117	41	10	110	1110
	May-84		7.82		107	115	89	10	111	1052



SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE, DISSOLVED (mg/L)	TOTAL DISSOLVED SOILDS (TDS, mg/L)
	Jun-84		7.62		105	116	42	8	118	1078
	Jul-84		7.55		108	115	41	6	118	1168
	Aug-84		7.53		100	120	45	12	103	1246
	Sep-84		7.56		83	98	38	3	32	
	Oct-84		7.7		79	100	41	4	36	868
	1/31/87	2.5	7.78	7340	208	611	121	12.7	1670	4780
	2/28/87	4	7.33	5890	155	494	140	23.6	1500	3740
	3/30/87	6	7.58	3850	141	410	100	24	1310	3380
	4/24/87	12	7.48	5620	204	436	120	20.8	1520	4510
	5/25/87	9.5	7.62	5420	169	470	130	29.4	1410	4100
	6/29/87	13	7.34	5280	225	391	108	13.1	1240	3610
	7/31/87	12	7.16	3860	193	283	94.8	7.7	924	2430
	8/30/87	13	7.32	4210	183	286	70.5	10.9	1150	2270
	9/30/87	12	7.35	3260	164	210	41.9	6	619	2460
	10/30/87	11	7.22	3560	263	236	56.7	2.9	878	2380
	12/5/87	5.5	8.32	13210	631	1080	512	49	3910	11300
	1/4/88	0.5	7.14	8690	392	860	287	30.1	3130	6240

## Appendix 2 - Ground-Water Quality Data for the Confined Aquifer in the Vicinity of the L-Bar Facility

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE (mg/L)	TOTAL DISSOLVED SOLIDS (TDS, mg/L)
HARRISON WELL	1/31/87	6	7.26	470	39.5	17.1	12.2	2.2	0.32	184
	2/28/87	8.5	7.71	489	54.7	19.7	12.8	2.4	1.54	216
	3/30/87	8	7.68	463	59	20.7	11.5	2.4	0.82	218
	4/24/87	19	7.75	456	51.8	20	11.6	2.4	1.24	172
	5/25/87	13	8.17	458	45.2	20.2	12.2	2.6	0.81	230
	6/29/87	13	7.66	390	52.4	20	11.6	2.2	0.79	134
	7/31/87	24	7.56	506	55.1	20.3	13.6	2.8	1.61	270
	8/30/87	10.5	7.26	492	51.8	20.2	11.2	2.8	0.85	252
	9/30/87	11	7.36	487	49.9	22.4	6.5	2.6	0.7	200
	10/30/87	8	7.66	471	55.2	22.1	9.6	2.3	1.29	252
	12/5/87	7	7.69	462	44.6	17	10.6	2.4	1	228
1/4/88	7.5	7.42	483	52	19.8	13.7	2.2	1.12	222	
HANSON WELL	1/31/87	9.5		506	53.8	21.2	11.7	2.2	0.27	212
	2/28/87	12		502	57	21.7	10.2	2.2	0.83	222
	3/30/87	9.5		528	59	23.1	10.1	2.4	0.82	244
	4/24/87	10.5		502	51.4	22.8	10.4	2.5	0.75	232
	5/25/87	9.5		500	48.3	23.6	12	4.2	11.4	248
	6/29/87	9.5		530	51.5	23	10.5	2.4	0.93	174
	7/31/87	16		568	55.3	24.2	12.4	2.5	1.16	218
	8/30/87	9		511	51.2	22.8	9.6	2.8	0.74	264
	9/30/87	10		503	49	19.7	6.8	2.4	0.62	222
	10/30/87	8		452	57.9	19.9	8.7	2.4	1.04	236
	12/5/87	9		474	55.6	19.6	9.9	2.9	1.45	270
1/4/88	11		414	51.7	22.2	12.7	2.3	1.17	208	

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE (mg/L)	TOTAL DISSOLVED SOLIDS (TDS, mg/L)
MELODY RIDER'S	1/31/87	6	7.29	474	50.5	17.2	15	1.9	0.34	144
	2/28/87	9	7.38	487	56.5	17.3	16	2.3	0.94	208
	3/30/87	7	7.63	483	59	17.8	16.7	2.3	0.86	182
	4/24/87	11	7.83	459	51.2	17.5	15.5	2.2	0.75	198
	5/25/87	10.5	8.17	484	48.8	17.9	15.8	2.4	0.88	248
	6/29/87	9	7.43	500	51.2	17.6	15.8	2.2	0.86	202
	7/31/87	16	7.76	494	52.2	18.1	17.6	2.2	1.11	220
	8/30/87	9	7.46	498	51.7	17.7	13.8	2.6	1.1	172
	9/30/87	10	7.4	487	49.7	16.9	9.8	2.6	0.67	194
	10/30/87	8	7.86	460	37.9	16.4	14.5	2.4	1	204
	12/5/87	6.5	7.71	387	53.6	22.5	13.8	2.3	1.18	146
	1/4/88	9	7.73	466	51.6	17.6	17.2	2.2	1.03	238
DEEP WELL										
	Jul-79		7.43		50	21	16	19	0	236
	Aug-79		7.13		71	44	21	4	0	242
	Sep-79		6.99		44	19.7	16.4	1.4	0.5	212
	Oct-79		7.35		42.8	17.2	20	2	1	280
	Feb-80		7.23		51	21	20.9	0.7	1	280
	Mar-80		6.83		49	20	19	1	1	270
	Jul-80		7.62		49	21	16	4	1	200
	Oct-80		7.12		41	18	1	12	1	238
	Oct-81		7.15		35	18	19	2	0.5	212
	Dec-81		7.08		45	18	19	3	1	234
	Jan-82		7.15		45	19	21	2	1	242
	Feb-82		7.09		40	29	23	9	28	286
	Mar-82		7.19		44	17	19	2	1	244
	May-82		6.82		45	19	19	2	1	244
	Jun-82		7.15		46	19	19	1	1	222
	Aug-82		7.29		45	18	20	2	1	252
	Sep-82		7.07		45	19	20	1	1	244
	Nov-82		7.14		46	19	22	2	1	250

SITE NAME (Station)	DATE SAMPLED	TEMP. (Celsius)	pH	CONDUCTIVITY (uMHO/cm)	CALCIUM (Ca, mg/L)	MAGNESIUM (Mg, mg/L)	SODIUM (Na, mg/L)	POTASSIUM (K, mg/L)	CHLORIDE (mg/L)	TOTAL DISSOLVED SOLIDS (TDS, mg/L)
	Dec-82		7.17		44	19	20	1	1	240
	Jan-83		7.09		46	19	20	2	1	268
	Mar-83		7.07		43	19	19	2	1	278
	May-83		7.18		43	20	19	2	3	242
	Sep-83		7.21		42	18	18	2	1	232
	Feb-84		7.08		45	18	19	2	1	232
	Mar-84		7.02		42	18	19	1	1	232
	Apr-84		7.14		44	18	20	2	1	246
	May-84		7.07		45	18	19	2	1	222
	Jun-84		7.03		43	18	20	2	1	242
	Jul-84		7.02		44	18	19	1	1	224
	Aug-84		7.11		43	18	20	2	1	250
	Sep-84		7.16		43	18	19	1	1	228
<b>L-BAR PRODUCTS</b>										
	1/31/87	4.5	7.35	451	42.7	17.3	17.3	1.8	1.12	230
	2/28/87	10.5	7.47	911	43.9	18.2	18.2	1.7	1.1	198
	3/30/87	9.5	7.34	721	45	17.5	18	1.5	1.75	200
	4/24/87	10	7.68	438	41.8	17.5	17.3	1.8	7.34	260
	5/25/87	11	7.79	440	39.5	17.8	17.5	1.6	3.75	148
	6/29/87	13	8.08	470	42.6	17.9	17.6	1.8	1.2	166
	7/31/87	17	7.08	430	41	17.9	19.4	1.6	1.98	180
	8/30/87	15	7.57	465	42.5	17.5	15.4	1.9	0.81	164
	9/30/87	14	7.43	474	39.2	16.9	11.2	1.6	0.7	100
	10/30/87	11.5	7.62	426	43	17.6	16.4	1.3	1.73	202
	12/5/87	4.5	8.4	420	43.5	17.2	15.2	1.5	1.86	166
	1/4/88	6	7.52	412	42.1	19.7	19.5	1.4	1.22	210

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TEMP. (Celsius)	pH	CONDUCTIVITY, (us)	AMMONIA (NH <sub>3</sub> -N, mg/L)	CHLORIDE (Cl, mg/L)	FLOW RATE (cfs)	NITROGEN TKN (mg/L)	FLUORIDE (mg/L)	NITRATE AS N (mg/L)	NITRITE AS N (mg/L)	PHOS-ORTHO (mg/L)	PHOS-TOTAL (mg/L)	SULFATE (mg/L)	TOTAL DIS SOLIDS (mg/L)
Upstream C.R. (RI ?)	Oct-80		7.56			10									296
	Mar-82		7.29			1									200
	May-82		6.47			1									170
	Jun-82		6.92			1									142
	Aug-82		7.58			1									202
	Sep-82		7.18			1									206
	Nov-82		7.11			1									214
	Dec-82		7.06			2									232
	Jan-83		7.11			3									264
	Mar-83		7.02			1									194
	May-83		7.02			1									152
	Sep-83		7.17			1									196
	Feb-84		6.82			2									206
	Mar-84		6.96			1									212
	Apr-84		7.04			1									162
	May-84		7.04			1									148
	Jun-84		7.04			1									156
	Jul-84		7.08			1									160
	Aug-84		7.01			2									208
	Sep-84		7.32			1									186
	Oct-84		7.37			1									288
	1/31/87	0.5	7.76	425		1.96									198
	2/28/87	5.5	7.61	455		2.24									248
	3/30/87	6	7.58	370		2.55									172
	4/24/87	16.5	8.2	325		2.66									180
	5/25/87	11.5	8.07	360		1.53									182
	6/29/87	24.5	8.23	470		2.71									442
	7/31/87	19	7.27	378		2.86									296
	8/30/87	17	8.12	425		1.15									236
	9/30/87	14	7.4	461		4.22									250
	10/30/87	10.5	7.98	411		2.32									148
	12/5/87	3	6.99	392		2.5									208
RI?	10/25/93	12	8.26	393	ND	4.6		0.2	ND	0.2	ND	0.03	0.03	11	235
RI	3/29/94	6.4	7.94	400	0.02	1.8	79.5								
	4/11/94	11.7	8.04	318	0.04	1.85	147.1								
	4/26/94	9.8	8.26	246	0.02	1.2	144.4								
	5/10/94	20.9	8.85	289	0.03	1.5	75.6								
	5/24/94	17.3	8.42	286	0.04	1.6	68.6								
	6/7/94	14.8	7.8	349	0.02	1.05	58.2								
	6/21/94	17	8.88	369	0.02	0.9	31.65								
	7/5/94	20.3	8.89	341	<0.01	1.15	17.2								
	7/18/94	22.2	8.08	385	0.01	1.8	9.7								

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TOTAL SUS SOLIDS (mg/L)	TOTAL ORG CARBON (mg/L)	TURBIDITY (ntu)	ALUMINUM (ppb)		ANTIMONY (ppb)		ARSENIC (ppb)		BARIUM (ppb)		BERYLLIUM (ppb)		CADMIUM (ppb)		CALCIUM (ppb)		
					Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total
Upstream C.R. (R1 ?)	Oct-80																		39
	Mar-82																		34
	May-82																		30
	Jun-82																		30
	Aug-82																		39
	Sep-82																		41
	Nov-82																		42
	Dec-82																		41
	Jan-83																		48
	Mar-83																		29
	May-83																		29
	Sep-83																		38
	Feb-84																		38
	Mar-84																		38
	Apr-84																		27
	May-84																		33
	Jun-84																		31
	Jul-84																		34
	Aug-84																		38
	Sep-84																		38
	Oct-84																		38
	1/31/87																		44.3
	2/28/87																		46.4
	3/30/87																		37
	4/24/87																		33.4
	5/25/87																		37.4
	6/29/87																		38.6
	7/31/87																		40.5
	8/30/87																		44.5
	9/30/87																		34.4
	10/30/87																		43
	12/5/87																		45
R1?	10/25/93	ND		2		22.8	4.3	0.16	0.15	3	2	158	178	ND	ND	0.03	0.03	41,400	42,000
R1	3/29/94																		
	4/11/94																		
	4/26/94																		
	5/10/94																		
	5/24/94																		
	6/7/94																		
	6/21/94																		
	7/5/94																		
	7/18/94																		

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	CHROMIUM (ppb)		COBALT (ppb)		COPPER (ppb)		IRON (ppb)		LEAD (ppb)		MAGNESIUM (ppb)		MANGANESE (ppb)		MOLYBDENUM (ppb)		NICKEL (ppb)	
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
Upstream C.R. (R1 ?)	Oct-80											23							
	Mar-82											15							
	May-82											14							
	Jun-82											14							
	Aug-82											20							
	Sep-82											21							
	Nov-82											21							
	Dec-82											21							
	Jan-83											23							
	Mar-83											14							
	May-83											13							
	Sep-83											21							
	Feb-84											18							
	Mar-84											18							
	Apr-84											12							
	May-84											15							
	Jun-84											14							
	Jul-84											16							
	Aug-84											19							
	Sep-84											20							
	Oct-84											19							
	1/31/87											18.8							
	2/28/87											21.6							
	3/30/87											17.7							
	4/24/87											15.3							
	5/25/87											18.8							
	6/29/87											21.6							
	7/31/87											22.3							
	8/30/87											21.8							
	9/30/87											21.1							
	10/30/87											21							
	12/5/87											20							
R1?	10/25/93	0.2	ND	0.23	0.22	1.59	1.14	60	137	0.14	0.1	20,900	21,100	26.2	26	2.18	2.3	ND	ND
R1	3/29/94																		
	4/11/94																		
	4/26/94																		
	5/10/94																		
	5/24/94																		
	6/7/94																		
	6/21/94																		
	7/5/94																		
	7/18/94																		

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	POTASSIUM (ppb)		SELENIUM (ppb)		SILVER (ppb)		SODIUM (ppb)		THALLIUM (ppb)		URANIUM (ppb)		VANADIUM (ppb)		ZINC (ppb)	
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
Upstream C.R. (R1 ?)	Oct-80	1						5									
	Mar-82	2						5									
	May-82	2						4									
	Jun-82	1						5									
	Aug-82	2						6									
	Sep-82	2						6									
	Nov-82	3						5									
	Dec-82	4						6									
	Jan-83	2						6									
	Mar-83	4						5									
	May-83	2						6									
	Sep-83	2						6									
	Feb-84	3						6									
	Mar-84	3						7									
	Apr-84	2						4									
	May-84	2						5									
	Jun-84	2						5									
	Jul-84	1						5									
	Aug-84	2						5									
	Sep-84	2						5									
Oct-84	2						6										
1/31/87	2.2						6.1										
2/28/87	2.2						5.8										
3/30/87	1.5						2.7										
4/24/87	2.2						3.4										
5/25/87	2						4.3										
6/29/87	2.3						5.7										
7/31/87	2.4						5.8										
8/30/87	2.6						4.9										
9/30/87	2.6						3.9										
10/30/87	3						3.8										
12/5/87	3.2						4.7										
RI?	10/25/93	4,580	4,300	ND	ND	0.03	ND	6,640	6,740	ND	ND	2	2.1	ND	ND	8.6	14.6
RI	3/29/94																
	4/11/94																
	4/26/94																
	5/10/94																
	5/24/94																
	6/7/94																
	6/21/94																
	7/5/94																
	7/18/94																



Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TEMP. (Celsius)	pH	CONDUCTI VITY, (us)	AMMONIA (NH <sub>3</sub> -N, mg/L)	CHLORIDE (Cl, mg/L)	FLOW RATE (cfs)	NITROGEN TKN (mg/L)	FLUORIDE (mg/L)	NITRATE AS N (mg/L)	NITRITE AS N (mg/L)	PHOS-ORTHO (mg/L)	PHOS-TOTAL (mg/L)	SULFATE (mg/L)	TOTAL DIS SOLIDS (mg/L)
	8/1/94	21.1	8.31	425	0.25	2.4	6.6								
	8/15/94	22.3	8.25	369	<0.01	2	8.9								
	8/29/94	15.6	8.02	393	0.14	1.6	14.9								
	9/12/94	9.9	7.82	330	0.23	2	20.2								
	9/26/94	11.7	7.42	370	<0.01	1.95	18.3								
	10/10/94	9.9	7.99	308	<0.01	2.2	20.3								
	10/24/94	5.6	8.1	374	0.03	2.15	22.5								
	11/7/94	4.1	8.47	370	0.05	2.1	28.9								
R2	3/29/94	8.8	8.07	318	0.02	1.75									
	4/11/94	12.8	8.42	334	0.02	2									
	4/26/94	10.9	8.21	243	0.01	1.3									
	5/10/94	19.5	8.45	299	0.03	1.55									
	5/24/94	17.2	8.39	298	0.02	1.85									
	6/7/94	14.7	7.96	337	0.02	2.15									
	6/21/94	17	8.8	366	0.01	1.35									
	7/5/94	20.6	8.88	344	<0.01	1.45									
	7/18/94	23.1	8.35	387	0.03	2.45									
	8/1/94	23.1	8.21	430	0.12	9.3									
	8/15/94	21	8.12	445	<0.01	8.5									
	8/29/94	15.2	8.11	388	0.02	5									
	9/12/94	9.5	7.89	374	0.02	3.25									
	9/26/94	11	7.4	349	<0.01	2.55									
	10/10/94	9.9	7.85	380	0.33	2.45									
	10/24/94	5.6	7.9	407	0.02	3									
	11/7/94	4	8.55	352	0.04	3.1									
Downstream C.R. (R3 ?)	Jul-79		8.16			15									216
	Aug-79		7.53			3.8									228
	Sep-79		7.36			0.5									194
	Oct-79		7.9			3.8									264
	Feb-80		6.84			2.5									376
	Mar-80		6.96			3									320
	Jul-80		7.1			1									142
	Oct-80		7.3			4									216
	Oct-81		7.38			1									194
	Dec-81		7.32			3									224
	Jan-82		6.97			6									186
	Feb-82		7.06			5									270
	Mar-82		7.16			1									196

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Section)	SAMPLE DATE	TOTAL SUS SOLIDS (mg/L)	TOTAL ORG CARBON (mg/L)	TURBIDITY (ntu)	ALUMINUM (ppb)		ANTIMONY (ppb)		ARSENIC (ppb)		BARIUM (ppb)		BERYLLIUM (ppb)		CADMIUM (ppb)		CALCIUM (ppb)		
					Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total
	8/1/94																		
	8/15/94																		
	8/29/94																		
	9/12/94																		
	9/26/94																		
	10/10/94																		
	10/24/94																		
	11/7/94																		
R2	3/29/94																		
	4/11/94																		
	4/26/94																		
	5/10/94																		
	5/24/94																		
	6/7/94																		
	6/21/94																		
	7/5/94																		
	7/18/94																		
	8/1/94																		
	8/15/94																		
	8/29/94																		
	9/12/94																		
	9/26/94																		
	10/10/94																		
	10/24/94																		
	11/7/94																		
Downstream C.R. (R3 ?)	Jul-79																		41
	Aug-79																		45
	Sep-79																		43.8
	Oct-79																		39.1
	Feb-80																		49
	Mar-80																		33
	Jul-80																		32
	Oct-80																		42
	Oct-81																		32
	Dec-81																		42
	Jan-82																		23
	Feb-82																		37
	Mar-82																		33

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	CHROMIUM (ppb)		COBALT (ppb)		COPPER (ppb)		IRON (ppb)		LEAD (ppb)		MAGNESIUM (ppb)		MANGANESE (ppb)		MOLYBDENUM (ppb)		NICKEL (ppb)			
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.		
	8/1/94																				
	8/15/94																				
	8/29/94																				
	9/12/94																				
	9/26/94																				
	10/10/94																				
	10/24/94																				
	11/7/94																				
R2	3/29/94																				
	4/11/94																				
	4/26/94																				
	5/10/94																				
	5/24/94																				
	6/7/94																				
	6/21/94																				
	7/5/94																				
	7/18/94																				
	8/1/94																				
	8/15/94																				
	8/29/94																				
	9/12/94																				
	9/26/94																				
	10/10/94																				
	10/24/94																				
	11/7/94																				
Downstream C.R. (R3 ?)	Jul-79																			23	
	Aug-79																			30	
	Sep-79																			22	
	Oct-79																			20.5	
	Feb-80																			34	
	Mar-80																			19	
	Jul-80																			17	
	Oct-80																			23	
	Oct-81																			21	
	Dec-81																			23	
	Jan-82																			27	
	Feb-82																			20	
	Mar-82																			16	

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	POTASSIUM (ppb)		SELENIUM (ppb)		SILVER (ppb)		SODIUM (ppb)		THIALLIUM (ppb)		URANIUM (ppb)		VANADIUM (ppb)		ZINC (ppb)	
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
	8/1/94																
	8/15/94																
	8/29/94																
	9/12/94																
	9/26/94																
	10/10/94																
	10/24/94																
	11/7/94																
R2	3/29/94																
	4/11/94																
	4/26/94																
	5/10/94																
	5/24/94																
	6/7/94																
	6/21/94																
	7/5/94																
	7/18/94																
	8/1/94																
	8/15/94																
	8/29/94																
	9/12/94																
	9/26/94																
	10/10/94																
	10/24/94																
	11/7/94																
Downstream C.R. (R3 ?)	Jul-79	34							84								
	Aug-79	21							8								
	Sep-79	2.2							6								
	Oct-79	3.5							10.2								
	Feb-80	2.3							9								
	Mar-80	2							6								
	Jul-80	4							4								
	Oct-80	1							3								
	Oct-81	3							6								
	Dec-81	5							7								
	Jan-82	6							9								
	Feb-82	5							8								
	Mar-82	3							6								

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TEMP. (Celsius)	pH	CONDUCTIVITY, (us)	AMMONIA (NH3-N, mg/L)	CHLORIDE (Cl, mg/L)	FLOW RATE (cfs)	NITROGEN TKN (mg/L)	FLUORIDE (mg/L)	NITRATE AS N (mg/L)	NITRITE AS N (mg/L)	PHOS-ORTHO (mg/L)	PHOS-TOTAL (mg/L)	SULFATE (mg/L)	TOTAL DIS SOLIDS (mg/L)
	May-82		6.11			1									174
	Jun-82		6.95			1									160
	Aug-82		7.62			1									198
	Sep-82		6.8			1									220
	Nov-82		7.42			2									216
	Dec-82		7.2			6									234
	Jan-83		7.24			8									284
	Mar-83		7.13			11									206
	May-83		7.31			3									152
	Sep-83		7.27			1									204
	Feb-84		6.94			2									202
	Mar-84		7.05			2									228
	Apr-84		7.21			1									162
	May-84		7.16			1									162
	Jun-84		7.27			3									182
	Jul-84		7.07			2									164
	Aug-84		7.18			2									222
	Sep-84		7.09			2									204
	Oct-84		7.52			2									312
	1/31/87	0.5	7.79	463		10.3									258
	2/28/87	5.5	7.73	458		9.16									248
	3/30/87	6.5	7.55	390		4.99									270
	4/24/87	17	7.95	317		2.06									198
	5/25/87	11	7.87	360		1.33									212
	6/29/87	24	8.27	400		1.56									242
	7/31/87	19.5	7.11	415		16.9									230
	8/30/87	17	8.01	413		2.51									162
	9/30/87	14	7.01	430		1.24									238
	10/30/87	11	8.25	410		2.75									224
	12/5/87	3	8.19	401		7.99									434
CR Down Stream (R3 ?)	10/25/93	11.6	8.28	396	0.1	4.2		0.4	ND	0.3	ND	0.01	0.03	10	219
R3	3/29/94	8.2	8.09	364	0.05	6.8									
	4/8/94	5	7.85	378	0.14	6.2	147.9								
	4/11/94	12.5	8.16	328	0.08	6.25									
	4/26/94	9.8	8.2	269	0.07	7									
	5/10/94	18.6	8.76	326	0.12	7.15									
	5/24/94	17.7	8.32	317	0.06	4.25									
	6/7/94	14.6	7.88	328	0.06	4.95									

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TOTAL SOLIDS (mg/L)	TOTAL ORG CARBON (mg/L)	TURBIDITY (ntu)	ALUMINUM (ppb)		ANTIMONY (ppb)		ARSENIC (ppb)		BARIUM (ppb)		BERYLLIUM (ppb)		CADMIUM (ppb)		CALCIUM (ppb)		
					Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total
	May-82																	29	
	Jun-82																	30	
	Aug-82																	38	
	Sep-82																	40	
	Nov-82																	41	
	Dec-82																	42	
	Jan-83																	47	
	Mar-83																	29	
	May-83																	28	
	Sep-83																	38	
	Feb-84																	38	
	Mar-84																	38	
	Apr-84																	27	
	May-84																	32	
	Jun-84																	32	
	Jul-84																	34	
	Aug-84																	38	
	Sep-84																	39	
	Oct-84																	38	
	1/31/87																	41.8	
	2/28/87																	44.7	
	3/30/87																	38.9	
	4/24/87																	35.9	
	5/25/87																	35	
	6/29/87																	37.8	
	7/31/87																	39.5	
	8/30/87																	44.6	
	9/30/87																	35.3	
	10/30/87																	45.3	
	12/5/87																	44.8	
CR Down Stream (R3 ?)	10/25/93	ND		0.6	36	5.2	0.15	0.19	2	2	132	192	ND	ND	0.03	0.04	41,900	42,200	
R3	3/29/94																		
	4/8/94																		
	4/11/94																		
	4/26/94																		
	5/10/94																		
	5/24/94																		
	6/7/94																		

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	CHROMIUM (ppb)		COBALT (ppb)		COPPER (ppb)		IRON (ppb)		LEAD (ppb)		MAGNESIUM (ppb)		MANGANESE (ppb)		MOLYBDENUM (ppb)		NICKEL (ppb)	
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
	May-82											14							
	Jun-82											15							
	Aug-82											21							
	Sep-82											21							
	Nov-82											22							
	Dec-82											23							
	Jan-83											25							
	Mar-83											14							
	May-83											13							
	Sep-83											20							
	Feb-84											18							
	Mar-84											18							
	Apr-84											12							
	May-84											15							
	Jun-84											16							
	Jul-84											16							
	Aug-84											19							
	Sep-84											20							
	Oct-84											19							
	1/31/87											22							
	2/28/87											23.7							
	3/30/87											19.1							
	4/24/87											15.3							
	5/25/87											15.7							
	6/29/87											10.2							
	7/31/87											29.5							
	8/30/87											22.1							
	9/30/87											21.1							
	10/30/87											21.1							
	12/5/87											21.8							
CR Down Stream (R3 ?)	10/25/93	0.5	0.2	0.24	0.21	0.98	1.04	165	60	0.11	0.11	21,000	21,200	27.7	24.6	3.02	2.91	ND	ND
R3	3/29/94																		
	4/8/94																		
	4/11/94																		
	4/26/94																		
	5/10/94																		
	5/24/94																		
	6/7/94																		

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	POTASSIUM (ppb)		SELENIUM (ppb)		SILVER (ppb)		SODIUM (ppb)		THALLIUM (ppb)		URANIUM (ppb)		VANADIUM (ppb)		ZINC (ppb)	
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
	May-82	2							4								
	Jun-82	2							5								
	Aug-82	2							6								
	Sep-82	2							6								
	Nov-82	3							7								
	Dec-82	7							8								
	Jan-83	5							9								
	Mar-83	3							7								
	May-83	3							6								
	Sep-83	3							6								
	Feb-84	3							6								
	Mar-84	2							7								
	Apr-84	2							4								
	May-84	2							5								
	Jun-84	8							5								
	Jul-84	2							5								
	Aug-84	2							5								
	Sep-84	2							5								
	Oct-84	2							6								
	1/31/87	5.8							8.2								
	2/28/87	4.1							6.9								
	3/30/87	2.6							3.5								
	4/24/87	2.1							3.2								
	5/25/87	1.9							3.5								
	6/29/87	1.9							4.2								
	7/31/87	7.7							8								
	8/30/87	2.9							5.4								
	9/30/87	2.6							4								
	10/30/87	3.5							4.2								
	12/5/87	6.3							6								
CR Down Stream (R3 ?)	10/25/93	4,170	3,940	ND	ND	0.04	ND	6,240	6,710	ND	ND	2.1	2	ND	ND	1.5	17.7
R3	3/29/94																
	4/8/94																
	4/11/94																
	4/26/94																
	5/10/94																
	5/24/94																
	6/7/94																



Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TEMP. (Celsius)	pH	CONDUCTIVITY (µS)	AMMONIA (NH <sub>3</sub> -N, mg/L)	CHLORIDE (Cl, mg/L)	FLOW RATE (cfs)	NITROGEN TKN (mg/L)	FLUORIDE (mg/L)	NITRATE AS N (mg/L)	NITRITE AS N (mg/L)	PHOS-ORTHO (mg/L)	PHOS-TOTAL (mg/L)	SULFATE (mg/L)	TOTAL DIS SOLIDS (mg/L)
	6/21/94	16.1	8.55	316	0.08	5.75									
	7/5/94	19.9	8.79	358	0.01	2.65									
	7/18/94	22.8	8.21	405	0.07	6.35									
	8/1/94	23	8.14	403	0.01	5.55									
	8/15/94	20.9	8.12	397	<0.01	6.6									
	8/29/94	15.1	8	402	0.01	6.95									
	9/12/94	9.8	8.06	384	<0.01	3.15									
	9/26/94	10.7	7.34	382	<0.01	2.35									
	10/10/94	9.9	7.98	366	<0.01	2.5									
	10/24/94	5.9	8.16	392	0.02	2.7									
	11/7/94	4	8.49	402	0.11	7.35									
Drainage Ditch (D1 ?)	1/31/87	2	8.08	32700		8950									19500
	2/28/87	8	8.06	29200		7900									17200
	3/30/87	13	7.75	23900		6680									15000
	4/24/87	15.5	7.49	36900		12200									25600
	5/25/87	DRY													
	6/29/87	DRY													
	7/31/87	DRY													
	8/30/87	DRY													
	9/30/87	DRY													
	10/30/87	13	8.8	55100		18200									33800
	12/5/87	4	9.04	30900		8980									27400
D1	3/29/94	14.1	8.61	79,200	621.16	25,000.00									
	4/8/94	7.9	8.52	18,400	178.88	6,460									
	4/11/94	18.8	8.5	18,560	158.65	6,112.50									
	4/26/94	15.4	8.42	33,900	287.93	12,175									
	5/10/94	27.5	8.03	30,700	222.67	8,037.50									
	5/24/94	23.8	8.33	15,200	136.24	5,262.50									
	6/7/94	15.4	8.06	24,800	201.38	8,862.50									
	6/21/94	26.1	7.8	33,300	303.16	12,000									
	7/5/94	29.2	7.39	42,000	363.31	14,675									
	7/18/94	27.5	7.14	46,700	368.47	18,200									
	8/1/94	23.4	7.38	52,200	467.32	19,800									
	8/15/94	19.3	7.55	45,700	362.59	17,000									
	8/29/94	15.2	7.53	42,500	358.45	15,075									
	9/12/94	6.4	7.74	41,400	345.41	14,100									
	9/26/94	5.1	7.66	48,400	465.61	17,425									
	10/10/94	8.9	7.9	30,500	346.39	13,900									

# Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TOTAL SUS SOLIDS (mg/L)	TOTAL ORG CARBON (mg/L)	TURBIDITY (ntu)	ALUMINUM (ppb)	ANTIMONY (ppb)		ARSENIC (ppb)		BARIUM (ppb)		BERYLLIUM (ppb)		CADMIUM (ppb)		CALCIUM (ppb)	
						Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
	6/21/94																
	7/5/94																
	7/18/94																
	8/1/94																
	8/15/94																
	8/29/94																
	9/12/94																
	9/26/94																
	10/10/94																
	10/24/94																
	11/7/94																
	1/31/87																
Drainage Ditch (D1 ?)	2/28/87																377
	3/30/87																402
	4/24/87																361
	5/25/87																414
	6/29/87																
	7/31/87																
	8/30/87																
	9/30/87																
	10/30/87																177
	12/5/87																117
D1	3/29/94																
	4/8/94																
	4/11/94																
	4/26/94																
	5/10/94																
	5/24/94																
	6/7/94																
	6/21/94																
	7/5/94																
	7/18/94																
	8/1/94																
	8/15/94																
	8/29/94																
	9/12/94																
	9/26/94																
	10/10/94																

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	CHROMIUM (ppb)		COBALT (ppb)		COPPER (ppb)		IRON (ppb)		LEAD (ppb)		MAGNESIUM (ppb)		MANGANESE (ppb)		MOLYBDENUM (ppb)		NICKEL (ppb)			
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.		
	6/21/94																				
	7/5/94																				
	7/18/94																				
	8/1/94																				
	8/15/94																				
	8/29/94																				
	9/12/94																				
	9/26/94																				
	10/10/94																				
	10/24/94																				
	11/7/94																				
Drainage Ditch (D1 ?)	1/31/87											1330									
	2/28/87											1120									
	3/30/87											971									
	4/24/87											1310									
	5/25/87																				
	6/29/87																				
	7/31/87																				
	8/30/87																				
	9/30/87																				
	10/30/87											2150									
	12/5/87											1520									
D1	3/29/94																				
	4/8/94																				
	4/11/94																				
	4/26/94																				
	5/10/94																				
	5/24/94																				
	6/7/94																				
	6/21/94																				
	7/5/94																				
	7/18/94																				
	8/1/94																				
	8/15/94																				
	8/29/94																				
	9/12/94																				
	9/26/94																				
	10/10/94																				

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	POTASSIUM (ppb)		SELENIUM (ppb)		SILVER (ppb)		SODIUM (ppb)		THIALLIUM (ppb)		URANIUM (ppb)		VANADIUM (ppb)		ZINC (ppb)	
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
	6/21/94																
	7/5/94																
	7/18/94																
	8/1/94																
	8/15/94																
	8/29/94																
	9/12/94																
	9/26/94																
	10/10/94																
	10/24/94																
	11/7/94																
Drainage Ditch (D1 ?)	1/31/87	2710						1770									
	2/28/87	2210						1630									
	3/30/87	1940						1310									
	4/24/87	3400						2550									
	5/25/87																
	6/29/87																
	7/31/87																
	8/30/87																
	9/30/87																
	10/30/87	5220						3970									
	12/5/87	3600						1650									
D1	3/29/94																
	4/8/94																
	4/11/94																
	4/26/94																
	5/10/94																
	5/24/94																
	6/7/94																
	6/21/94																
	7/5/94																
	7/18/94																
	8/1/94																
	8/15/94																
	8/29/94																
	9/12/94																
	9/26/94																
	10/10/94																

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TEMP. (Celsius)	pH	CONDUCTIVITY, (µs)	AMMONIA (NH <sub>3</sub> -N, mg/L)	CHLORIDE (Cl, mg/L)	FLOW RATE (cfs)	NITROGEN TKN (mg/L)	FLUORIDE (mg/L)	NITRATE AS N (mg/L)	NITRITE AS N (mg/L)	PHOS-ORTHO (mg/L)	PHOS-TOTAL (mg/L)	SULFATE (mg/L)	TOTAL DIS SOLIDS (mg/L)
	10/24/94	4.3	8.05	43,600	390.14	14,100									
	11/7/94	5.5	8.65	32,500	314.36	11,725									
D2	3/29/94	8.9	7.71	6,210	7.07	1,435									
	4/11/94	12.8	7.72	5,530	7	1,410									
	4/26/94	10.9	7.82	3,300	1.1	715									
	5/10/94	21.6	7.96	2,520	0.21	424.5									
	5/24/94	17.5	7.69	2,890	0.59	580.5									
	6/7/94	13.3	7.52	1,980	0.22	321.5									
	6/21/94	18	7.76	2,230	0.16	350.5									
	7/5/94	21.5	8.24	2,560	0.38	335									
Main Ditch S	10/25/93	9.9	8.9	25,600	210	7,200		186	1.7	13	4.1	0.03	0.04	940	13,200
Main Ditch Mid	10/25/93	11.1	8.62	24,600	190	7,200		296	1.7	13	5	0.02	0.04	950	13,400
Main Ditch N	10/25/93	14.1	8.4	21,300	160	6,800		176	1.7	12	5.2	0.02	0.04	1,100	12,300
Field	4/26/94				2.35	10,562.50									
Holding Pond	10/25/93	12	9.01	2,337	ND	730		0.9	1.7	ND	ND	ND	0.02	9.6	1,250
	7/18/94	28.1	8.75	2,250	0.15	492.5									
	11/1/94	7	9.25	2,030	0.15	546.5									
Evap. Pond	10/25/93	13.1	7.65	13,745	14.5	4,900		20.8	2.2	14	1.6	ND	0.01	42	8,120
	7/18/94	26.8	7.83	12,210	6.46	4,562.50									
	11/1/94	6.6	8.09	15,410	3.31	5,425									

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	TOTAL SOLIDS (mg/L)	TOTAL ORG CARBON (mg/L)	TURBIDITY (ntu)	ALUMINUM (ppb)		ANTIMONY (ppb)		ARSENIC (ppb)		BARIUM (ppb)		BERYLLIUM (ppb)		CADMIUM (ppb)		CALCIUM (ppb)		
					Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total
	10/24/94																		
	11/7/94																		
D2	3/29/94																		
	4/11/94																		
	4/26/94																		
	5/10/94																		
	5/24/94																		
	6/7/94																		
	6/21/94																		
	7/5/94																		
Main Ditch S	10/25/93	ND	2.9	0.4	39	28	2.2	2.6	2	2	184	222	0.6	0.6	0.7	0.7	160,000	157,000	
Main Ditch Mid	10/25/93	ND	2.9	0.6	28	26	2.4	2.2	2	2	162	196	0.5	0.5	0.8	0.7	152,000	153,000	
Main Ditch N	10/25/93	ND	3.1	0.9	33	24	2.3	2.3	2	2	164	211	0.5	0.5	0.6	0.7	149,000	147,000	
Field	4/26/94																		
Holding Pond	10/25/93	ND	10.7	1	20.1	9.3	0.48	0.46	ND	ND	679	717	ND	ND	0.14	0.14	61,200	60,500	
	7/18/94																		
	11/1/94																		
Evap. Pond	10/25/93	ND	3.9	1	59	49	1.1	0.9	1	1	1,500	1,550	ND	ND	19.4	18.6	439,000	438,000	
	7/18/94																		
	11/1/94																		

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	CHROMIUM (ppb)		COBALT (ppb)		COPPER (ppb)		IRON (ppb)		LEAD (ppb)		MAGNESIUM (ppb)		MANGANESE (ppb)		MOLYBDENUM (ppb)		NICKEL (ppb)		
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	
	10/24/94																			
	11/7/94																			
D2	3/29/94																			
	4/11/94																			
	4/26/94																			
	5/10/94																			
	5/24/94																			
	6/7/94																			
	6/21/94																			
	7/5/94																			
Main Ditch S	10/25/93	4	4	1.2	1.3	23.2	22.9	175	155	1.1	0.9	1,100,000	1,150,000	377	242	17.9	18.4	ND	ND	
Main Ditch Mid	10/25/93	4	4	1.2	1.1	19.9	19	162	158	0.9	0.9	1,100,000	1,060,000	354	133	17.9	16.9	ND	ND	
Main Ditch N	10/25/93	4	4	1.1	1.1	18.7	20.4	169	153	1.1	1.1	1,060,000	1,070,000	314	113	16.5	16.4	ND	ND	
Field	4/26/94																			
Holding Pond	10/25/93	0.4	0.4	0.36	0.36	1.79	1.92	46	39	0.27	0.2	94,700	92,600	3.92	1.09	8.24	8.57	ND	ND	
	7/18/94																			
	11/1/94																			
Evap. Pond	10/25/93	2	ND	2.3	2.2	19.8	20.5	138	134	1.2	1	490,000	495,000	17.8	14	3.3	3.2	ND	ND	
	7/18/94																			
	11/1/94																			

Appendix 3 - Surface-Water Quality Data for L-Bar Products, Inc and Adjacent Colville River

SITE NAME (Station)	SAMPLE DATE	POTASSIUM (ppb)		SELENIUM (ppb)		SILVER (ppb)		SODIUM (ppb)		THALLIUM (ppb)		URANIUM (ppb)		VANADIUM (ppb)		ZINC (ppb)	
		Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.	Total	Dis.
	10/24/94																
	11/7/94																
D2	3/29/94																
	4/11/94																
	4/26/94																
	5/10/94																
	5/24/94																
	6/7/94																
	6/21/94																
	7/5/94																
Main Ditch S	10/25/93	2,660,000	2,910,000	ND	ND	ND	ND	786,000	828,000	0.3	0.3	2	2	13	13	14	17
Main Ditch Mid	10/25/93	2,680,000	2,600,000	ND	ND	ND	ND	777,000	749,000	0.3	0.3	3	2	14	14	12	16
Main Ditch N	10/25/93	2,580,000	2,590,000	ND	ND	ND	ND	758,000	764,000	0.3	0.3	3	3	13	12	15	20
Field	4/26/94																
Holding Pond	10/25/93	110,000	108,000	ND	ND	0.04	ND	138,000	134,000	0.03	0.04	0.2	0.2	ND	ND	2.7	7.5
	7/18/94																
	11/1/94																
Evap. Pond	10/25/93	833,000	836,000	ND	ND	ND	ND	977,000	983,000	ND	ND	3	3	ND	ND	28	25
	7/18/94																
	11/1/94																



Appendix 4 - Ground-Water and Staff-Gage Water Levels for L-Bar Site (feet above MSL)												
Water-Table Aquifer												
Confined Aquifer												
Sample Date	Harrison Well	Hanson Well	Melody Rider's	L-Bar Products	Well A	Well B	Well C	Well D	Well E	Well F	Well G	
1/31/87	1657.37		1650.6	1645.97	1642.26	1641.9	1641.1	1639.11	1639.14	1638.69	1639.82	
2/28/87	1658.39	1657.91	1652.21	1645.94	1642	1641.95	1640.88	1639.07	1639.08	1638.71	1639.81	
3/30/87	1658.52	1658.2	1652.04	1645.65	1642.18	1641.98	1641.02	1639.41	1639.39	1638.89	1639.88	
4/24/87	1657.12	1656.96	1651.3	1645.73	1642.36	1641.3	1639.66	1638.15	1638.51	1638.61	1639.72	
5/25/87	1656.88	1656.52	1652.47	1645.72	1640.57	1640.45	1638.92	1638.06	1638.22	1638.59	1639.71	
6/29/87	1652.69	1653.29	1648.03	1644.42	1640.22	1639.57	1637.67	1636.86	1637.66	1638.39	1639.68	
7/31/87	1652.71	1653.5	1650.63	1644	1639.95	1639.9	1636.98	1636.16	1637.77	1638.33	1639.9	
8/30/87	1654.01	1653.98	1649.79	1644.68	1640.61	1640.63	1638.47	1636.36	1637.9	1638.35	1639.86	
9/30/87	1654.05	1654.85	1648.72	1645.29	1639.92	1639.84	1637.69	1636.05	1637.88	1638.35	1639.84	
10/30/87	1656.85	1655.6	1653.47	1644.55	1640.36	1641.41	1637.86	1636.17	1637.94	1638.5	1639.76	
12/5/87	1657.31	1655.95	1654.89	1646.24	1641.86	1640.62	1639.44	1638.61	1638.5	1638.08	1639.97	
1/4/88	1658.25	1656.75	1654.06	1642.9	1641.26		1639.84	1638.08	1638.59	1639.04	1639.51	

Table 4 - Ground-Water and Staff-Gage Water Levels for L-Bar Site (feet above MSL) (cont)												
Water-Table Aquifer												
Well H	Well I	Well J	Well K	Well M	Well N	Well P	Well # 2	Well #3	Well # 4	C.R. Staff Gage		
1641.75	1642.66	1644.65	1645.07	1643.24	1642.29	1640.72	1643.94	1640.41	1639.28	1635.17		
1641.77	1642.74	1644.05	1644.52	1642.95	1641.92	1640.3	1643.78	1640.36	1639.3	1635.25		
1642.01	1642.85	1644.46	1644.6	1642.33	1641.93	1640.3	1643.64	1640.53	1639.65	1636.37		
1641.83	1642.32	1643.44	1643.78	1642.16	1641.34	1639.51	1643.08	1638.66	1638.22	1635.87		
1641.68	1642	1642.9	1643.14	1641.98	1641.1	1639.11	1642.38	1636.78	1638.16	1634.79	(5/30/87)	
1641.63	1641.88	1642.64	1642.84	1641.87	1640.91	1638.59	1642.25	1636.62	1636.92	1634.52		
1641.7	1642.25	1642.9	1642.24	1641.98	1641.15	1638.57	1642.55	1636.25	1636.43	1634.62		
1641.77	1642.62	1643.36	1643.89	1641.99	1641.31	1638.91	1643	1636.04	1636.47	1634.66	(8/2/87)	
1641.67	1642.03	1642.99	1643.37	1642.07	1641.4	1638.88	1642.41	1636.25	1636.11	1634.78		
1641.31	1641.96	1642.62	1642.38	1642.3	1641.21	1638.7	1642.33	1635.57	1635.4	1634.92		
1641.98	1641.91	1644.71	1645.59	1642.61	1642.08	1640.12	1643.91	1638.22	1637.56	1634.92		
1642.15	1642.11	1643.9	1644.38	1642.41	1640.81	1639.34	1642.87	1638.9	1638.65	1635.19		

# Appendix 5

	A	B	C	D	E	F	G	H	I
1	<b>Estimates of Natural Ground-Water Discharge and Contaminant Loading</b>								
2	<b>From the L-Bar Site to the Colville River</b>								
3									
4	Hydraulic Conductivity (K) [(ft/day)]	Length of Cross-sec Area (ft)	Aquifer Thickness (ft)	Cross-sec Area (ft <sup>2</sup> ) (1)	Average Gradient (dh/dL) (2)	Discharge to Colville R. = Q (ft <sup>3</sup> /sec) (3)	Q (liters/day) (4)	Average Cl <sup>-</sup> Concentration in GW (mg/L) (5)	Cl <sup>-</sup> Loading (kg/day) (6)
5									
6	0.1	840	8	6720	0.005	3.89E-05	95	17,400	1.7
7	1			6720	0.005	3.89E-04	951	17,400	17
8									
9	(1) B6 * C6								
10									
11	(2) Average gradient determined using Figure 2 & dividing the measured horizontal distance from various points on L-Bar site, down slope to the river, into the difference in head across that distance.								
12									
13									
14	(3) (A6 * D6 * E6)/86,400 Units: Q = KA(dh/dL), Q = ft/day * ft <sup>2</sup> /1 * dh/dL = ft <sup>3</sup> /day * 1 day/86,400 sec = ft <sup>3</sup> /sec.								
15									
16	(4) Units: ft <sup>3</sup> /sec * 7.48 gal/ft <sup>3</sup> * 86,400 sec/1 day * 3.785 liters/1 gal = liters/day								
17									
18	(5) Calculated from 1987 water-quality data collected by In-Situ, 1988								
19									
20	(6) Q, from G6 or G7 = liters/day * H6 or H7 in mg/l * 1g/1000 mg * 1Kg/1000 g = Kg/day								