Alaska Gold Company
A NovaGold Subsidiary

January 27, 2006

Luke Boles
Alaska Department of Environmental Conservation
610 University Avenue
Anchorage, AK 99709

Memorandum to Accompany Stream Reclassification Petition

Alaska Gold is submitting the attached stream reclassification petition for the following reasons:

- Alaska Gold Company is proposing to develop the Rock Creek Mine along Rock Creek and adjacent to Lindblom Creek. When the mine closes, there will remain a pit in Rock Creek that fills to a lake, becoming waters of the State,
- The Rock Creek pit lake water quality will meet baseline conditions, but cannot feasibly be cleaner than natural conditions at the site. Arsenic levels in the pit lake, although similar if not slightly lower than baseline, and average natural conditions, will exceed the drinking water standard for arsenic. This could result in the need for perpetual treatment to make the creek cleaner than its natural state, and/or result in unfair violations to the company;
- The natural background criterion is a potential means of resolving this issue. However, complications with that regulation are as follows:
    - EPA has asserted that the natural background criterion cannot be attributed to the drinking water use, this may or may not be legally defensible or within their jurisdiction;
    - There is some uncertainty if the definition of “natural background” can be applied for data collected in the mineralized zone in midstream and downstream Rock Creek due to historical surface mining. The fact that the water quality of the stream is dependent on the groundwater, which was not subject to human activity, may or may not resolve this concern.
    - EPA’s stated policy is to apply the lowest 5^{th} percentile to water quality data for determination of a natural background standard. This policy results in too stringent of a standard if the mine must use upstream data where there has been no surface disturbance, but where there is also less mineralization. The requirement to use the lowest 5^{th} percentile as the natural background standard may not be legally defensible or within EPA’s jurisdiction.

P.O. Box 640, Nome, Alaska 99762- 0640 USA ●Telephone 1- 907- 443- 5272 ● Facsimile 1- 907- 443- 5472

Head Office:
Suite 3454, Four Bentall Centre, 1055 Dunsmuir Street, P.O. Box 49215, Vancouver, BC V7X 1K8 Canada
Telephone 1- 604- 669- 6227 ● Facsimile 1- 604- 669- 6272

- Lindblom Creek is in an area that could be subject to mine expansion in the future. Lindblom Creek, in its natural condition, does not meet the drinking water criteria for arsenic. This could cause additional compliance confusion for monitoring conducted in the area.
- Due to the uncertainties surrounding the natural background criterion, and the permitting delays that would accompany resolution of these uncertainties, reclassification of the creeks is the most direct means to address the natural mineralization at the sites; and
- Reclassification may be the most direct means to address closure bonding that needs to be calculated in the near future. The bond amount needs to accommodate the anticipation of the reclassification to avoid the unnecessary burden of bonding for treatment for imperpetuity.

Please review the following stream reclassification petition. Contact me if there are additional data needs at (907) 743-9366 or by e-mail at cmaccay@beesc.com.

Thank you,

Charlotte L. MacCay
Environmental Manager

cc: Lynn Kent
Pete McGee
Nancy Sonofrank
Cameron Leonard
Tom Crafford

Alaska Gold Company

A NovaGold Subsidiary

January 27, 2006

Luke Boles
Alaska Department of Environmental Conservation
610 University Avenue
Fairbanks, Alaska 99709

RE: Petition to Reclassify Rock Creek and Lindblom Creek

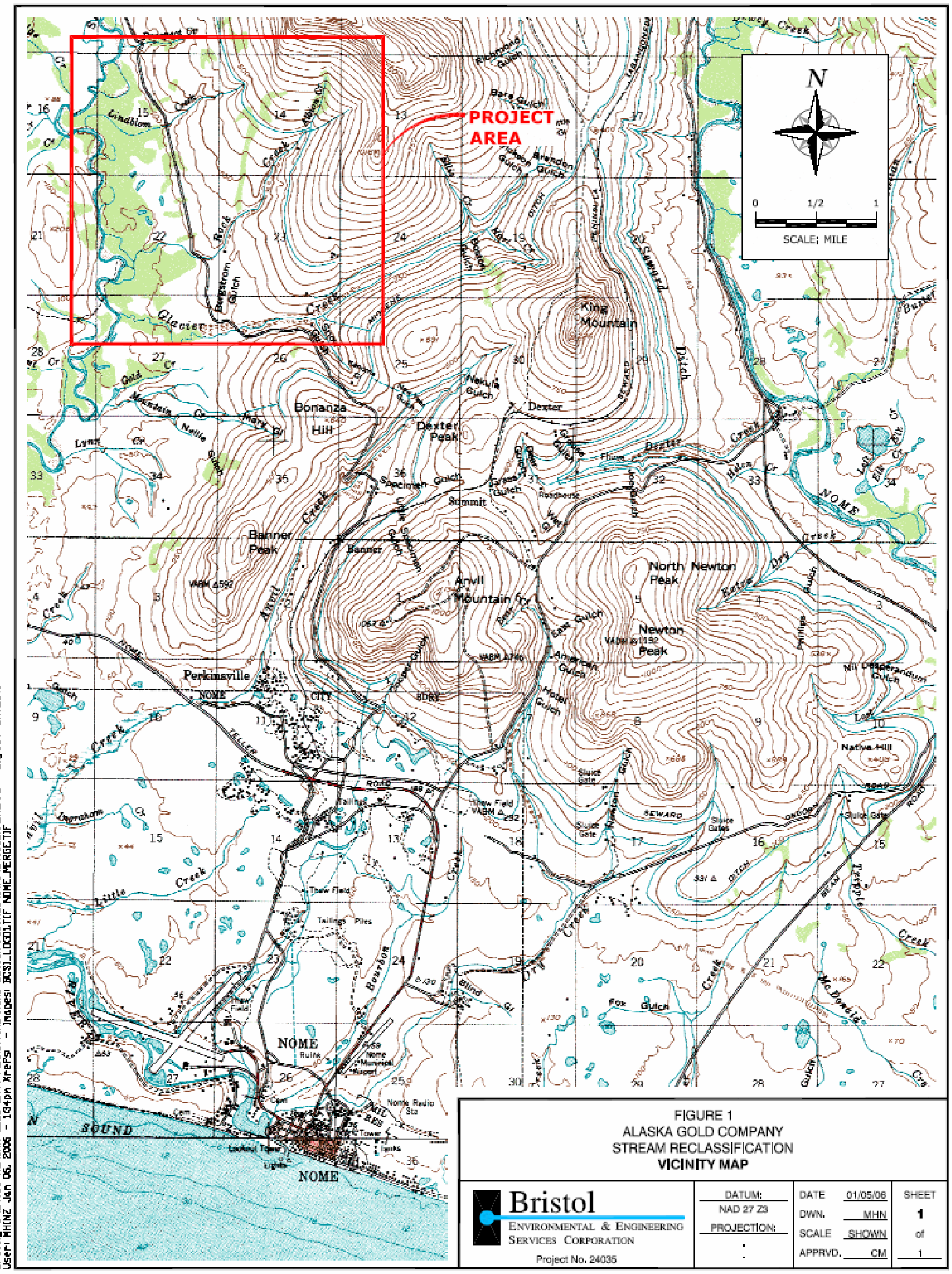
Dear Mr. Boles:

Alaska Gold Company is petitioning to remove the drinking water use from Rock Creek and from Lindblom Creek. Both streams are tributaries of the Snake River near Nome, Alaska. Rock Creek is located approximately 7 miles north of Nome and lies within the footprint of the proposed Rock Creek Mine. Lindblom Creek is the next drainage to the north and lies just outside of the proposed project boundary. The location of the streams is presented in Figure 1.

The reclassification petition is based on regulations contained within Title 40, Code of Federal Regulations, – Protection of the Environment, Chapter One – Environmental Protection Agency, Part 131 – Water Quality Standards Subpart B – Establishment of Water Quality Standards, and The Alaska Administrative Code, Chapter 70, Water Quality Standards. The reclassification petition addresses the following facts:

- According to 40 CFR 131.10(g)(6)(h)(1), states may not remove designated uses if they are an existing use, as defined in Section 131.3. 40 CFR 131.3(e) defines an existing use as those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards. The drinking water use is not currently an existing use in either Rock Creek or Lindblom Creek, and the drinking water use was not attained in either creek on or after November 28, 1975.
- Rock Creek and Lindblom Creek meet the following factors as listed in 40 CFR 131.10, Procedures for Removal of Designated Uses:
  - Factor 1- Naturally occurring pollutant concentrations prevent the attainment of the use and,

– **Figure 1: Vicinity Map**



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> Factor 2 – Natural, ephemeral, intermittent, or low-flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met. The information presented below is provided in support of this petition.

1.0 EXISTING USE

According to 40 CFR 131.10(g)(6)(h)(1), states may not remove designated uses if they are an existing use, as defined in Section 131.3. 40 CFR 131.3(e) defines an existing use as those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.

1.1 ROCK CREEK

Rock Creek is located on privately owned patented mining claims. There are no residences or public facilities located along Rock Creek. There is no public access to the creek, and no drinking water wells or water withdrawal system in place in the Rock Creek drainage. There is no record or evidence of any drinking water use on or after November 28, 1975.

1.2 LINDBLOM CREEK

Lindblom Creek is located on Native corporation land. There are no residences or public facilities along Lindblom Creek. There are no drinking water wells or water withdrawal systems in place in the Lindblom Creek drainage. There is no record or evidence of any drinking water use on or after November 28, 1975.

2.0 REMOVAL OF DESIGNATED USES

According to 40 CFR 131.10(g), states may remove a designated use which is not an existing use, as defined in 131.3, if the state can demonstrate that attaining the designated use is not feasible due to one or more of the six stated factors listed in Section 131.10 (g). The Reclassification Petition for Rock Creek and Lindblom Creek is based on two of these factors: Factor One that allows for removal of a designated use if there are naturally occurring pollutants, and Factor Two that allows for removal of a designated use if there are natural, ephemeral, intermittent, or low flow conditions or water levels that prevent the attainment of the use.

2.1 FACTOR ONE – NATURALLY OCCURRING POLLUTANT CONCENTRATIONS PREVENT ATTAINMENT OF THE USE

Removal of a use based on Factor One requires data that support that the pollutant levels are at a concentration that prevents attainment of the use, and that data support that assertion that the source of the pollutants is natural. State of Alaska Water Quality Standards, under 18 AAC 70.990(41), define “natural condition” to mean “any physical, biological, or radiological condition existing in a waterbody before any human-caused influence on, discharge to, or addition of material to, the waterbody."

2.1.1 Rock Creek

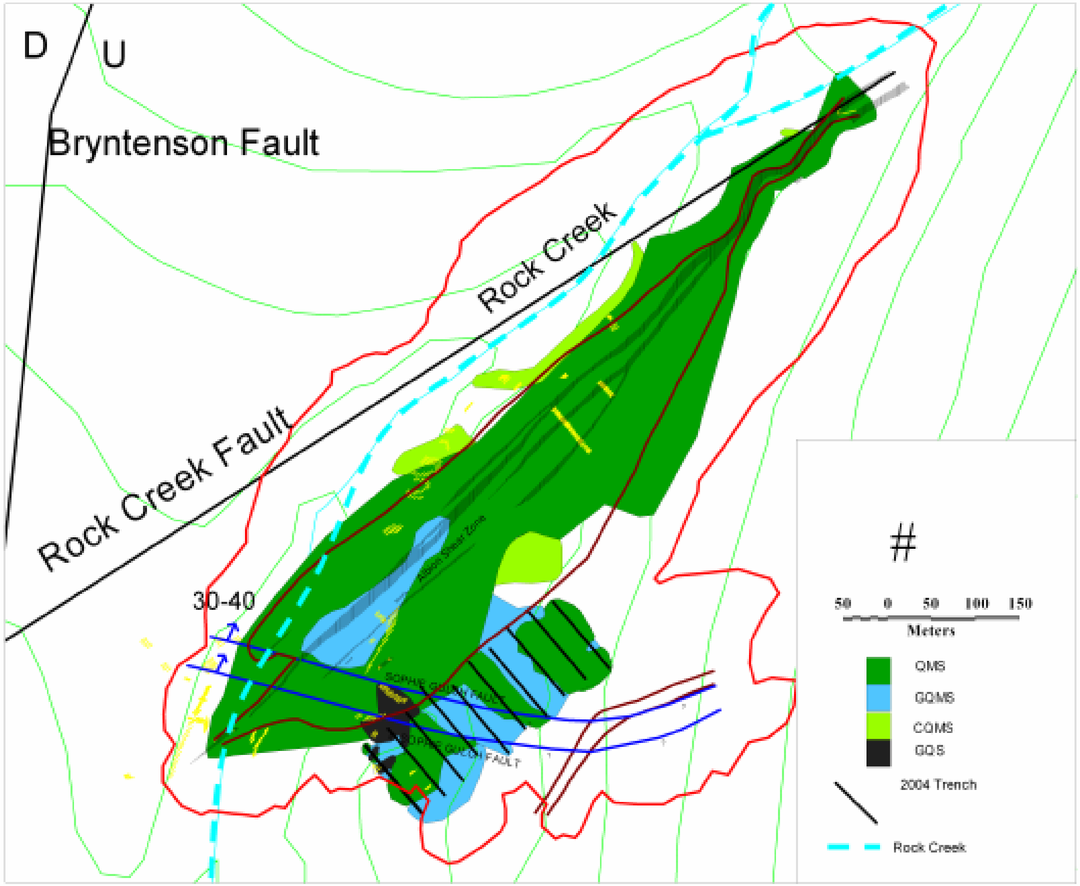
2.1.2 Geology of the Area.

The geology in the area is generally high in arsenic-bearing sulfides. These sulfides are the natural source of arsenic in the groundwater and surface water in the Rock Creek area. It is a source that pre-dates human activity in the area. The profound abundance of arsenic in the regional geology is exemplified by local place names such as Arsenic Mountain.

The Mixed Unit of the Nome Schist Belt in the vicinity of the Rock Creek deposit is composed primarily of Quartz-Muscovite Schist with varying amounts of graphite and calcite. Figure 2 below identifies these different rock types within the outline of the proposed Rock Creek Mine pit. Rock Creek flows through the center of this outlined area.

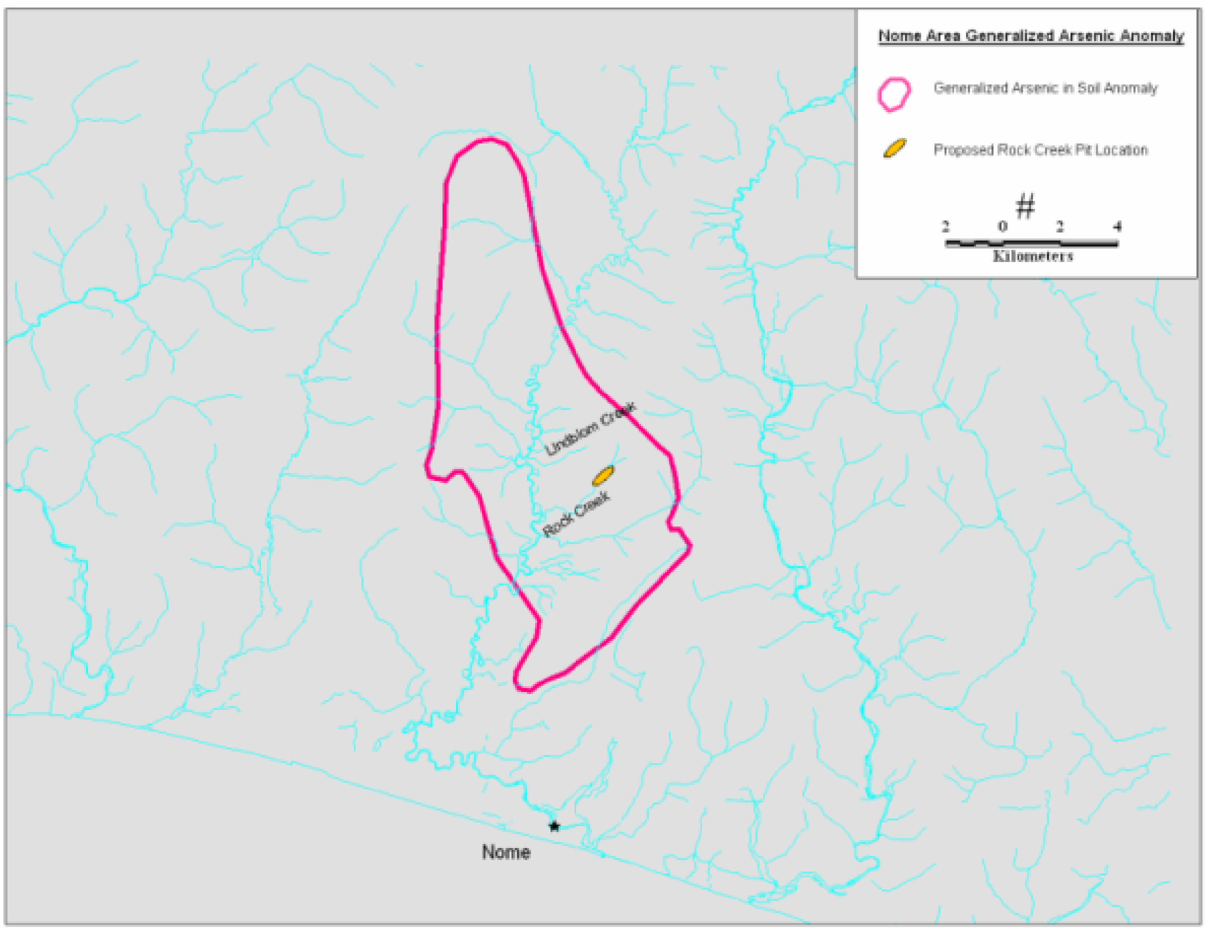
Within the Mixed Unit of the Nome Schist Belt, increased syngenetic pyrite and phyrrotite are associated with rocks with higher concentrations of graphite. Typically, the arsenic-bearing sulfide content in these rocks is in the trace-1% range. However, in graphite and graphitic schist, sulfide concentrations can be in excess of +5%. In Figure 2 below, graphitic quartz-muscovite is represented by light blue and quartzitic graphitic schist is depicted in dark green. Both of these units contain more syngenetic sulfides and are concentrated in the southwestern portion of the pit. These arsenic-bearing sulfides have been present in the host rocks since original sediment deposition and will most likely be present wherever there is graphite-bearing schist in the area.

Figure 2: The Nome Schist Belt in the Vicinity of Rock Creek



Hydrothermal fluids are responsible for a second source of arsenic-bearing sulfide mineralization. This style of mineralization at Rock Creek is concentrated in the tension vein zone and the Albion shear zone. Hydrothermal sulfide mineralization increases within and adjacent to individual veins and vein zones. Total sulfide content can be as high as +5% but typically is in the trace-2% range. These sulfides are most likely contemporaneous with gold mineralization. Gold and arsenic were probably precipitated from the same hydrothermal fluids when specific pressure, temperature, and oxidation potential conditions were present. Figure 3 below shows a generalized arsenic anomaly defined by soil samples. The Rock Creek deposit represents a very small portion of this district-wide arsenic anomaly.

Figure 3: The Nome Area Generalized Arsenic Anomaly



2.1.2.1 Elevated arsenic in Rock Creek is a perennial condition arising from the interaction of local geology with groundwater, and the subsequent flow of groundwater into Rock Creek.

The water in Rock Creek is naturally elevated in arsenic as a result of groundwater interaction with the local geology and the subsequent surfacing of the groundwater into Rock Creek. As water from snow and rain seeps into the ground, it interacts with this rock and soil. Arsenic minerals dissolve and arsenic concentrations in the water increase. Groundwater, which remains unaffected by man-made disturbance, is strongly mineralized from flowing through the mineralized rock and has elevated concentrations of arsenic. This groundwater eventually finds its way into Rock Creek. A map of groundwater sampling well locations in presented in Figure 4 below. Groundwater quality data are presented below in Table 1.

Rock Creek water is naturally elevated in arsenic because the rocks and soils have high arsenic concentrations. According to whole rock chemistry data, the materials at Rock Creek are about 1,000 times higher in arsenic than average igneous rocks. Whole rock elemental data summaries for arsenic are provided in Table 2 below.

Groundwater consists of both shallow groundwater that has relatively short travel paths to Rock Creek, and deeper groundwater that flows downward to the larger groundwater system and then back up to Rock Creek.

Shallow groundwater migrates along the bedrock/soil interface or in shallow fractures and daylights as springs near the creek banks. These are observed along the upper reaches of Rock Creek. Deeper groundwater migrates downward to the larger aquifer fracture system and then percolates upward into Rock Creek along the entire reach from above the mineralized deposit and previously mined area down to where the creek flows onto the Snake River alluvium. Upward percolation is observed in older exploration boreholes in the creek bottom and from artesian conditions around the creek.

The contribution of groundwater to Rock Creek is supported by the baseflow analysis conducted for Rock Creek, which shows approximately 3 liters/second percolating upward into Rock Creek upstream of Station RCK1 from groundwater, and approximately 10 liters/second percolating upward into Rock Creek upstream of Station ROCK.

The primary evidence of the groundwater influence on Rock Creek water quality is the elevated arsenic in the water chemistry observed in the dissolved analyses at the most upstream station, RCK1. This station is located above the previously mined areas. Surface water may also contribute arsenic to the system through arsenic-bearing soil and rock material eroded into the creek during storm events. Erosion of soils into the creek may be a natural event or an event exacerbated by human disturbance. However, because eroded particles of sand, silt, and clay contain predominantly suspended arsenic, they generally do not affect the dissolved concentrations observed in Rock Creek, but show up instead as the difference between the dissolved and total analyses. The groundwater component at RCK1, represented by the dissolved analyses, consistently exceeds the drinking water standard indicating that the groundwater provides a natural source of the pollutant arsenic that prevents attainment of the drinking water use within Rock Creek. The groundwater flows measured in the baseflow analyses, and the concentration of arsenic known to be in the groundwater, can essentially account for the arsenic we observe in the Rock Creek water both downstream at station ROCK and upstream at RCK1. A map of the surface water sampling stations is presented in Figure 5 below.

Figure 4: **Groundwater Sampling Well Locations**

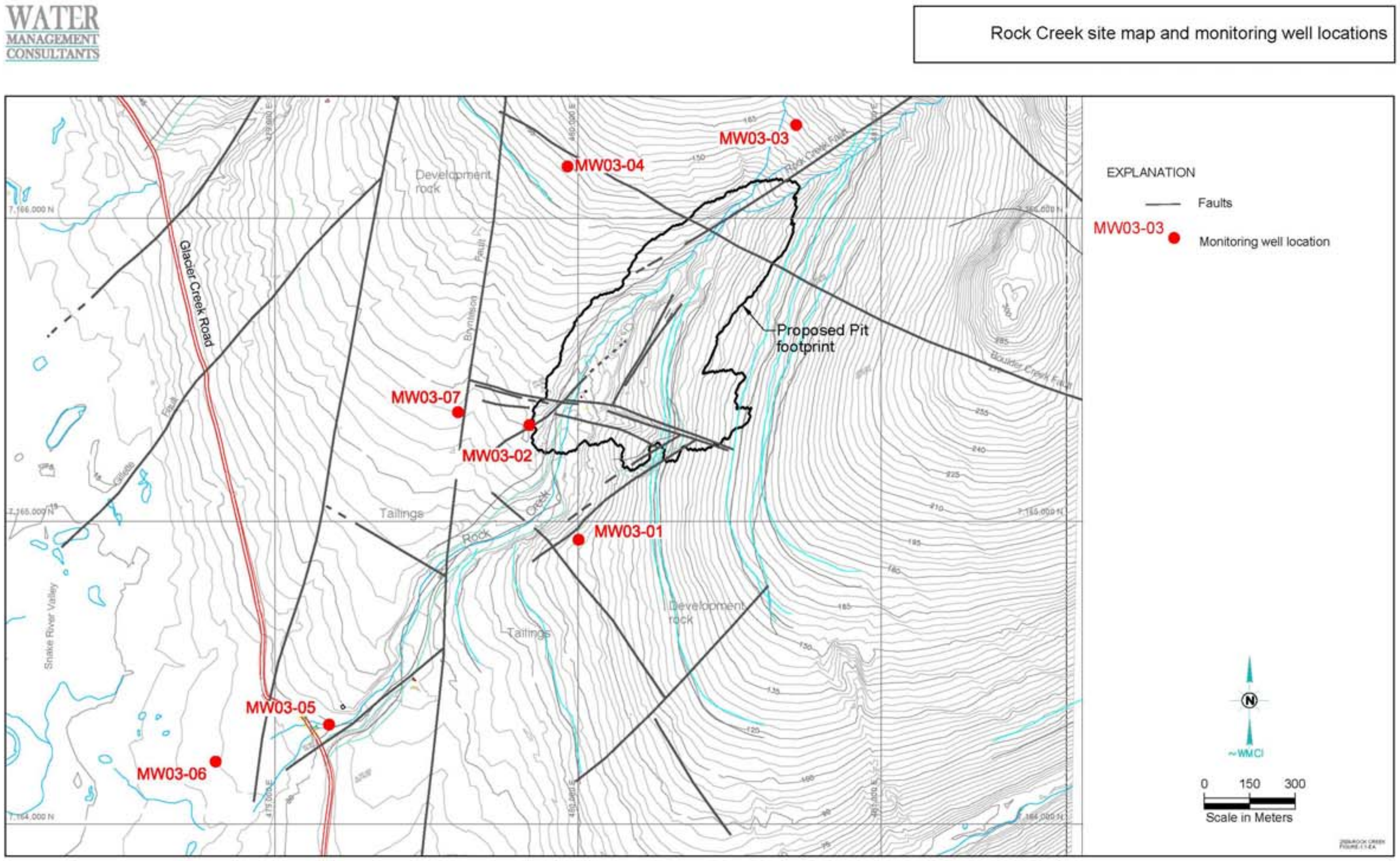


Table 1: Groundwater Quality Data

Well Number	Date	Analyte	Result mg/L	Analyte	Result ug/L
MW03-01	1/30/04	Arsenic, dissolved	146	Arsenic, total	211
MW03-01	4/22/04	Arsenic, dissolved	187	Arsenic, total	162
MW03-01	7/29/04	Arsenic, dissolved	147	Arsenic, total	145
MW03-01	11/4/04	Arsenic, dissolved	169	Arsenic, total	175
MW03-01	1/18/05	Arsenic, dissolved	132	Arsenic, total	185
MW03-01	4/19/05	Arsenic, dissolved	123	Arsenic, total	190
MW03-01	10/20/03	Arsenic, dissolved	148	Arsenic, total	230
MW03-02	1/29/04	Arsenic, dissolved	1,110	Arsenic, total	1,450
MW03-02	4/22/04	Arsenic, dissolved	1,180	Arsenic, total	1,380
MW03-02	7/15/04	Arsenic, dissolved	1,360	Arsenic, total	1,600
MW03-02	10/14/04	Arsenic, dissolved	1,240	Arsenic, total	1,170
MW03-02	1/1/05	Arsenic, dissolved	738	Arsenic, total	1,820
MW03-02	1/18/05	Arsenic, dissolved	738	Arsenic, total	1,820
MW03-02	4/19/05	Arsenic, dissolved	1,110	Arsenic, total	2,440
MW03-02	10/20/03	Arsenic, dissolved	161	Arsenic, total	3,980
MW03-03	1/30/04	Arsenic, dissolved	46.8	Arsenic, total	46.4
MW03-03	4/21/04	Arsenic, dissolved	48.8	Arsenic, total	51.6
MW03-03	7/28/04	Arsenic, dissolved	45	Arsenic, total	43.4
MW03-03	10/28/04	Arsenic, dissolved	47.2	Arsenic, total	46.3
MW03-03	1/1/05	Arsenic, dissolved	37.8	Arsenic, total	39
MW03-03	4/18/05	Arsenic, dissolved	37.8	Arsenic, total	40.1
MW03-03	10/19/03	Arsenic, dissolved	41	Arsenic, total	48.2
MW03-03P	10/5/03	Arsenic, dissolved	50.1	Arsenic, total	51.6
MW03-04	1/21/04	Arsenic, dissolved	2.19	Arsenic, total	1.5
MW03-04	4/21/04	Arsenic, dissolved	1.83	Arsenic, total	4.05
MW03-04	8/11/04	Arsenic, dissolved	1.88	Arsenic, total	3.06
MW03-04	11/4/04	Arsenic, dissolved	1.5	Arsenic, total	1.5
MW03-04	1/18/05	Arsenic, dissolved	5	Arsenic, total	5
MW03-04	4/18/05	Arsenic, dissolved	1.5	Arsenic, total	1.5
MW03-04	10/19/03	Arsenic, dissolved	5.68	Arsenic, total	42.9
MW03-05	1/15/04	Arsenic, dissolved	95.2	Arsenic, total	93.6
MW03-05	4/6/04	Arsenic, dissolved	67	Arsenic, total	70.6
MW03-05	7/8/04	Arsenic, dissolved	67	Arsenic, total	80
MW03-05	12/2/04	Arsenic, dissolved	83.7	Arsenic, total	86.7
MW03-05	4/20/05	Arsenic, dissolved	71	Arsenic, total	73.1
MW03-05	10/20/03	Arsenic, dissolved	33	Arsenic, total	94
MW03-06	1/26/04	Arsenic, dissolved	19.8	Arsenic, total	355
MW03-06	4/15/04	Arsenic, dissolved	9.91	Arsenic, total	402
MW03-06	10/13/04	Arsenic, dissolved	11.1	Arsenic, total	134
MW03-06	4/20/05	Arsenic, dissolved	8.9	Arsenic, total	163
MW03-07	1/28/04	Arsenic, dissolved	497	Arsenic, total	527
MW03-07	5/6/04	Arsenic, dissolved	515	Arsenic, total	541
MW03-07	8/5/04	Arsenic, dissolved	530	Arsenic, total	534
MW03-07	12/2/04	Arsenic, dissolved	511	Arsenic, total	521
MW03-07	1/18/05	Arsenic, dissolved	482	Arsenic, total	452
MW03-07	4/18/05	Arsenic, dissolved	493	Arsenic, total	461
MW03-07	10/20/03	Arsenic, dissolved	497	Arsenic, total	495

Table 2 Whole Rock Elemental Data Summary for Arsenic in ppm

Lithology	Arsenic in Development Rock (gold< 1 g/t)	Arsenic in Ore (gold >1g/t)
Average crustal igneous rocks	1.5	1.5
CQMS		
avg	3,522.2	4,452.2
max	9,370	9,960
min	19	385
count	113	26
nd	0	0
CS		
avg	1,608.9	4,294.0
max	9,940	9,110
min	10	1,400
count	213	10
nd	0	0
GQMS		
avg	2,900.4	5,085.9
max	9,960	9,690
min	10	512
count	402	37
nd	0	0
GS		
avg	3,339.9	6,118.4
max	9,590	9,540
min	14	1,335
count	132	160
nd	0	0
OVB		
avg	1,884.8	2,129.0
max	7,190	4,950
min	395	1,010
count	26	5
nd	0	0

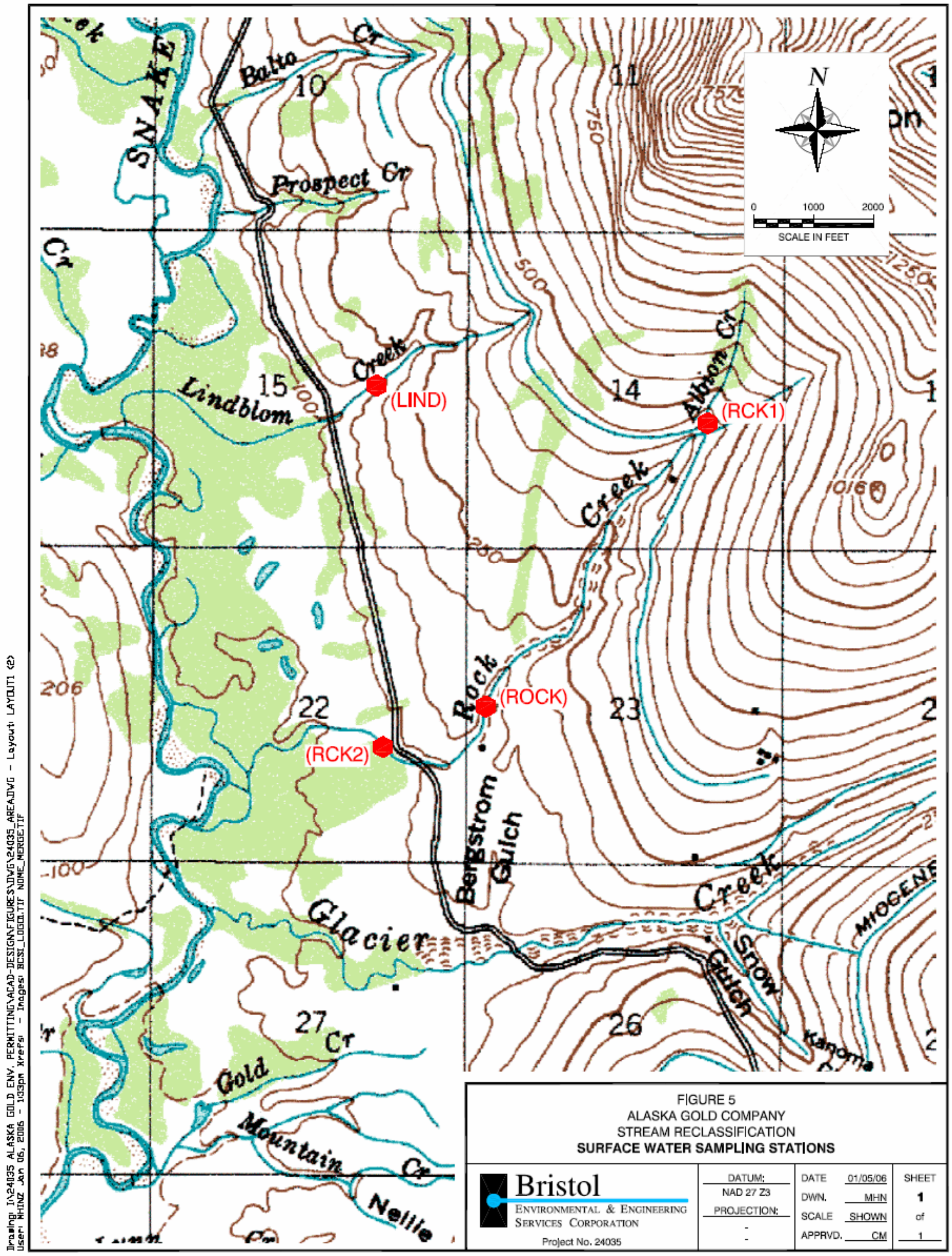
Table 2 Whole Rock Elemental Data Summary for Arsenic in ppm (continued)

Lithology	Arsenic in Development Rock (gold< 1 g/t)	Arsenic in Ore (gold > 1g/t)
Average crustal igneous rocks	1.5	1.5
QGS		
avg	4,518.3	8,665.0
max	9,860	9,360
min	8	7,970
count	60	2
nd	0	0
QMS		
avg	3,127.5	4,947.0
max	9,830	9,470
min	9	784
count	304	41
nd	0	0

Abbreviations: Overburden – OVB, Quartz-muscovite schist – QMS, Graphitic quartz–muscovite schist – GQMS, Calcareous quartz-muscovite schist – CQMS, Calcareous schist – CS, Quartzitic graphite schist – QGS.

Note: The geochemical sampling and analysis plan developed by Water Management Consultants in 2003 and submitted to the State for approval proposed sampling based on tonnages and rock types as summarized in Table 1 of the technical memorandum titled *Rock Creek Project – Preliminary Materials Geochemical Testing Update*. This memorandum can be located in the Rock Creek Project Environmental Information Document Appendices. Sampling was based on a total of 59 million tonnes of excavated rock mass. Based on the percentages, which were provided by NovaGold, the focus of the sampling and analysis was on quartz-muscovite schist (QMS), calcareous quartz-muscovite schist (CQMS), and graphitic quartz-muscovite schist (GQMS). The number of samples for the analysis was based on a minimum of one sample per 5 million tonnes of materials, and in most cases exceeded this guideline.

Figure 5 Surface Water Sampling Stations



2.1.2.2 Surface Water Quality Data Collected in Rock Creek Consistently Exceed the Drinking Water Standards.

The Rock Creek surface water quality data were collected between 2003 and 2005. All data were collected in accordance with the approved Quality Assurance Plan on file with the Alaska Department of Environmental Conservation.

All three Rock Creek water sampling stations consistently exceeded the drinking water criterion for arsenic. The three stations are presented in Figure 5 above and include:

- RCK1 – upstream of the heavily mineralized zone, in an area that has not been disturbed by historic mining or current exploration activity;
- ROCK – midstream and just downstream of the heavily mineralized zone, in an area that was disturbed by historical mining and is downstream of current exploration activity; and
- RCK2 – the most downstream station located just downstream of Glacier Creek Road, in an area that was disturbed by historical mining and is downstream of current exploration activity.

A statistics summary of arsenic concentrations in Rock Creek is presented in Table 3 below. Data in support of these statistics are available in the Hydrology Section of the Rock Creek Project Environmental Information Document Appendices.

Table 3 Statistics Summary for Arsenic Concentrations in Rock Creek

Station	RCK1	RCK1	ROCK	ROCK	RCK2	RCK2
Analyte	Arsenic Total	Arsenic Diss	Arsenic Total	Arsenic Diss	Arsenic Total	Arsenic Diss
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Practical Quantification Limit	5	5	5	5	5	5
Mean	47.422	40.292	83.667	70.232	93.685	70.865
Standard Deviation	29.43	12.95	35.12	13.763	49.934	13.938
# of values	61	61	75	75	48	48
Lowest fifth percentile	27.1	21.9	47.05	43.62	64.405	39.94
Minimum	2.35	10.5	28.6	34.8	26.1	35.6
Maximum	251	78.7	273	106	392	97.9
# of values undetected	0	0	0	0	0	0
# of values between MDL and PQL	1	0	0	0	0	0
Drinking water criteria	10		10		10	
Aquatic life criteria		150		150		150
# of values exceeding the drinking water standard	60/61	61/61	75/75	75/75	48/48	48/48

Notes:

#	=	number	PQL	=	practical quantitation limit
µg/L	=	micrograms per liter	ROCK		Rock Creek just below deposit
Diss	=	dissolved	RCK1		Rock Creek upstream of deposit
MDL	=	method detection limit	RCK2	=	Rock Creek below the road

2.1.2.3 Water Quality Data Collected in Support of the Petition During this Time period is Typical for the Region.

The water quality data were collected between 2003 and 2005. To establish that water quality data at Rock Creek were collected under typical conditions, precipitation recorded five miles away at the Nome airport during this time period was compared to the historical record of precipitation data collected at the Nome Airport between 1961 and 1990. These data were provided by the Western Regional Climate Center.

The precipitation between 2004 and 2005 consistently falls within the historical range and within less than 0.02 standard deviation of the historical normal value (the arithmetic mean of a climatological element computed over three consecutive decades) as established by the Western Region Climate Center. A summary table of Nome Airport precipitation comparing data for 2003, 2004, and 2005 to the normals, maximums, and minimums based on the 1961 to 1990 record is provided in Table 4 below.

Table 4: Nome Airport Precipitation Comparison in Inches

	Measured at Nome Airport												
Month	2003	2003 Std. Dev.	2004	2004 Std. Dev.	2005	2005 Std. Dev.	Nome Airport			24-hour Maximum Measured at Nome Airport			Nome Airport 24-hour
							Normal	Maximum	Minimum	2003	2004	2005	Maximum
January	0.22	0.002	0.03	0.001	0.19	0.002							
February	0.34	0.003	0.13	0.001	0.81	0.005	0.79	2.10	0.00	0.08	0.01	0.09	1.23
March	0.39	0.003	0.16	0.002	0.47	0.003	0.60	2.11	0.00	0.12	0.04	0.25	0.77
April	0.78	0.005	0.33	0.004	0.30	0.003	0.54	1.95	0.00	0.21	0.04	0.10	0.65
May	0.42	0.004	2.97	0.013	1.06	0.007	0.68	2.15	0.01	0.36	0.26	0.22	0.75
June	1.51	0.011	1.26	0.009	0.86	0.013	0.62	2.02	0.04	0.19	0.62	0.53	0.75
July	2.05	0.012	1.21	0.015	1.62	0.014	1.12	4.15	0.04	0.37	0.33	0.78	2.03
August	3.99	0.018	4.56	0.019	2.91	0.014	2.17	4.66	0.25	0.49	0.41	0.72	1.77
September	0.86	0.006	1.15	0.012	4.85	0.016	2.71	7.82	0.40	0.88	1.38	0.65	2.99
October	1.41	0.008	2.86	0.013	1.61	0.009	2.43	7.46	0.36	0.31	0.37	0.74	1.49
November	2.40	0.010	0.96	0.006	0.40	0.003	1.35	3.94	0.00	0.45	0.55	0.62	2.28
December	0.60	0.004	1.21	0.006	0.43	0.004	1.04	4.39	0.03	0.77	0.46	0.15	1.15
							0.83	2.16	0.03	0.22	0.27	0.14	1.09
Annual	14.97	0.009	16.83	0.010	15.51	0.009							
							14.88	22.38	7.42	0.88	1.38	0.78	2.99

Note: The normals, maximums, and minimums are based on the 1961 to 1990 record period. These data were provided by the Western Regional Climate Center.

Std. Dev. = standard deviation

2.1.2.4 Natural Conditions and Human-caused Disturbances in the Sampling Area

"Natural Conditions", by State of Alaska Water Quality Standards, must meet the definition of any physical, chemical, or radiological condition existing in a waterbody before any human-caused influence on, discharge to, or addition of material to, the waterbody.

The data presented above meet these criteria for the following reasons:

- The geology of the area that contributes arsenic to the local hydrology predates human presence in the area.
- The groundwater is the primary influence on the surface water quality, and there has been no underground disturbance in the area.
- For the above reasons, all data collected in Rock Creek support the presence of naturally occurring pollutants in the stream, despite surface disturbances present in mid- and lower Rock Creek. Stations ROCK and RCK2 were previously disturbed, as can be determined from historic photos, remnant dredge tailings piles, and ongoing exploration activity near station ROCK. This disturbance was limited to surface activities.
- In addition, Station RCK1 is above the area that was mined during or after the gold rush, and above the area of mineral exploration activity. Station RCK1 provides data from an area that has not been subject to human-caused influence on, discharge to, or addition of material to, the waterbody. The area is above the heavily mineralized zone that would have attracted mining activity. There are no remnant dredge piles left behind by the early miners in this area, and no pit sampling or trenching has been conducted during mine exploration in this area.

A full historical survey of the area is on file with the Alaska Department of Natural Resources' State Historic Preservation Office in Anchorage, Alaska, under the title *Cultural Resources Survey of Proposed Mining Development Activities in the Rock Creek Area, Nome, Alaska*.

2.1.3 Lindblom Creek

2.1.3.1 Geology of the Area

Lindblom Creek is adjacent to Rock Creek to the north and shares similar geology with Rock Creek. The area within the drainage is generally high in arsenic-bearing sulphides that provide the natural source of arsenic to Lindblom Creek. The Mixed Unit of the Nome Schist Belt in the vicinity of the Rock Creek deposit is composed primarily of Quartz-Muscovite Schist with varying amounts of graphite and calcite. Increased syngenetic pyrite and phyrrotite are associated with rocks with higher concentrations of graphite. Typically, the arsenic-bearing sulfide content in these rocks is in the trace-1% range. However, in graphite and graphitic schist, sulfide concentrations can be in excess of +5%.

In Figure 3 (shown above) in the Rock Creek Section the map depicts the Nome Area Generalized Arsenic Anomaly. Like Rock Creek, Lindblom Creek falls within the area outlined in this figure. Within the outlined area, hydrothermal fluids are a source of arsenic-bearing sulfide mineralization. This style of mineralization is concentrated in the tension vein zone and the Albion shear zone. Hydrothermal sulfide mineralization increases within and adjacent to individual veins and vein zones. Total sulfide content can be as high as +5%, but typically is in the trace-2% range. These arsenic-bearing sulfides are most likely contemporaneous with gold mineralization. Gold and arsenic were probably precipitated from the same hydrothermal fluids when specific pressure, temperature, and oxidation potential conditions were present.

2.1.3.2 Elevated arsenic in Lindblom Creek is likely a perennial condition similar to adjacent Rock Creek, arising from the interaction of local geology with groundwater and the subsequent upward flow of groundwater.

It is postulated that Lindblom Creek is similar to adjacent Rock Creek regarding groundwater quality and the inflow of groundwater. The geology is similar, as discussed above. Both creeks fall within the same generalized arsenic anomaly. There is no additional source of surface water inflow.

2.1.3.3 Surface Water Quality Data Collected in Lindblom Creek Consistently Exceed the Drinking Water Standards.

The Lindblom Creek surface water quality data presented in support of this petition were collected between 2003 and 2005. All data were collected in accordance with the approved Quality Assurance Plan on file with Alaska Department of Environmental Conservation. Surface water quality sampling for Lindblom Creek was collected at one site, located midstream, and results are presented in Table 5 below.

Table 5: Statistics Summary for Arsenic Concentrations in Lindblom Creek

Station	LIND	LIND
Analyte	Arsenic Total	Arsenic Diss
Units	µg/L	µg/L
Practical Quantification Limit	5	5
Mean	31.658	30.635
Standard Deviation	5.514	5.717
# of values	67	67
Lowest fifth percentile	20.25	20.31
Minimum	13.1	7.53
Maximum	48.7	43.7
# of values undetected	0	0
# of values between MDL and PQL	0	0
Drinking water criteria	10	
Aquatic life criteria		150
# of values exceeding the drinking water standard	67/67	66/67

Notes:

#	=	number	MDL	=	method detection limit
µg/L	=	micrograms per liter	PQL	=	Practical quantitation limit
Diss	=	dissolved	LIND		Lindblom Creek just below deposit

2.1.3.4 Water Quality Data Collected in Support of the Petition During this Time Period are Typical for the Region

The water quality data for Lindblom Creek were collected at the same time and under the same conditions as the Rock Creek data. The water quality data were collected between 2003 and 2005. To establish that water quality data at Rock Creek represent typical conditions, precipitation recorded five miles away at the Nome Airport during this same time period was compared to the historical record of precipitation data collected at the Nome Airport between 1961 and 1990. These data were provided by the Western Regional Climate Center. The precipitation between 2004 and 2005 is consistently within the historical range and within one standard deviation of the historical normal value as established by the Western Region Climate Center. A summary table of the precipitation data is presented in the Rock Creek section above.

2.1.3.5 Natural Conditions and Human-caused Disturbances in the Sampling Area

"Natural Conditions", by State of Alaska Water Quality Standards, must meet the definition of any physical, chemical, or radiological condition existing in a waterbody before any human-caused influence on, discharge to, or addition of material to, the waterbody.

The data presented above meet these criteria for the following reasons:

- The geology of the area that contributes arsenic to the local hydrology predates human presence in the area;
- The groundwater is the primary influence on the surface water quality, and there has been no underground disturbance in the area; and
- Lindblom Creek, like many of the creeks in the area, was likely mined in the lower reaches below the sampling station. It is a small creek with minimal flow that would not likely have attracted mineral activity much above the downstream reaches in the alluvium of the Snake River. There are no visible signs of disturbance at or above station LIND. There are no remnant dredge piles and no exploration pits or trenches in the area.

3.0 FACTOR TWO – NATURAL, EPHEMERAL, INTERMITTENT, OR LOW-FLOW CONDITIONS OR WATER LEVELS PREVENT THE ATTAINMENT OF THE USE, UNLESS THESE CONDITIONS MAY BE COMPENSATED FOR BY THE DISCHARGE OF SUFFICIENT VOLUME OF EFFLUENT DISCHARGES WITHOUT VIOLATING STATE WATER CONSERVATION REQUIREMENTS TO ENABLE USES TO BE MET.

3.1 ROCK CREEK

Rock Creek is primarily fed by groundwater. Flow in Rock Creek is generally minimal and extremely low during the winter months as groundwater flows decrease. After the water reaches the surface, it glaciates as it flows downstream. During the winter months, measurable, but low flow can be located at the upstream sites in the drainage. Further downstream the stream has an ice layer up to 4 feet thick with no water flowing underneath.

The water in Rock Creek is shallow with relatively low flows. Water withdrawal would be impracticable at these depths, and flows would be insufficient to supply community drinking water use. Community drinking water use is considered to consist of a minimum of 25 people for 60 days (a Class B drinking water system by Alaska Department of Environmental Conservation standards) or more per year. Drinking water consumption is typically estimated at 50 gallons per person per day by Alaska Department of Environmental Conservation for drinking water system design purposes.

Flow data recorded between September 2002 and January 2004 give an indication of the annual range of flow within Rock Creek. The data are presented below in Table 6. Tables 7, 8, and 9 present water depth statistics at stations ROCK, RCK1, and RCK2, respectively.

Table 6 Flows in Rock Creek at Station ROCK

DATE	FLOW in cfs
9/10/02	1.4
7/30/03	7.4
8/14/03	5.6
10/2/03	5.7
11/5/03	6.4
1/28/04	0.7
5/16/05	6.5
6/20/05	5.5
7/5/05	2.1
8/2/05	2.0

Note: cfs: cubic feet per second

Table 7 Water Depth at Station ROCK between 2/24/04 and 4/4/05

Mean	8.5 inches
Standard Deviation	5.91
Number of Values	37
Minimum	3 inches
Maximum	31 inches

Table 8 Water Depth at Station RCK1 between 2/23/04 and4/4/05

Mean	5.5 inches
Standard Deviation	5.91
Number of Values	37
Minimum	2 inches
Maximum	10 inches

Table 9 Water Depth at Station RCK2 between 5/3/04 and 12/20/04

Mean	5 inches
Standard Deviation	5.91
Number of Values	37
Minimum	2 inches
Maximum	8 inches

Note: The was no water present under the ice during the winter months. The 0 values were not included in the table and were not caculated into the mean.

Water was encountered at ROCK and RCK1 for water quality sampling throughout the winter however, no valid stream flow measurements were recorded during that time period as it is difficult to establish stream boundaries under the ice. However, further downstream at RCK2, no water was present under the ice during weekly sampling events between 12/01/04 and 5/3/04. In 2005, sampling frequency was reduced to monthly. Between 12/20/05 and 5/16/05, again, no water was present under the ice. Ice depth at the sampling site was reported up to approximately 4 feet in depth.

3.2 LINDBLOM CREEK

Lindblom Creek is primarily fed by groundwater. The water in Lindblom Creek is shallow with relatively low flows during the summer months and nonexistent flow during the winter months. Water withdrawal during the summer months would be impracticable at these depths, and flows would be insufficient to supply community drinking water use. There would be no water available during the winter months. Community drinking water use is considered to consist of a minimum of 25 people for 60 days (a Class B drinking water system by Alaska Department of Environmental Conservation standards) or more per year. Drinking water consumption is typically estimated at 50 gallons per person per day by Alaska Department of Environmental Conservation for drinking water system design purposes

Flow data recorded between September 2002 and September 2005 are presented below in Table 10. These data give an indication of the annual range of flow within Lindblom Creek. Table 11 provides water depth data for the non-winter months when water is present.

Table 10 Flows in Lindblom Creek

DATE	FLOW in cfs
9/10/02	0.7
7/31/03	1.2
8/14/03	2.8
10/2/03	2.2
11/5/03	2.2
6/20/05	1.7
7/5/05	1.6
8/2/05	0.3
9/26/05	11.8

cfs: cubic feet per second

Table 11 Water Depth at Station LIND as measured between 3/15/04 and 1/4/05

Mean	5 inches
Standard Deviation	5.91
Number of Values	34
Minimum	2 inches
Maximum	11 inches

Note: The above data does not include winter water depths.

Lindblom Creek is typically frozen during the winter months. It was recorded as frozen on 1/14/04. Further sampling during the winter of 2004 produced records of a pool of water that remained under the ice at the sampling station. Its depth was measured on the following dates 2/17/04, 2/23/04, 3/1/04, 3/8/04, 3/15/04, and 3/22/04. On these dates, the depth ranged from 2 to 3.5 inches. The water quality during this time was near constant, indicating that there was no inflow or outflow of water to this pool.

During the winter of 2005, water sampling was conducted on a monthly basis. There was no water present under the ice at the Lindblom Creek sampling station between 1/4/05 and 5/23/05.

4.0 USE ATTAINABILITY

4.1 IS THE USE ATTAINABLE?

States may not remove designated uses if such uses will be attained by implementing effluent limits required under sections 301(b) and 306 of the Act and by implementing cost-effective and reasonable best management practices (BMPs) for nonpoint source control.

Alaska Department of Environmental Conservation guidance on determining if a use is attainable is based on an assessment of the aquatic uses that can be attained based on physical, chemical, and biological characteristics of the water body.

The potential to create drinking water from a stream through the use of water treatment systems is sometimes confused with the ability to bring the water body itself into compliance with drinking water standards. The application of water treatment systems to provide drinking water to a community is a separate issue from use attainability based on the characteristics of the water body. Arguably, all water sources require treatment to ensure against bacteria and arguably any water source of any quality could be treated to drinking standards through distillation. What can be done to treat water for end-of-tap consumption is distinctly different from what can be done to achieve an aquatic use based on, as stated in the Alaska Department of Environmental Conservation Guidelines, “the physical, chemical, and biological characteristics of the water body” or by methods stated in the U.S. Environmental Protection Agency regulations which focus on effluent limits and stormwater BMPs.

4.1.1 Rock Creek

There are no discharges to Rock Creek. The implementation of effluent limits would not remedy the nonattainment of the drinking water use in this creek.

Surface water quality upstream of all surface disturbance exceeds the drinking water standard for arsenic. There are no surface disturbances or activities in the area that could be mitigated through the use of stormwater BMPs. The primary source of naturally occurring arsenic to Rock Creek is the groundwater. Stormwater BMPs would not mitigate the natural presence of arsenic in the groundwater.

4.1.2 Lindblom Creek

There are no discharges to Lindblom Creek. The implementation of effluent limits would not remedy the nonattainment of the drinking water use in this creek.

Surface water quality upstream of all historic surface disturbance exceeds the drinking water standard for arsenic. There are no surface disturbances area or activities in the area that could be mitigated through the use of stormwater BMPs. The primary source of naturally occurring arsenic to Lindblom Creek is the groundwater. Stormwater BMPs would not mitigate the natural presence of arsenic in the groundwater.

4.2 USE ATTAINABILITY ANALYSIS

A State must conduct a Use Attainability Analysis, as described in Section 131.3(g), whenever the State wishes to remove a designated use that is specified in Section 101(a)(2) of the Act, or to adopt subcategories of uses specified in Section 101(a)(2) of the Act which require less stringent criteria.

This petition solely addresses the removal of the drinking water use. No other uses are addressed within this petition, and all other uses are assumed to exist. The drinking water use is not a use specified under Section 101(a)(2) of the Act and it is not a subcategory of a use specified under Section 101(a)(2) of the Act. Therefore, removal of the drinking water use from Rock Creek and Lindblom Creek does not require a formal Use Attainability Analysis. However, the data provided in this document support the premise that the use is not attainable.

Thank you for your consideration of this stream reclassification petition and use attainability analysis. Please contact me if you have any questions or if you require additional information. I may be reached at (907) 272-2117 or by e-mail at cmaccay@beesc.com.

Sincerely,

Charlotte MacCay
Environmental Manager

cc: Lynn Kent
Pete McGee
Nancy Sonofrank
Cameron Leonard
Tom Crafford