

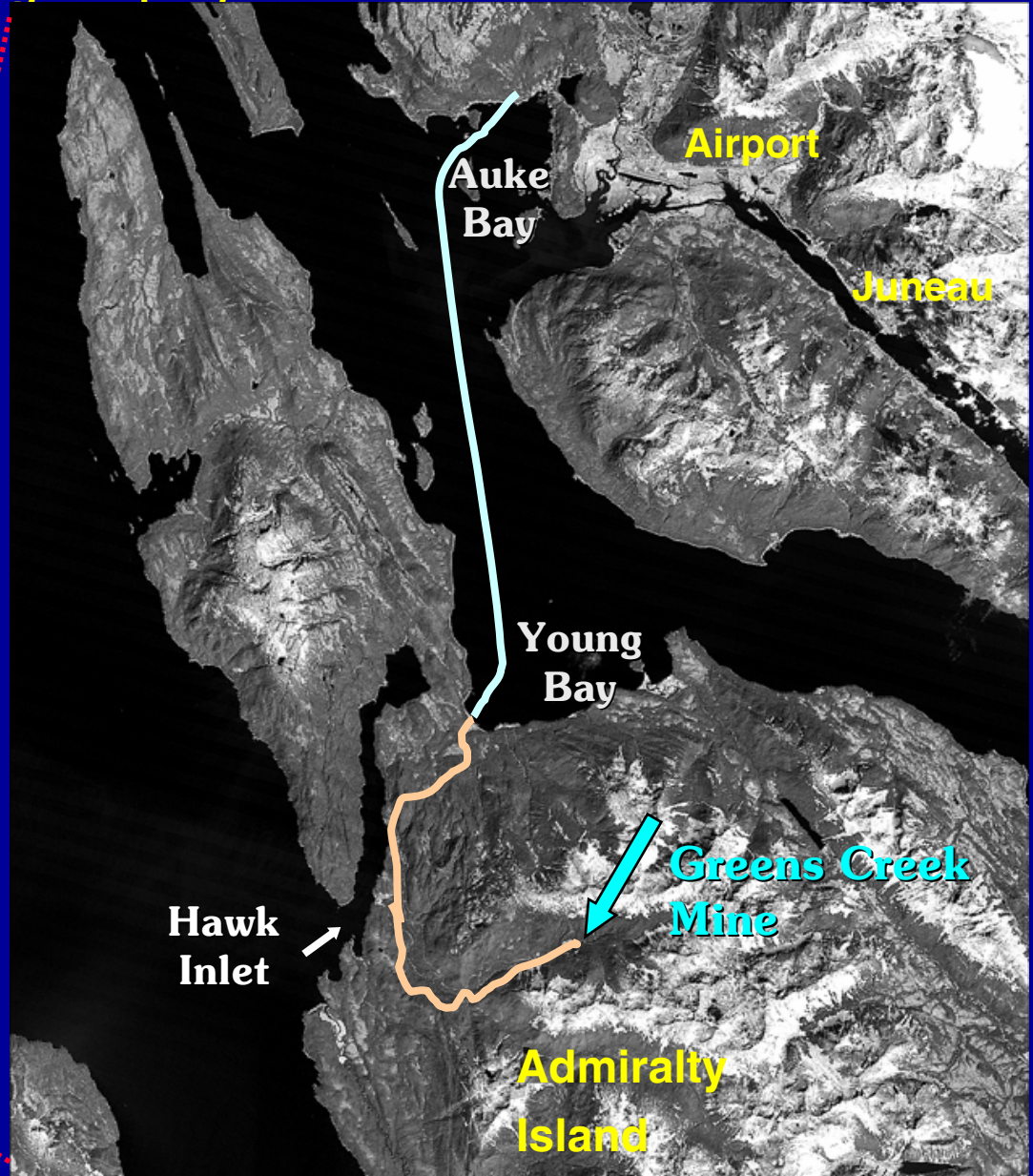
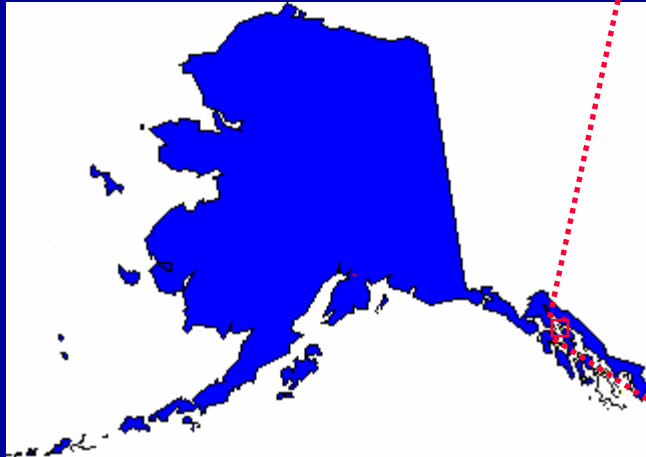
# Comparison of Laboratory Kinetic Test Results to Field Data from Waste Rock Sites at the Greens Creek Mine, Juneau, Alaska

by Peter Condon and Kerry Lear(presenter)

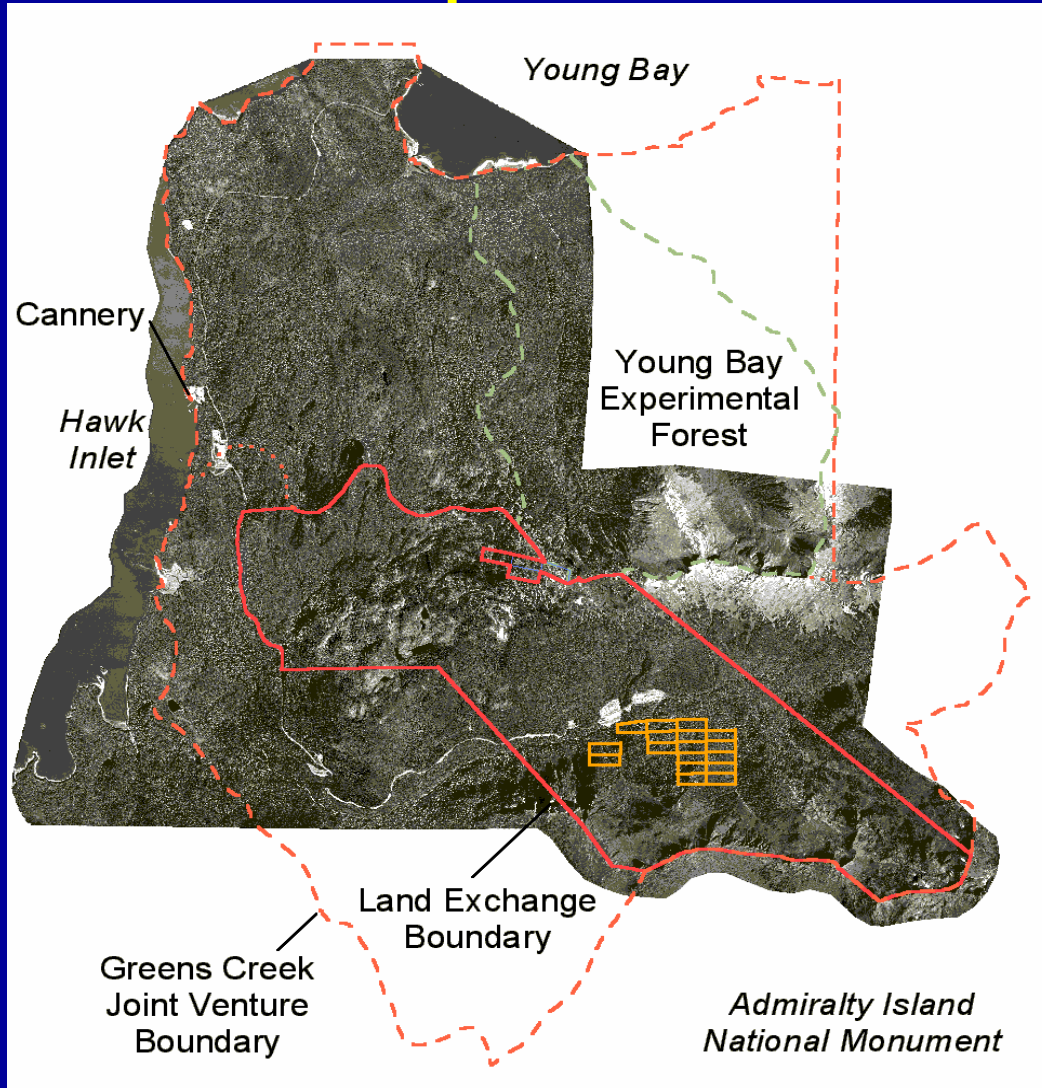


## Location

- 18 miles south of Juneau



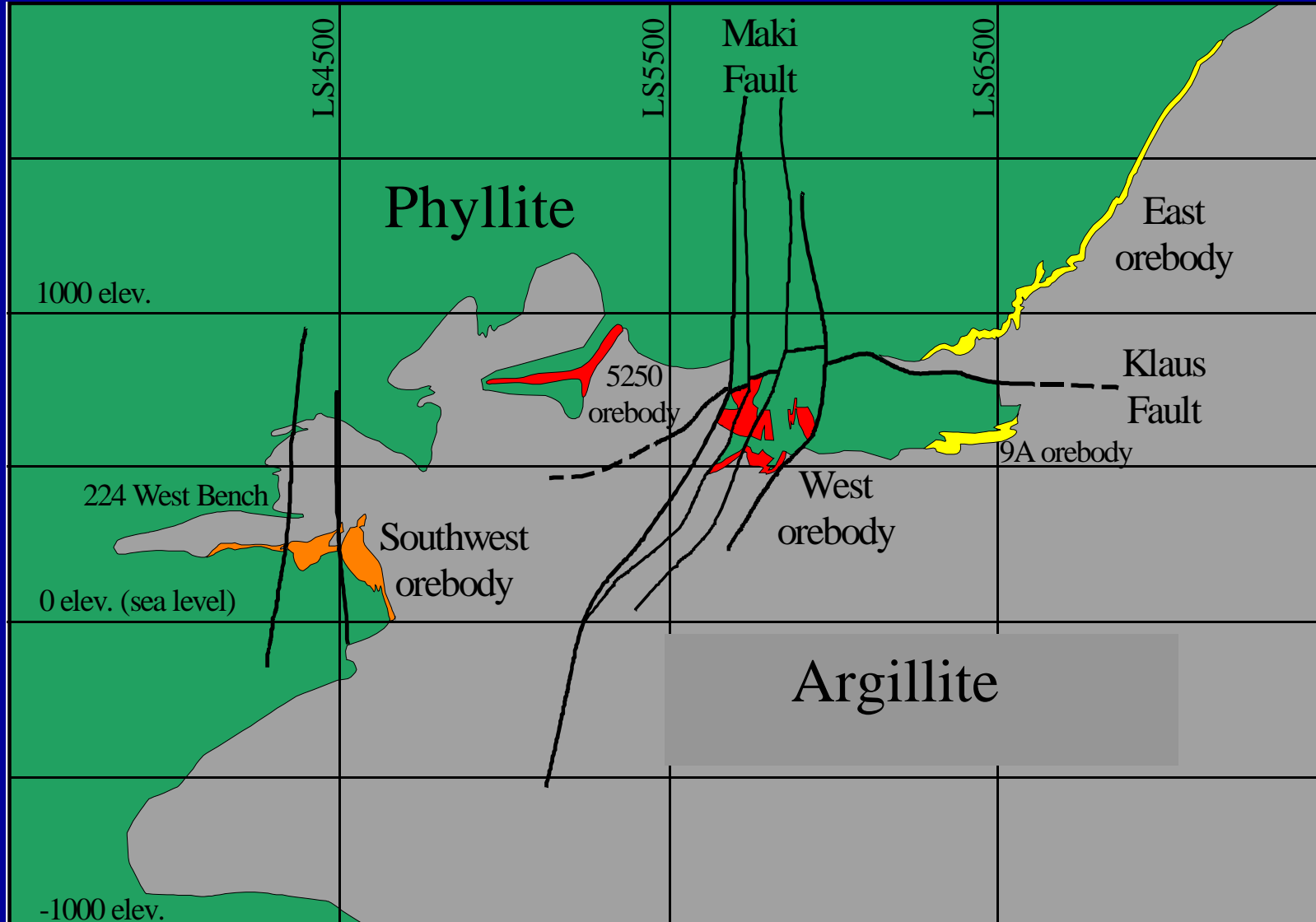
## Site Map



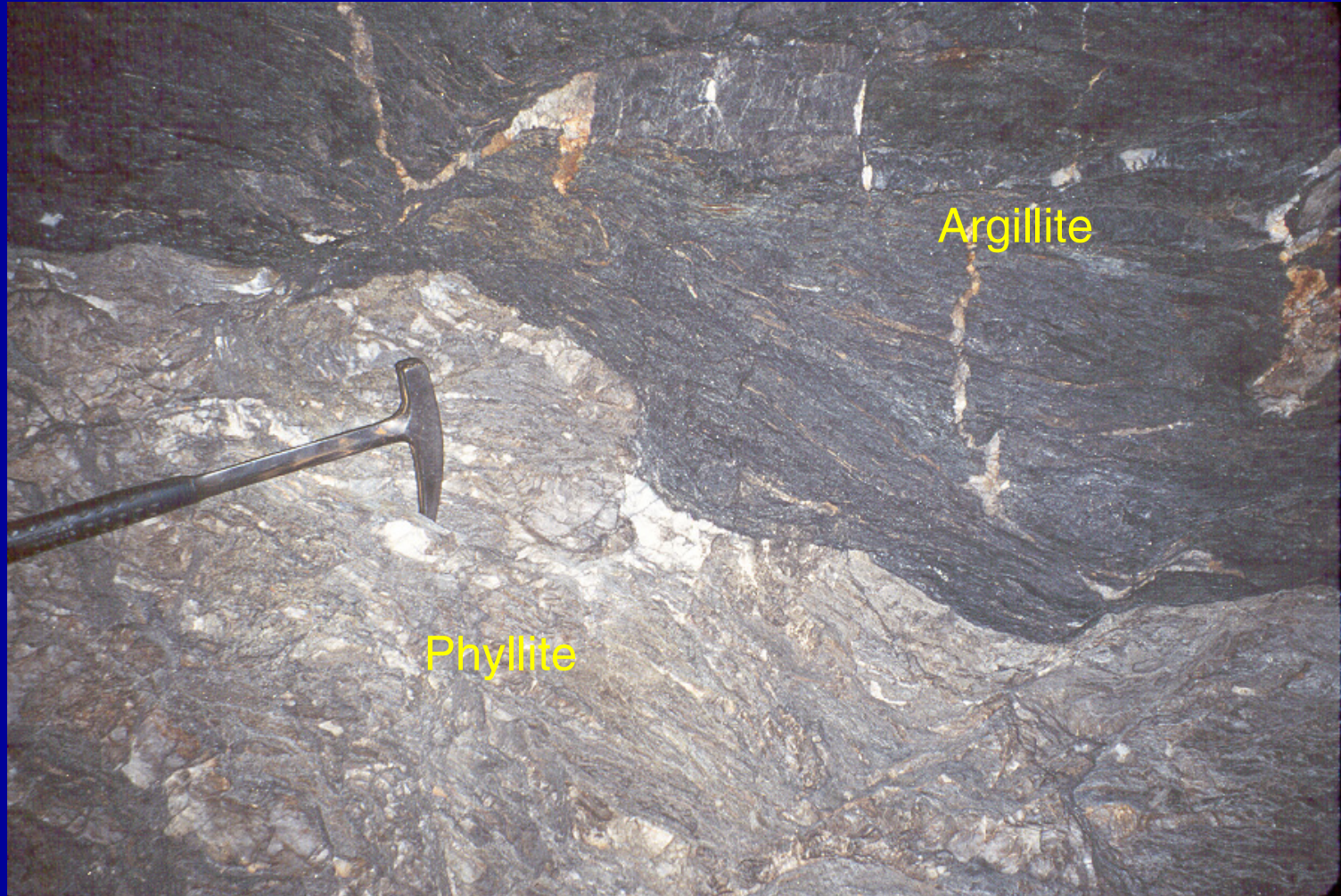
## Climate

Month	Tailings Area		Minesite	
	Average Temperature (°C)	Average Precipitation (inches)	Average Temperature (°C)	Average Precipitation (inches)
Jan	-1.3	3.6	-2.5	4.8
Feb	0.4	3.1	-1.5	3.0
Mar	0.5	2.6	-1.1	3.6
Apr	4.4	2.9	2.5	3.2
May	8.0	3.0	6.3	3.7
Jun	11.8	2.8	10.4	3.2
Jul	13.3	4.0	12.1	4.8
Aug	13.3	5.1	11.9	6.7
Sep	10.0	6.8	8.4	8.3
Oct	6.2	6.3	4.6	9.6
Nov	2.5	3.7	0.6	5.5
Dec	0.3	5.4	-1.5	7.7
Average	5.8	4.1	4.2	5.4
Total		49.2		64.0

# Generalized Mine Geology



## Photo of barren Argillite / Phyllite contact



# Production Rock Chemistry

## Rock Compositions

### Kinetic Test Samples

#### Major

Elements (%)	Phyllite	Argillite
SiO <sub>2</sub>	56	33
Al <sub>2</sub> O <sub>3</sub>	7	4
Fe <sub>2</sub> O <sub>3</sub>	13	5
CaO	5	16
MgO	4	10
S <sub>tot</sub>	6	4

#### Trace Elements (ppm)

Cu	91	240
Pb	160	130
Zn	2930	6060

#### ABA Data (tCaCO<sub>3</sub>/kt)

AP	196	135
NP	162	515
NNP	-34	380
Paste pH	8.9	8.5

### Field Data

Phyllite	Argillite
53	49
11	6
9	4
3	10
8	7
7	3
120	69
604	92
2069	559

## Column Test Parameters

### • Large Scale Column

- 10 ft x 16 inch dia.

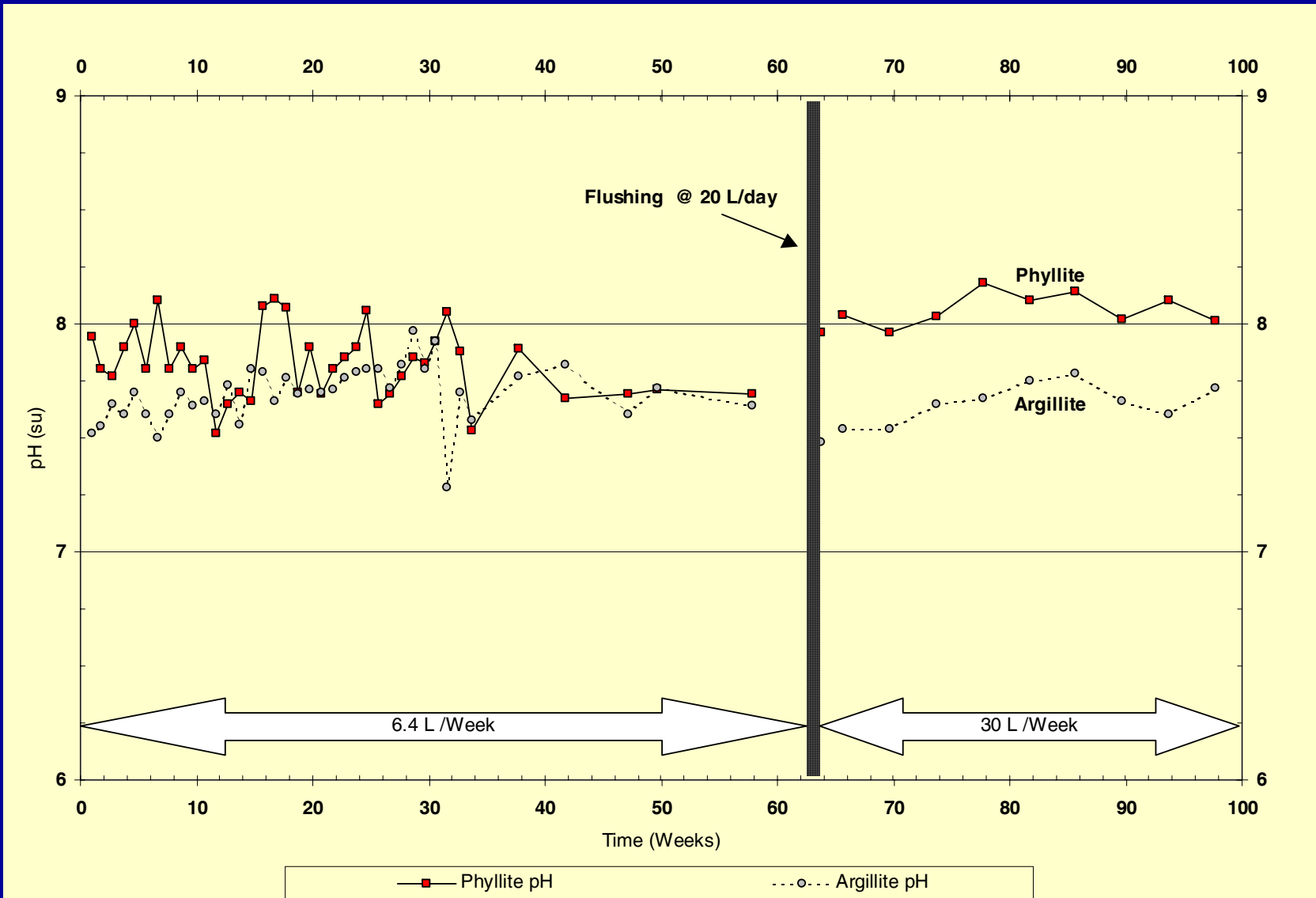
### • Flow Rates

- 1) Initial ~1.5x annual ppt
- 2) Columns experience gypsum sat.
- 3) Columns flushed for 2 weeks to remove gypsum
- 4) Flow increased to ~7x annual ppt.

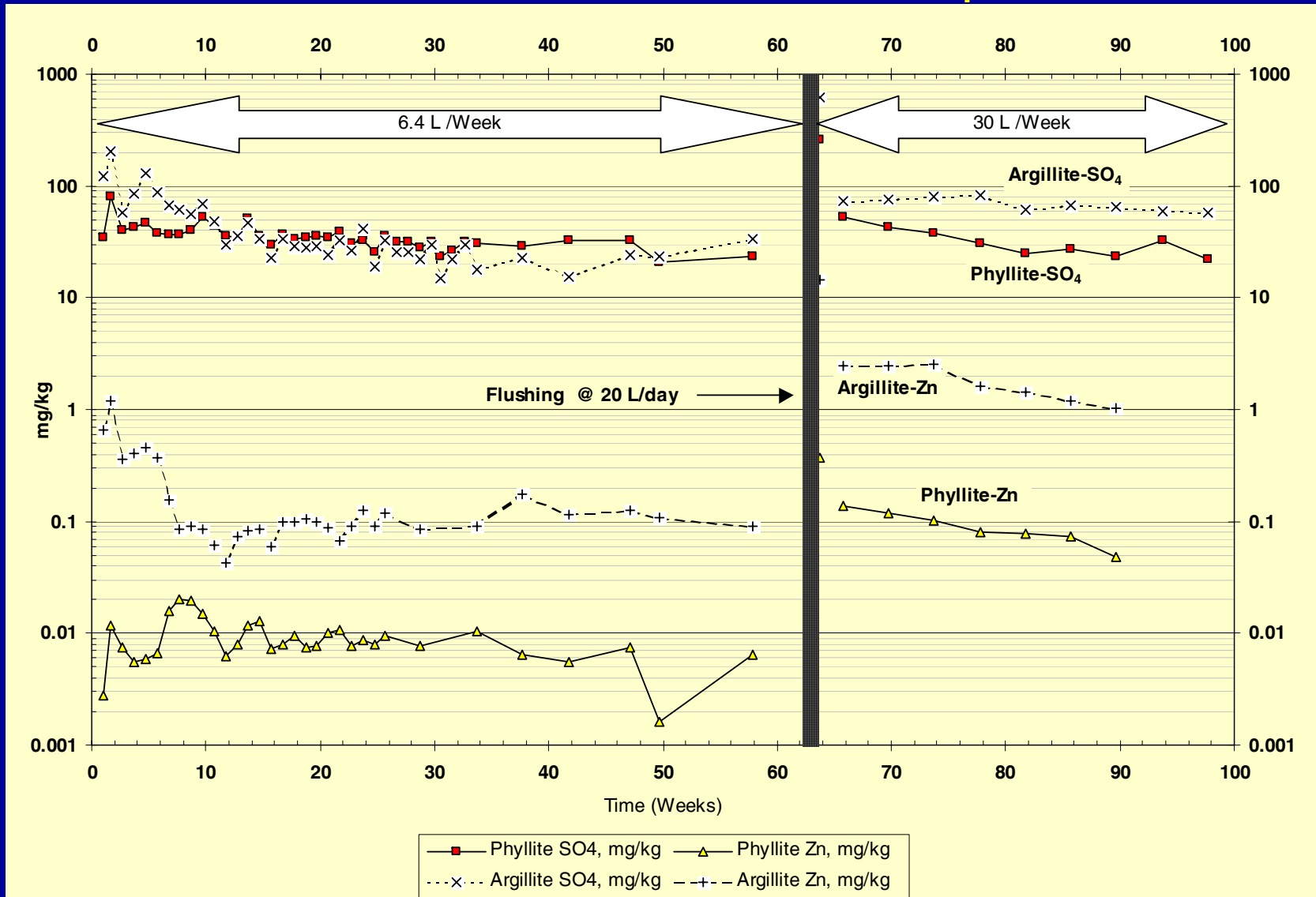
### • Testing Duration (Total 1.75 years)

- 1) Low flow 62 weeks sat.
- 2) Flushing 2 weeks
- 3) High flow 28 weeks

# Waste Rock Column Test - pH



# Waste Rock Column Test - SO<sub>4</sub> & Zn

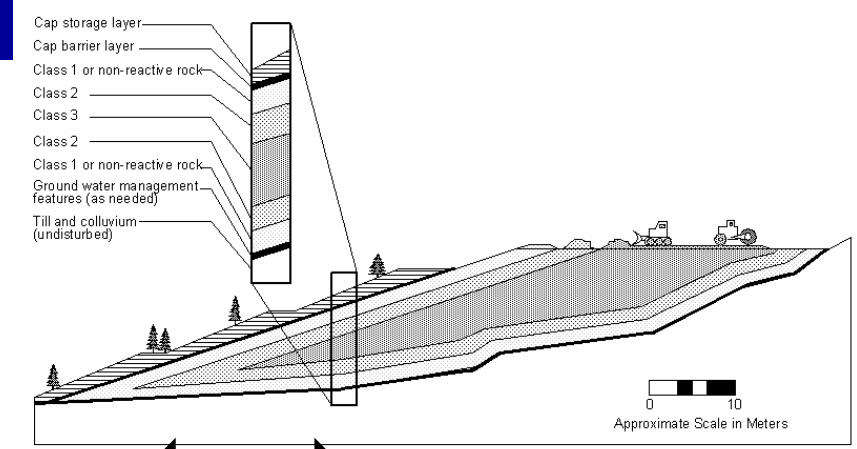
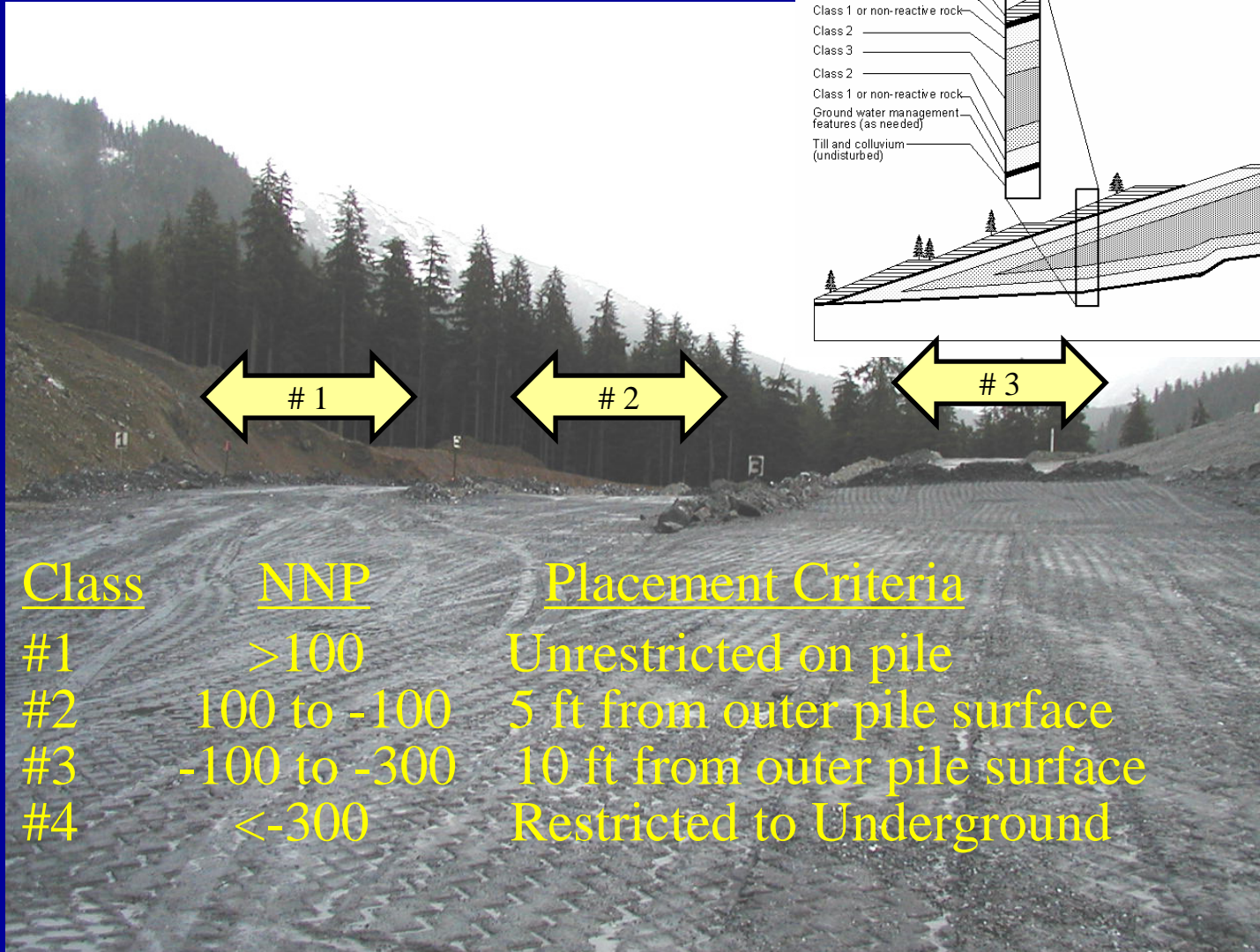




# Contact Water Chemistry

Kinetic Test Data (Week 90)			Field Data					
	Phyllite	Argillite	Phyllite	Argillite	Mix(ARG) >15 yrs	Mix(Phy) Pre-Acidic	Phy Acidic	Mix(Phy)
<b>Field Parameters</b>								
pH	8.0	7.7	7.5	7.0	7.1	6.4	5.2	2.6
SC (uS)	778	1950	2180	2930	1363	1300	1862	3370
<b>Major Components (mg/L)</b>								
Sulfate	388	1510	1170	1600	564	656	1120	2800
Acidity	9	68	<10	<10	<10	-10		1500
Alkalinity	166	103	195	310	196	144	2	-2
Ca	115	568	165	442	220	207	200	270
Mg	68	83	256	153	55	83	140	175
<b>Trace Elements (ug/L)</b>								
Fe	26	8	194	<100	160	11700	7000	420000
Cu	10	15	5	4	2	5	1150	2500
Pb	<4	<4	<1	<2	3	5	52	47
Zn	811	23300	358	1400	550	10800	50700	99000

# Site 23 Designated Placement Zones



<u>Class</u>	<u>NNP</u>	<u>Placement Criteria</u>
#1	>100	Unrestricted on pile
#2	100 to -100	5 ft from outer pile surface
#3	-100 to -300	10 ft from outer pile surface
#4	<-300	Restricted to Underground

# Composite Soil Cover Design & Testing

