

SADIE LADUE 600 ADIT (#77)
(NO MINFILE)

1. LOCATION AND ACCESS

The Sadie Ladue 600 adit is 6 km north of the community of Keno City at an approximate elevation of 1115 metres above sea level (Figure 1). It is located at the approximate UTM co-ordinates 7 092 700m N and 485 950m E. Access to the property is by a 1-km trail leading north from the abandoned mining community of Wemecke. An alternate route is from Keno City along Wernecke Road to the Sadie Ladue 600 Adit trail; the latter is washed out in several places but can be driven with a four-wheel drive in dry weather.

2. SITE PHYSIOGRAPHY

The site is on the northwest slope of Keno Hill, and is covered by silt and gravel till overlying bedrock. Sadie Ladue 600 adit is in an area of discontinuous permafrost, although no surface indications of permafrost were observed during the site visit. Dominant vegetation is willow with substantial (30%) black spruce cover.

A mine water discharge of about 600-800 liters/minute flows out of the adit into a vertical shaft beside the adit. The mine water is directed via a 40 cm bolted steel culvert beneath the site and the waste rock pile, finally discharging to a gully below the site. The untreated water drains to an unnamed stream flowing into the small unnamed lake west of Gambler Lake. Upslope of the site, a poorly-defined gully channels snowmelt and runoff water onto the site; surface water then flows past the waste rock dump into a gully below the site. Vegetation stress above and below the site was evident.

3. GEOLOGY AND MINERALIZATION

The commodities of interest at the Sadie Ladue 600 adit site are silver, lead and zinc. The Keno Hill - Galena Hill silver-lead ores occur in erratic shoots and lenses lying in vein-faults that cut fine-bedded to massive quartzite, intercalated greenstone sills and lenses, and various schistose rocks (GSC Paper 68-68, p.21). The wall rocks are highly shattered greenstone (chlorite schists) and phyllite, and the ore body consists of a stockwork of veinlets containing principally siderite, galena, sphalerite, freibergite, pyrite and a small amount of quartz (GSC Bulletin I 11, p. 33). Pyroxenite was also observed on the surface of the Sadie Ladue 600 waste rock dump.

4. SITE HISTORY

The adit and waste rock pile was created between 1921 and 1933 when a drainage tunnel over 900 meters in length, the 600 Ladue tunnel, and over 275 meters of drifting on the ore zone occurred (GSC Summary Report, 1929, Part A, p. 4A). The Ladue No. 2 shaft joins the drainage tunnel 730 meters from the adit entrance. Production from the Ladue Mine ceased in 1933. During the period 1955 to 1957 the 600 Ladue tunnel was rehabilitated and minor development work was completed. In 1968 the 600 Ladue tunnel and the Ladue No. 2 shaft were rehabilitated to their junction point (GSC Paper 68-68, p. 22-23). A limited amount of waste rock was likely generated during the rehabilitation and subsequent underground exploration program. A camp was established at the 600 Ladue portal for the most recent rehabilitation and exploration program.

5. MINE DEVELOPMENT

Mine development at the Sadie Ladue 600 adit site includes collapsed powerhouse and mechanic's shop buildings, a collapsed adit, one waste rock pile with loadout structure, and a log cabin 80 m north of the adit. Site details can be found on Figure 1; see Attachment A for site photos.

5.1 Mine Openings and Excavations

Adit (photo 77-6)

Location: East end of site on northwest facing slope.

Dimensions (L x W x H): N/A

Supports: N/A

Condition: Adit is collapsed.

Accessibility: Adit is still open and accessible.

5.2 Waste Rock Disposal Areas

The waste rock pile at the Sadie Ladue 600 mine site was created with the development of a drainage tunnel over 900 meters in length, the 600 Ladue tunnel, and over 275 meters of drifting on the Ladue vein on the 600 level. A raise connects the 600 Ladue tunnel to the Ladue No. 2 shaft (GSC Summary Report 1929, Part A, p. 4A). Approximately 22,000 tonnes of waste rock from underground development covers an area 3800 m² at Sadie Ladue 600. The surface of the waste rock pile is covered with 20% moderately carbonitized rock, 15% moderately chloritized greenstone and pyroxenite and 6% graphitic schist. The remaining surface area is covered with a mixture of greenstone, quartzite, and various schistose rocks (SRK 1997).

In 1996, six waste rock samples were gathered from five test pits. Samples SGWR/P301 and SGWR/P305 were collected from waste rock that exhibited iron carbonate staining on the surface. Sample SGWR/P304 was collected from an area mineralized graphite schist that exhibited whitish secondary mineralization on the surface. Sample SGWR/P303 was collected from the chlorite schist rich portion of the dump. Sample SGWR/P302/1 was collected from the mixed waste rock material on the south side of the pile. Sample SGWR/P302/2 was collected from the iron carbonate stained soil beneath the waste rock. The samples were submitted for Acid Base Accounting (ABA) test and determination of metals by Inductively Coupled Plasma -Atomic Emission Spectrophotometry (ICP-AES). Descriptions of waste rock samples are summarized in Table 2; results of the ABA tests are presented in Attachment B and summarized in Table 1.

All rock samples collected had field and laboratory paste pH values near between 7.5 and 8.5, indicating that the material is not currently generating acid. The Neutralization Potential to Acid Potential (NP:AP) ratios in SGWR/P302/1 and SGWR/P304 were 2.6 and 1.3, indicating that the material is potentially acid generating. Sample P301 has low acid generating potential. It has a NP:AP ratio of 3.0. The remaining samples had NP:AP ratios above 3, indicated a low potential for acid generation.

All the rock samples contained elevated concentrations of silver, iron, and manganese. Sample SGWR/P304 contained elevated concentrations of cadmium, lead, and zinc. Samples SGWR/P301 and SGWR/P305 also contained elevated concentrations of lead and zinc.

Table 1. Summary of 1996 Acid/Base Accounting Test Results

Sample ID	Paste pH	Total S (%)	SO ₄ (%)	AP	NP	Net NP	NP/AP
SGWR/P301	8.01	1.22	0.21	31.56	95.94	64.38	3.04
SGWR/P302/1	7.92	1.41	0.18	38.44	101.44	63.00	2.64
SGWR/P302/2	8.28	0.47	n/a	14.69	225.88	211.19	15.38
SGWR/P303	8.08	0.40	n/a	12.50	82.75	70.25	6.62
SGWR/P304	7.46	2.36	0.27	65.31	86.38	21.06	1.32
SGWR/P305	8.12	0.57	0.21	11.25	105.38	94.13	9.37

Table 2. 1996 Waste Rock Sample Descriptions

Sample ID	Sample Description
SGWR/P301	Sample collected at the crest of the rock pile's northern edge in material that exhibited iron carbonate staining on the surface. Sample was collected over a thickness of 20 cm in dark grey/brown silt, sand and gravel size material that included chlorite schist and pyroxenite with minor galena and sphalerite.
SGWR/P302/1	Sample collected from mixed waste rock material at southern edge of the rock pile over a thickness of 30 cm. Material consisted of graphite schist with <1% of the surface exhibiting staining.
SGWR/P302/2	Sample collected over a thickness of 20 cm in sand and silt sized brown soil below P302/1.
SGWR/P303	Sample collected in chlorite schist and greenstone below the load out facility. The sample was collected over a thickness of 40 cm in grey/green in coloured sand and gravel size material.
SGWR/P304	Sample collected from mineralized graphitic schist on the northwest edge of the rock pile. The surface had a whitish precipitate. The sand and gravel size material was collected over a thickness of 30 cm. 1% of the material was cobble size up to 8 cm.
SGWR/P305	Sample collected at the toe of the rock pile northwest corner in material similar to P301. The sample was collected over a thickness of 35 cm in moist dark grey/brown sand and gravel size material.

A confirmatory rock sample (77-WR-01) was collected from the northwest edge of the waste rock pile near the position of SGWR/304, but was not analyzed.

Waste rock pile:

There is approximately 22,000 tonnes in the waste rock pile. The rock is unsorted and the slopes appear to be stable.

Location: Northwest corner of site; loadout structure is at southern edge of waste rock disposal area

Dimensions (L x W x H): 65m x 20m x 4m

Stability: There is no evidence of the waste rock pile slumping. The waste rock pile appears stable, although the wooden loadout structure is deteriorating and could fail at any time.

5.3 Tailings Impoundments

No milling was reported at the Sadie Ladue 600 adit site, and no tailings were encountered.

6. MINE SITE INFRASTRUCTURE

Infrastructure at the Sadie Ladue 600 adit site is limited to collapsed remnants of two wooden buildings and remnants of a loadout structure. Site details can be found on Figure 1; see Attachment A for site photos.

6.1 Buildings

There are two collapsed buildings at Sadie Ladue 600 adit (remnants of a former powerhouse and mechanic's workshop) and a small log cabin associated with this site.

Building 77A: Log cabin

Location: 80m north of adit entrance

Dimensions (L x W x H): 4m x 3m x 2.5m

Construction: log walls; corrugated steel sheet roof

Paint: none observed

Asbestos: none observed

Contents: none

Foundation: none

Hazardous products: none

6.2 Fuel Storage

There were no fuel drums or storage tanks encountered at this site.

6.3 Rail Infrastructure

Fabrication: steel

Amount of materials: approximately 20m total length of rail and one ore car

Condition: The rails and ore car are rusted, but pose no safety hazard

6.4 Milling and Processing Infrastructure

No signs of milling or ore processing are evident at the Sadie Ladue 600 adit site.

6.5 Electrical Equipment

None identified.

7. SOLID WASTE DUMPS

There were no solid waste dumps observed at this site.

8. POTENTIAL CONTAMINANTS OF CONCERN

No contaminants of concern were observed at the site.

9. WATER QUALITY

Mine water from this mine and the Ladue mill and mine site at Wemecke flows through the adit and is directed into a 0.5 m corrugated steel culvert. The culvert passes directly beneath the waste rock dump and discharges at the northwest end of the site, 85m downslope of the adit entrance. The estimated flow of the mine seepage at the time of site assessment was 4 - 5 liters/second. Discharged water flows along an unnamed stream channel toward the unnamed lake west of Gambler Lake. No discoloration or precipitated oxides were observed in the mine water or discharge stream channel.

Three water quality samples were collected:

1. 77-WQ-01-01 (routines), 77-WQ-01-02 (metals) and duplicates 77-WQ-02-01 (routines) and 77-WQ-02-02 (metals), all taken from the box culvert mine water flow near the adit; and
2. 77-WQ-03-01 (routines) and 77-WQ-03-02 (metals) collected 40m downstream from the culvert discharge point.

A list of water quality samples, field tests and laboratory results is given in Attachment B.

10. RECLAMATION

Some grass and short willows have grown on the site pad and sides of the waste rock piles; however, natural reclamation overall has been minimal.

11. OTHER SOURCES OF INFORMATION AND DATA

Further information on this site can be found in the SRK (1997) Phase II assessment report. This report provides a detailed discussion of water quality and waste rock analyses from the 1996 field program; these analytical results are also summarized in Attachment B.

12. REFERENCES

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Table B2. Sadie Ladue 600 ("South Gambler") 1996 Water Quality Results

Sample ID	SG/WQ/Str 202	SG/WQ/201	SG/WQ/S T001
Physical Tests			
Conductivity	561	565	638
(umhos/cm)	307	307	340
Hardness (as CaCO3)	8.12	7.92	8.22
pH			
Dissolved Anions			
Acidity (as CaCO3)	5.2	6.5	1.5
Alkalinity - Total (as CaCO3)	169	170	185
Sulphate (as SO4)	136	137	166
Total Metals			
Aluminum T-Al	0.184	0.416	0.095
Arsenic T-As	0.0044	0.0049	0.0011
Barium T-Ba	0.02	0.03	0.05
Beryllium T-Be	<0.005	<0.005	<0.005
Boron T-B	<0.1	<0.1	<0.1
Cadmium T-Cd	0.0033	0.0033	0.0054
Calcium T-Ca	77.8	77.8	92.7
Chromium T-Cr	<0.001	<0.001	<0.001
Cobalt T-Co	<0.02	<0.02	<0.02
Copper T-Cu	0.003	0.005	0.001
Iron T-Fe	0.57	1.02	0.22
Lead T-Pb	<0.001	0.007	0.002
Lithium T-Li	<0.02	<0.02	<0.02
Magnesium T-Mg	27.4	27.3	26.3
Manganese T-Mn	0.058	0.081	0.029
Mercury T-Hg	<0.00005	<0.00005	<0.00005
Molybdenum T-Mo	<0.03	<0.03	<0.03
Nickel T-Ni	<0.02	<0.02	<0.02
Selenium T-Se	0.001	0.0008	0.0022
Silver T-Ag	0.0002	0.0002	0.0001
Sodium T-NA	2	2	<2
Vanadium T-V	<0.03	<0.03	<0.03
Zinc T-Zn	0.459	0.462	0.543

Table B3. Sadie Ladue 600 Adit 1996 Waste Rock Test Results

Parameter	Units	SG/WR/P301	SG/WR/P302/1	SG/WR/P302/2	SG/WR/P303	SG/WR/P304	SG/WR/P305
Field Paste	pH	8.01	7.92	8.28	8.08	7.46	8.12
Field Cond		110	280	310	60	>1990	40
Lab Paste	pH	8.31	8.25	8.41	8.49	8.07	8.38
Total Sulfur		1.22	1.41	0.47	0.40	2.36	0.57
Sulfate		0.21	0.18	na	na	0.27	0.21
AP		31.56	38.44	14.69	12.50	65.31	11.25
NP		95.94	101.44	225.88	82.75	86.38	105.38
NET NP		64.38	63.00	211.19	70.25	.21.06	94.13
NP/AP		3.04	2.64	15.38	6.62	1.32	9.37
Aluminum		0.19	0.54	0.10	1.66	0.55	0.64
Antimony		129	43	30	32	287	211
Arsenic		<1	<1	<1	<1	<1	61
Barium		444	78	343	454	69	86
Beryllium		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth		<1	<1	<1	<1	<1	<1
Cadmium		<0.1	<0.1	<0.1	<0.1	>100	9.1
Calcium	%	2.20	3.56	5.53	3.00	2.89	3.22
Chromium	ppm	58	63	47	53	67	75
Cobalt	ppm	14	15	15	25	15	9
Copper	ppm	168	78	63	193	379	255
Gallium	ppm	<1	<1	<1	<1	<1	<1
Iron	%	10.75	4.77	12.31	6.71	4.29	3.49
Lead	ppm	6186	1190	418	834	>10000	6259
Lithium	ppm	<1	4	<1	19	6	8
Magnesium	%	1.34	1.18	2.19	1.74	1.02	1.40
Manganese	ppm	>10000	8389	>10000	8311	5817	6304
Molybdenum	ppm	28	19	30	20	20	15
Nickel	ppm	114	66	144	63	55	46
Potassium	%	0.10	0.10	0.07	0.19	0.11	0.13
Phosphate	ppm	570	1170	340	1020	1090	1310
Silver	ppm	140.5	61.4	48.2	27.2	>200	>200
Sodium	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	ppm	9	46	7	81	55	68
Thorium	ppm	<1	<1	<1	<1	<1	<1
Tin	ppm	9	4	11	6	4	3
Titanium	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tungsten	ppm	11	<1	<1	<1	18	6
Uranium	ppm	<1	<1	<1	<1	<1	<1
Vanadium	ppm	8.0	13.0	12.9	73.2	13.2	13.6
Zinc	ppm	8678	1802	237	1300	>10000	3521

AP = Acid Potential in tonnes CaCO₃ equivalent per 100 tonnes of material

NP = Neutralization Potential in tonnes CaCO₃ equivalent per 1000 tonnes of material

Net NP = Net Neutralization Potential = tonnes CaCO₃ equivalent per 1000 tonnes of material

na = no assay / analysis

Table B4. 1999 Water Quality Results, Sadie Ladue 600 Adit Site

Sample Number		Detection Limit	Units	77-WQ-01-01/02 17/09/99	77-WQ-02-01/02 17/09/99	77-WQ-03-01/02 17/09/99
pH (field)		N/A	pH	7.8	8	8.2
Conductivity (field)		N/A	µS/cm	150	230	390
pH (Lab)		0.01	pH	7.79	8.02	7.98
Conductivity (Lab)		0.01	µS/cm	690	700	710
Total Alkalinity		5	mg CaCO ₃ /L	168	176	189
Chloride		0.25	mg/L	<0.25	<0.25	<0.25
Hardness (CaCO ₃ equiv)		5	mg/L	357	363	365
Nitrate-N		0.05	mg/L	0.13	0.13	0.12
Nitrate-N		0.003	mg/L	<0.003	<0.003	
Nitrite-N		0.003	mg/L	<0.003	<0.003	<0.003
Sulphate		1	mg/L	196	196	195
Total Dissolved Solids		5	mg/L	483	465	497
Analysis by ICP-USN						
	Aluminum	0.0008	mg/L	0.0423	0.0529	0.0389
	Antimony	0.005	mg/L	0.006	0.005	0.006
	Arsenic	0.01	mg/L	<0.01	<0.01	<0.01
	Barium	0.00004	mg/L	0.0158	0.0168	0.0171
	Beryllium	0.00001	mg/L	<0.00001	<0.00001	<0.00001
	Bismuth	0.0004	mg/L	<0.0004	<0.0004	<0.0004
	Boron	0.002	mg/L	<0.002	<0.002	<0.002
	Cadmium	0.00006	mg/L	0.00519	0.00557	0.0054
	Calcium	0.002	mg/L	93.8	99.5	96.3
	Chromium	0.00006	mg/L	0.00051	0.00044	0.00037
	Cobalt	0.00003	mg/L	0.00024	0.00031	0.00026
	Copper	0.00003	mg/L	0.00304	0.00586	0.00301
	Iron	0.00001	mg/L	0.16	0.022	0.188
	Lead	0.0003	mg/L	0.002	0.0033	0.0036
	Lithium	0.001	mg/L	0.004	0.006	0.005
	Magnesium	0.0005	mg/L	32.8	34.6	33.2
	Manganese	0.00002	mg/L	0.0452	0.0547	0.0703
	Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001
	Molybdenum	0.00007	mg/L	0.00392	0.00373	0.00347
	Nickel	0.00001	mg/L	0.0175	0.0201	0.0155

	Phosphorus	0.03	mg/L	<0.03	0.04	<0.03
Sample Number		Detection Limit	Units	77-WQ-01-01/02	77-WQ-02-01/02	77-WQ-03-01/02
				17/09/99	17/09/99	17/09/99
	Potassium	0.4	mg/L	0.6	0.6	0.6
	Selenium	0.004	mg/L	<0.004	<0.004	<0.004
	Silicon	0.004	mg/L	3.02	3.22	3.07
	Silver	0.00005	mg/L	<0.00005	<0.00005	<0.00005
	Sodium	0.004	mg/L	2.2	2.4	2.3
	Strontium	0.00002	mg/L	0.424	0.437	0.412
	Sulphur	0.008	mg/L	59.3	63.7	60.6
	Thallium	0.001	mg/L	<0.001	<0.001	<0.001
	Titanium	0.00002	mg/L	0.00104	0.0016	0.00119
	Vanadium	0.00003	mg/L	na	na	<0.00003
	Zinc	0.0002	mg/L	0.746	0.766	0.748
	Zirconium	0.00004	mg/L	<0.00004	na	na
Analysis by Hydride AA						
	Arsenic	0.0002	mg/L	0.0016	0.002	0.0012
	Selenium	0.0001	mg/L	0.0002	<0.0001	<0.0001



Photo 77-1: Mine water from portal (right) draining down culvert opening (left).



Photo 77-2: Load out area.



Photo 77-3: Drainage from culvert downslope of waste rock dumps.