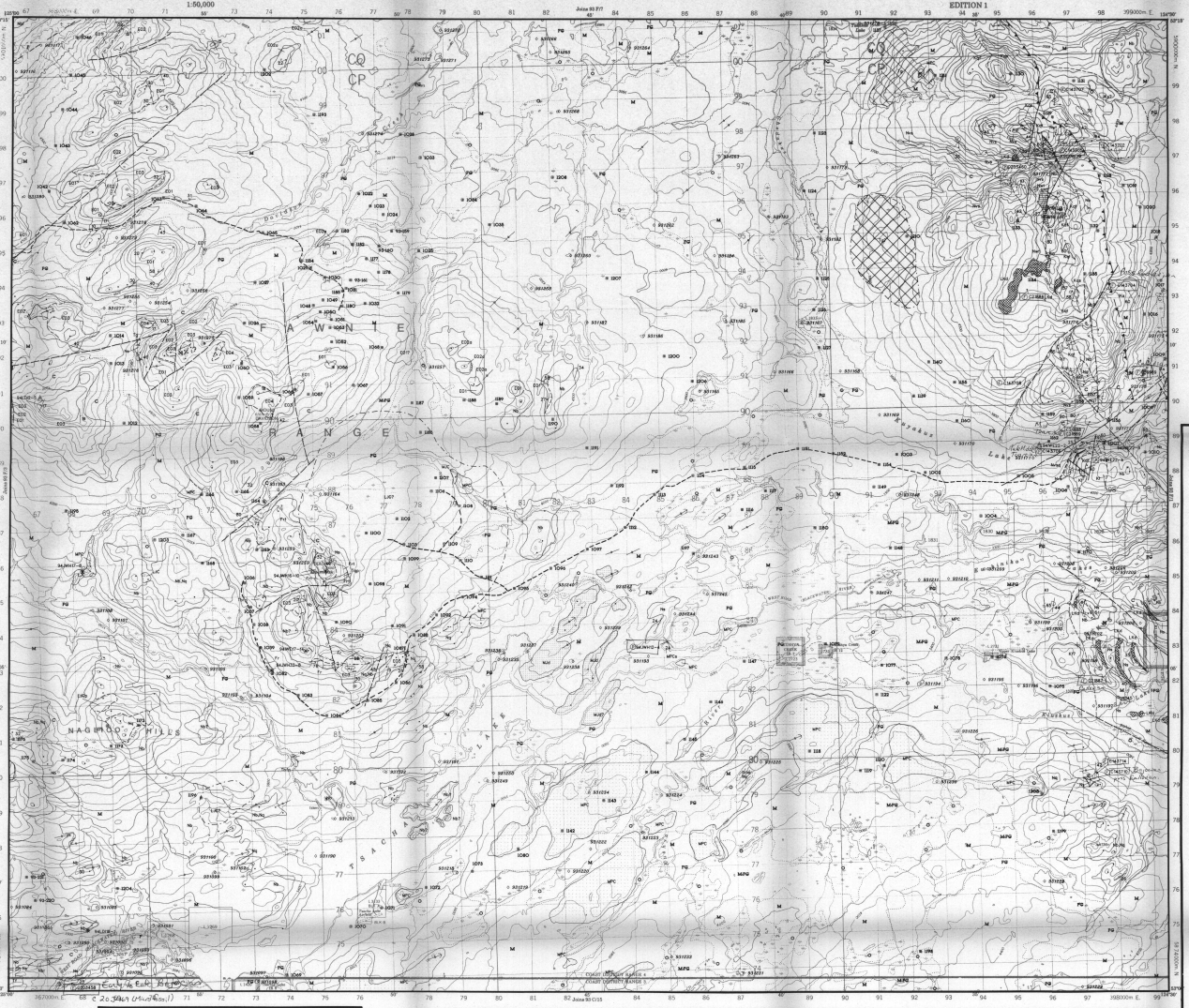
93F/2



BC Ministry of Energy, Mines and Petroleum Resources

1895 - 1995 100 YEARS OF GEOLOGICAL SURVEYING

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(Sheet 1 of 1)

BEDROCK AND SURFICIAL GEOLOGY OF THE TSACHA LAKE MAP AREA

NTS 93F/2

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Scale 1:50000

KILOMETRES 0 1 2 3 4

SURFICIAL SEDIMENTS

QUATERNARY
HOLOCENE

F — **Fluvial sand, pebble gravel and silt:** typically stratified and moderately well sorted; shallow water tables common; includes floodplain, terrace, delta and alluvial fan deposits; commonly veneered by organics; unit locally includes other surficial deposits too small to be mapped individually.

C — **Colluvium:** unsorted or very poorly sorted diamicton with abundant angular clasts of local bedrock; occurs mainly as veneers less than 1 metre thick over bedrock in upland areas; locally includes thicker colluvial fan and talus deposits at the base of steep slopes.

O — **Organic deposits:** accumulations of decayed vegetative material; includes peat bog, swamp, and marsh deposits; shallow water table common.

LATE PLEISTOCENE

L — **Glaciolacustrine sand, silt or clay:** well sorted, laminated or thinly bedded; may contain ice-rafted stones, normal faults and slump structures; locally kettled; often overlain by organics.

FG — **Glaciofluvial pebble to boulder gravel and sand:** poorly to well sorted and stratified; often interbedded with glacial debris flow deposits; includes kettled outwash, raised deltas, eskers and kame terraces; occurs with morainal deposits in hummocky terrain and fluvial or organic deposits in valleys.

M — **Morainal diamicton:** dominantly basal tills and glacially-derived debris flow deposits; unsorted to very poorly sorted, massive or crudely stratified and compact; diamicton matrix sandy to silty clay; clasts up to boulder size; flutings and crag-and-tail features common; deposits thin (<1 m thick) on steep upper slopes and thicker on lower slopes; locally includes areas of exposed rock or colluvium.

M,FG — **Resedimented glacial debris:** sandy diamicton, gravel and sand; dominantly glacial debris flow deposits and interbedded sands and gravels that accumulated on or near the margins of melting glaciers; discontinuously mantled by FG; small meltwater channels and local areas of hummocky topography common; in low areas often occurs with small organic, fluvial and glaciofluvial deposits.

VOLCANIC AND SEDIMENTARY ROCKS

TERTIARY
MIOCENE AND PLIOCENE
CHILCOTIN GROUP

MPC — **Olivine basalt flows:** thin to thickly bedded; prominent columnar joints; weathers to light brown and develops reddish brown soil; grey-green; typically fine-grained crystalline and vesicular textures; scarce flows with plagioclase laths to 1.5 centimetres; rare interbeds of poorly consolidated mudstone and sandstone containing wood fragments (MPCs).

EOCENE
OOTSA LAKE GROUP

EO4 — **Andesite flows and volcaniclastic rocks:** On the Mount Davidson ridge the uppermost Eocene strata consist mainly of maroon coarsely porphyritic andesite flows and tuff breccia (with ~20% plagioclase up to 5 mm in length) and minor interbeds of ash-tuff. At the summit of Mt. Davidson, a black-lapilli tuff with an interbed of laminated ash tuff appears to conformably overlie rocks of Unit EO3. This tuff locally contains subangular blocks over a metre in diameter composed of coarsely porphyritic andesite (25% plagioclase between 3 and 6 mm and 2% chloritized pyroxene) set in a well-indurated matrix that contains several percent quartz and very rare biotite.

EO3 — **Rhyolite ash-flow tuff:** well indurated, unwelded to very weakly welded; 25-30% crystal pyroclasts characterized by resorbed and prismatic quartz (<5-15%, avg. 2 mm diameter), plagioclase, potassium feldspar (2-7%), and rare semicitical biotite. Fragments (5-20%) are typically lapilli-size and dominated by porphyritic andesite (resembling Unit EO2) and cognate fragments containing sparse quartz phenocrysts; the groundmass accepts a weak to moderate K-spar stain; minor block-lapilli tuff; rare, parallel layered volcaniclastic quartz-bearing sandstone.

Lithic poor ash-flow tuff is about 400 metres thick in an apparent volcanic depression centered on Mount Davidson. These deposits have a conformable lower contact with flows of Unit EO2. Peripheral to this depression outliers(?) sheets rest directly on Jurassic volcanic rocks. Biotite-plagioclase porphyritic dacite sills (Unit Thfp) locally cut the ash-flow deposits.

EO2 — **Andesite lava flows:** light maroon and greyish green; seriate texture imparted by phenocrysts 1-5 mm in length, rarely to 1 cm; phenocrysts (20-30%) listed in order of abundance include: plagioclase, microscopic augite and rare quartz. Other local textural variants of the flows are amygdaloidal with chalcedonic silica, calcite, chlorite and zeolite amygdules, and plagioclase porphyry characterized by phenocrysts up to 1.5 centimetres long (EO2a); minor tuff breccia and laharic deposits.

The lower contact with Unit EO1 is conformable. In the absence of diagnostic bounding fossil strata, these flows are easily confused with lithologically similar flows (Unit Nb) of the Middle Jurassic Naglico formation.

EO1 — **Rhyolite lava flows:** mauve, light green or cream colored; aphanitic and flow laminated textures predominate, sometimes sparsely porphyritic with feldspar, rare quartz and very rare semicitical biotite; primary textures are commonly overprinted by solitary and coalescing spherulites; lithophysae are present in some flows; local autoclastic breccia (EO1brc); minor crudely bedded lapilli tuff and block-lapilli tuff dominated by rhyolitic fragments (EO1t); unconformable lower contact with Jurassic strata.

LOWER CRETACEOUS

lKs — **Conglomerate:** rounded pebbles and cobbles of light grey and green chert and black mudstone; interlayered greyish sandstone and siltstone. This sedimentary succession is exposed mainly along the axis of the Nechako Range, unconformably overlying Jurassic strata.

MIDDLE JURASSIC - EARLY BAJOCIAN TO EARLY CALLOVIAN
Naglico formation

The Naglico formation is composed mainly of dark green and maroon andesitic and basaltic flows characterized by ubiquitous pyroxene phenocrysts. Sparsely distributed sediments, dominated by feldspathic sandstone and siltstone and lesser black mudstone, locally contain abundant fossils. These rocks are variably altered to an epidote-quartz assemblage that is found in clots and lines fractures in the flows. Hematite is pervasively distributed throughout the groundmass, imparting a maroon color; it sometimes selectively coats pyroxene crystals (~2 mm) resulting in a "hematite-speckled" appearance.

Nb — **Basalt and andesite lava flows:** dark green and maroon; characterized by fresh pyroxene phenocrysts (trace to 20%); flow textures include crowded plagioclase porphyry (~35-40% equant subhedral plagioclase grains <3 mm in diameter), dense aphanitic flows and amygdaloidal porphyry with rounded chlorite, epidote-quartz and rarely, chalcedony filled amygdules (up to 15 cm in diameter).

Note: Compound lithologic symbols indicate interfingered rock sequences in which the dominant lithology is listed first, followed by strata of lesser relative abundance (e.g. Unit Nb, Nd: basaltic and andesitic rocks predominate and are interlayered with subordinate dacitic rocks).

Subordinate rock units interlayered with flows of Unit Nb

tuff, ash tuff and crystal-ash tuff: maroon and green; glassy broken quartz grains (generally <1.5 mm in diameter) may or may not be present in trace quantities; scarce accretionary lapilli tuff.

Ns — **Sandstone and sharpstone conglomerate:** dark green; dominated by angular feldspar and volcanic lithic fragments; locally abundant shelly faune; some black mudstone.

Nbt — **Andesitic lapilli tuff:** rare accretionary lapilli and debris flow deposits dominated by fragments of Unit Nb.

Nd — **Dacite porphyry flows.**

LOWER AND MIDDLE JURASSIC - EARLY TOARCIAN TO AALENIAN?
Kuyakuz Mountain Rhyolitic Tuffs and Volcaniclastic Sediments: Stratigraphically conformable with the underlying Nechako Range sedimentary assemblage on Kuyakuz Mountain.

Kqt — **Rhyolitic tuff:** similar to, but distinguished from, Kt on the basis of diagnostic quartz phenocrysts (2-5%); weakly potassic (positive K-spar stain) felsic pyroclasts.

Kt — **Lapilli tuff:** characterized by aphanitic white and light green wooy rhyolitic pyroclastic; rare accretionary lapilli tuff.

Kqs — **Volcanic sandstone and siltstone:** contains angular feldspar and quartz grains; sparse marine bivalves.

Kdf — **Andesite-dacite flows:** porphyritic and aphanitic textures; trace quartz phenocrysts sometimes present.

Kqf — **Rhyolitic flows:** contain trace quartz phenocrysts.

Fawnie Range Subaerial Rhyolitic Volcanic Sequence:
The upper contact of this sequence is stratigraphically continuous with conformably overlying flows of Unit Nb. The lower contact is not exposed. Exposures of rhyolitic flows and pyroclastic rocks representative of this sequence are most extensive in the eastern part of the Eustako Spur and the Naglico Hills in the Fawnie Creek map area (formerly Unit Nr in 93 F/3). Correlative rocks are found in the southern Fawnie Range, underlying Tsacha Mountain, and locally along the western flank of the northern Nechako Range. These rhyolitic rocks represent subaerial deposits that are replaced towards the east in the Nechako Range by a marine, volcanic-sourced sedimentary assemblage.

Frt — **Ash-flow tuff:** grey, weak to moderately welded; characterized by resorbed quartz (3%) up to 5 mm; pyroclasts include flow-laminated rhyolite, porphyritic andesite and rare equigranular granodiorite.

Fr — **Rhyolite flows:** grey-black, off white or light pink; thinly laminated; contain diagnostic quartz phenocrysts as in Unit Frt.

Nechako Range Marine Volcanogenic Sedimentary Assemblage:
The upper contact of this assemblage is stratigraphically conformable with the Kuyakuz Mountain rhyolitic volcanic sequence. The lower contact is not exposed. These sediments are characterized by crystal and lithic detritus derived from a felsic volcanic source. Scarce ammonites suggest that deposition occurred mainly during Toarcian time.

Nvs — **Crystal-rich sandstone and siltstone:** dominated by angular plagioclase and locally abundant aphanitic felsic volcanic clasts; medium to thick tabular beds; minor black siltstone and argillite may contain discrete off-white tuffaceous laminae (positive K-spar stain); rare brownish limey and concretionary mudstone.

Nvst — **Felsic tuff.**

Nwt — **Andesitic tuff:** well bedded; probably subaerial; locally conformable upper contact with Unit Kqt.

Nvsq — **Quartz-bearing crystal tuff, sandstone and siltstone.**

INTRUSIVE ROCKS

SILLS AND DIKES
EOCENE OR YOUNGER?

Thfp — **Biotite-feldspar porphyry:** cuts Unit EO3; light grey groundmass supports about 20% phenocrysts comprised mainly of plagioclase between 2 and 7 mm in diameter and up to 7% vitreous and chloritized biotite.

Tf — **Felsite sills:** greyish green; fine-grained granular groundmass supports vitreous biotite (<1 mm diameter, <7%) and sparse plagioclase phenocrysts (5 mm in diameter, <5%); weathers to porcelaneous fragments with conchoidal fracture.

Tqp — **Quartz-bearing rhyolite porphyry:** white; quartz is less than 3 mm in diameter and less than 5 volume per cent.

PLUTONS
EOCENE?

TKg — **Granite:** pink; coarse grained and equigranular.

TKfs — **Granitic pluton** (inferred from total field aeromagnetic anomaly).

LATE CRETACEOUS?

lKd — **Porphyritic diorite:** contains anhedral pyroxene grains (<2 mm in diameter, ~7-10%) in a grey-green aphanitic groundmass.

LATE JURASSIC TO EARLY CRETACEOUS

LJC — **Capoose batholith: pink;** biotite-hornblende quartz monzonite; coarse grained, equigranular texture; numerous fine-grained diorite xenoliths; minor porphyritic quartz monzonite (LJCp).

LJC? — **Inferred near surface pluton:** based on total field aeromagnetic anomaly and coincident thermally altered country rocks.

MIDDLE JURASSIC?

Mdd — **Mafic plutons** that are probable feeders to Unit Nb. Textural variations include:

Mdiop — **Diorite:** mottled white-green; medium-grained equigranular texture.

Mdgp — **Anglin porphyry:** contains subhedral and euhedral augite phenocrysts (2-6 mm diameter; <20%) and randomly oriented plagioclase laths averaging 1-2 mm in diameter and rarely up to 1 cm long.

Mdg — **Coarse-grained gabbro.**

ASSAY DATA

UTM Field No.	East	North	Rock Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Pb ppm	Zn ppm	As ppm	Sb ppm
IWE 13-2	397950	5912500	stratabound sulphides exposed in a trench	2813	6.7	1193	13	81	51772	19762	14
IWE 17-14	374650	5983450	disseminated and shear hosted pyrite in volcanic rock	31	2.9	89	4	146	2668	41	2
IWE 22-9	399049	5889063	pyritic shears in basalt	10	0.1	171	19	2	534	6	2
IWE 24-3	384809	5922680	quartz veins in mudstones and siltstones	6	0.1	4	1	2	17	5	2
IWE 24-5a	383073	5921862	quartz veining and potassic alteration	28	0.1	2	4	4	17	191	3
IWE 24-5b	383073	5921862	quartz veining and potassic alteration	65	0.5	2	6	2	26	358	5
IWE 24-5c	383073	5921862	quartz veining and potassic alteration	59	0.2	1	7	2	15	172	2
IWE 28-3	394350	5915650	pyritic laminated rhyolite	9	0.1	44	3	6	65	9	2
JWH 7-4	395225	5919956	pyrite and chlorite bearing hornfels	1	0.1	52	2	2	83	7	2
JWH 9-2	368750	5907050	pyrite and chalcopyrite in pyroxene porphyry	10	0.8	646	2	9	48	2	2
JWH 9-3	369100	5906975	disseminated pyrite in maroon to green silicified rock	4	0.2	82	3	18	105	7	2
JWH 16-10	375120	5987575	pervasively silicified zone with ~3% pyrite	19	0.2	88	5	6	1236	234	2
JWH 17-8	368214	5885863	gouge zone and quartz vein in intrusion	3	0.1	51	2	2	71	13	2
JWH 21-3	393050	5902080	quartz vein with malachite/pyrite at an intrusive contact	57	17.5	4611	7	59	41	7	2
JWH 32-8	373604	5882916	altered maroon flows with quartz veining	1	0.1	7	2	11	24	4	3
LJJ 18-1	368121	5875599	quartz breccia with malachite in maroon flows	1	50.8	31647	5	16	8	29	5

Analytical method: all elements by ICP from a 0.5 gram sample; Au by FA/ICP from a 20 gram sample.

SYMBOLS

Bedrock unit boundary[1]
Quaternary unit boundary[2]
Bedrock field station
Geologic contact (assumed)
High-angle fault (approximate, inferred)
Contractional fault (assumed)
Plutonic contact (inferred from aeromagnetic data)
Bedding
Igneous layering
Cleavage
Glacial striae
Glacial fluting
Drumlin, crag-and-tail
Fossil site (GSC catalogue number) — C141738
Age determination site (field number, age in Ma)
Ar-Ar — A 94JRC22-4
K-Ar — K 93-JH-17
U-Pb — U 94JWC22-2
Bedrock assay sample site — 94JWH7-4
Till geochemical sample site[3] — 179
Lake sediment geochemical sample site[3] — 931106

[1] Bedrock and surficial mapping in the Tsacha Lake (93F/2) and Cheslakee Creek (93F/7) map areas was conducted during the summer of 1994. These data are current to May, 1995. Six radiometric age determinations are in progress.
[2] Surficial map units are generalized from Giles and Levson (1995). Till geochemical results will be released at a later date.
[3] Data for lake geochemistry samples are given by Cook and Jackaman (1994).

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