DEPARTMENT OF
MINERALS AND ENERGY

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1976/55

MISCELLANEOUS CHEMICAL, PETROGRAPHIC AND MINERAGRAPHIC INVESTIGATIONS CARRIED OUT IN THE GEOLOGICAL LABORATORY

JANUARY–DECEMBER 1975

Compiled

by

J.C.W. WEEKES

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Compiled by J. Weekes

Record

January - December 1974/5

The miscellaneous chemical, petrographic and mineragraphic investigations carried out in the Geological Laboratory, Bureau of Mineral Resources during 1975 are compiled in this Record. The results of these investigations are presented in a series of Laboratory Reports which are arranged in numerical order in the Record.

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Laboratory Report No. 1 30 January 1975

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK, P.J. SWAN & J.C.M. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as lited below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 2/1/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	295	7.8	0.02	0.06	-
Honeysuckle Crk (F2)	275	7.2	0.01	0.08	-
Lake Burley Griffin at					
Scrivener Dam (H4)	205	7.9	0.01	0.02	24.87

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No.2 30 January 1975

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 9/1/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	322	7.9	0.01	0.06	0.27
Honeysuckle Crk (F2)	242	7.3	0.02	0.06	-
Lake Burley Griffin at					
Scrivener Dam (H4)	220	8.2	0.01	0.05	25.00

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 3 30 January 1975

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK & J.C.W. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 16/1/75

Sampling points	Sp Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	317	7.8	0.03	0.12	0.30'
Honeysuckle Crk (F2)	286	7.0	0.12	0.24	-
Lake Burley Griffin at					
Scrivener Dam (H4)	212	7.8	<0.01	0.05	24.95'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 4

5 February 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank & J. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling: 23/1/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at Burbong Weir (D2) (410705)	335	7.8	0.03	0.08	0.22
Honeysuckle Crk (F2)	250	7.4	0.01	0.03	-
Lake Burley Griffin at Scrivener Dam (H4)	211	8.0	0.01	0.04	24.94

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 5 7 February 1975

Zinc Content of Molonglo River Water

by

B.I. CRUICKSHANK & P.J. SWAN

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 30/1/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2)* (410705)	358	7.8	0.11	0.31	0.30'
Honeysuckle Crk (F2)	225	7.8	0.01	0.03	-
Lake Burley Griffin at Scrivener Dam (H4)	218	7.9	0.01	0.02	-

* Work on low level crossing in progress upstream

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory/Report No. 6 2 July 1975

Degraded illite from Raglan, via Beaufort, Victoria

by

G.W.R. Barnes

A soil sample from a well-developed profile overlaying granite was submitted by P.D. Hohnen for X-ray diffraction analysis of the clay content.

An initial scan of the < 125 um fraction indicated that the major clay mineral present was montmorillonite. As the determination was critical, from an engineering point of view, further treatment of the material was carried out.

Methods & Results:

The < 125 um fraction was dispersed in a water-filled beaker in an ultrasonic bath and allowed to settle for 5 hours. The fraction present in the upper part of the beaker should therefore almost entirely consist of the < 2 um, (clay), fraction. Liquid containing this fraction was pipetted on to a porous ceramic tile disc, under vacuum, until sufficient clay had been deposited on the surface to just mask the surface texture of the tile. This was allowed to dry at room temperature over 3 days and the clay mount was then X-rayed. The diffraction chart gave a strong peak at 15.4 A and a broad weak peak at 7.4 A .

To swell any expanding layer structures, the sample was placed in a desiccator containing ethylene glycol and put in an oven at 65°C. After cooling, the sample was X-rayed again and revealed a strong but slightly reduced peak at 17.1 A and a broad weaker peak at 7.6 A.

To expel ethylene glycol and any loosely bound water, (and thereby collapse any expanded structures), the mount was heated to 300°C for 2 hours. This resulted in the complete removal of the 15-17 A peak and very minor development of a peak at about 10.1 A . The peak at 7.6 A dropped to 7.5 A .

Heating to 550°C causes kaolinite-type structures to decompose and become amorphous. Heating the sample to this temperature resulted in the disappearance of the peak at 7.5 A . The peak at 10 A had very much intensified.

Discussion & Interpretation:

On glycolation, the peak at 15.4 A expanded to 17.1 A; the peak at 7.4 A was barely affected. This implied that montmorillonite, and possibly poorly crystalline kaolinite, were present. Heating to 300°C destroyed the 15-17 A montmorillonite peak, but at the same time a weak peak at 10 A appeared (indicative of the mica-like clay minerals). The peak at 7.6 A dropped to near its original position.

Laboratory Report No. 6 (cont'd)

At 550°C, the 7.5 A peak disappeared and confirmed the presence, in the initial sample, of a poorly crystalline kaolinite. The 10 A peak became more intense indicating illite had been formed from the break-down of the montmorillonite-like structure.

From these results and interpretations the clays are deduced to be poorly crystalline kaolinite and a degraded illite (i.e. illite from which K^+ ions have been removed) and whose behaviour under the various conditions of glycolation and heat treatment is very similar to that of montmorillonite.

Laboratory Report No. 7 25 March 1975

Fluorite & sulphide-bearing rocks from the Georgetown & Red River 1:250 000 sheets, Queensland

by

G.W.R. Barnes, J.C.W. Weekes & T.I. Slezak

3 samples were submitted by Dr B.S. Oversby for mineral identification, initially by X-ray diffraction. As a comprehensive mineralogical determination was required, the sample was crushed and the 75–500 μm fraction put through a heavy mineral separation. Both fractions were X-rayed & submitted for minor element chemical analysis.

TABLE I – Mineralogy

74300165	Albite (An_7), Fluorite, Dolomite, Calcite, Pyrite, Ilmenite, (Molybdenite, Galena).
74300666	Quartz, Epidote, Galena, Sphalerite, Calcite, Dolomite, ? Kaolinite, (Chalcopyrite, Rutile, & possibly Molybdenite, Ilmenite).
74300667	Quartz, Fluorite, Kaolinite, Phosphuranylite, (Galena, Rutile, & possibly Molybdenite & Ilmenite)

TABLE II

Chemical Analysis (D.R.O.S.[1] & Emission Spectroscopy)

Element	74300165 Light Fraction [2]	74300165 Heavy Fraction	74300666 Light Fraction	74300666 Heavy Fraction	74300667 Light Fraction	74300667 Heavy Fraction
Na	>5	>5	n.d.	n.d.	n.d.	n.d.
Mg	>4	>5	>4	>4	n.d.	n.d.
Ca	>5	>5	>5	>5	>5	>5
Ti	n.d.[3]	n.d.	1400 ppm	< 1000 ppm	0.6	< 1000 ppm
V	n.d.	n.d.	200 ppm	200 ppm	n.d.	n.d.
Mn	800 ppm[4]	1500 ppm	1500 ppm	1500 ppm	n.d.	n.d.
Fe	3.5	>5	>5	>5	3–4	5

Table II (Contd.)

Element	74300165 Light Fraction	74300165 Heavy Fraction	74300666 Light Fraction	74300666 Heavy Fraction	74300667 Light Fraction	74300667 Heavy Fraction
Ni	n.d.	n.d.	100 ppm	100 ppm	n.d.	n.d.
Cu	10 ppm	30 ppm	>1	>1	100 ppm	100 ppm
Zn	n.d.	n.d.	< 1	< 1	n.d.	n.d.
Sr	200 ppm	300 ppm	1000 ppm	200 ppm	>1	>1
Mo	trace	trace	trace	trace	trace	trace
Ag	n.d.	n.d.	< 1000 ppm	< 1000 ppm	n.d.	n.d.
Ba	trace	trace	>1	0.5	>1	>1
Pb	trace	trace	1	1000 ppm	< 1	< 1
U	n.d.	n.d.	< 1000 ppm	< 1000 ppm	trace	trace

(Figures are in % unless otherwise indicated)

The possible presence of the minerals listed in parentheses in Table I has been deduced from the chemistry & from known mineral associations. Microscope work is required to verify this. e.g. Mo & Pb were identified in 74300165. Molybdenite (MoS_2) may occur as a late-stage addition in e.g., contact metasomatic environments. Pb may occur as trace amounts of galena (PbS).

Amounts of Cu, Ti, Zn, Pb, U, Ag & trace Mo were detected in 74300666. Zn as sphalerite , Cu in minor amounts of chalcopyrite ($CuFeS_2$), Ti possibly as rutile (TiO_2) inclusions in kaolinite, or ilmenite ($FeTiO_3$), in calcite ; U in trace uraninite (UO_2) or oxidation products, Ag in galena probably as discrete blebs of ?argentite (Ag_2S) & Mo as trace amounts of molybdenite.

Pb, Ti, Cu & trace Mo were detected in 74300667. The equivalent mineralogy should be similar to 74300165 & 74300666.

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1. Direct Reading Optical Spectrometer
2. Light Fraction, S.G. < 2.85; Heavy fraction, S.G. > 2.85
3. n.d. = Not detected
4. ppm = parts per million

Laboratory Report No. 8

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK, J.C. WEEKES & P.J. SWAN

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 6/2/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	375	7.8	0.04	0.06	0.22'
Honeysuckle Crk (F2)	215	7.7	<0.01	0.01	-
Lake Burley Griffin at					
Scrivener Dam (H4)	195	8.7	<0.01	0.01	24.92

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 9

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK, J.C. WEEKES & P.J. SWAN

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 13/2/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	392	7.2	0.11	0.27	0.66
Honeysuckle Crk (F2)	212	7.2	0.01	0.08	-
Lake Burley Griffin at					
Scrivener Dam (H4)	213	7.5	0.01	0.03	25.01

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 10

Zinc Content of Molonglo River Water

by

J.C. WEEKES, P.J. SWAN, B.I. CRUIKSHANK

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 20/2/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn(ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	371	7.5	0.02	0.09	0.32
Honeysuckle Crk (F2)	252	7.1	0.02	0.02	-
Lake Burley Griffin at					
Scrivener Dam (H4)	212	7.8	0.01	0.01	24.94

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 11

Zinc Content of Molonglo River Water

by

P.J. SWAN, B.I. CRUIKSHANK, J.C. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 27/2/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	440	7.5	0.04	0.07	-
Honeysuckle Crk (F2)	174	7.7	0.02	0.04	-
Lake Burley Griffin at					
Scrivener Dam (H4)	228	7.7	<0.01	0.01	25.02

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 12

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK, J.C. WEEKES & P.J. SWAN

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 6/3/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	420	7.6	0.05	0.13	0.35'
Honeysuckle Crk (F2)	255	7.8	0.01	0.03	2.10'
Lake Burley Griffin at					
Scrivener Dam (H4)	210	8.3	<0.01	0.02	25.01

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 13

Zinc Content of Molonglo River Water

by

J.C. WEEKES, P.J. SWAN & B.I. CRUIKSHANK

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 13/3/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	392	7.2	0.14	0.28	1.02'
Honeysuckle Crk (F2)	110	7.9	0.01	0.03	
Lake Burley Griffin at					
Scrivener Dam (H4)	208	8.3	<0.01	<0.01	24.94'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 14 2 July 1975

Mixed-layer clays from pillow lavas, WA

by

G.W.R. Barnes

A sample of a yellow to yellow-green mineral was submitted by Mr L. Ranford (Mineral Resources Branch, BMR) for identification. The mineral occurs as massive coatings with quartz solution infillings within vugs in pillow lavas which crop out at the top of the Jeerinah Formation, Hamersley Group, Mt Newman, WA.

The mineral was to be checked for radioactivity, however, testing with a geiger counter proved negative. The material was then examined under a binocular microscope (x12 - x45). The only crystalline structures observed appeared to be plates of white mica embedded in an apparently structureless massive aggregate of yellow clay-like material. This material was then X-rayed using a Philips' powder diffractometer with the following operating conditions: CuK_α radiation ($\lambda = 1.542A$), Ni β -filter; Goniometer speed $1^o 2\theta$/min; chartspeed 10 mm/min; amplification 4000 counts/second; attenuation 2^4; time constant 1; divergence slit = scatter slit = 1^o; receiving slit = 0.2^o. The pattern was taken at 26^oC.

The diffraction trace indicated a clay mineral and most probably a mixed-layer clay of illite and montmorillonite.

Glycolation and heat treatment could be used to confirm the type of clay mineral present. However, the worth of this type of exercise, with the present material, is dubious.

Laboratory Report No 15 24 July 1975

Description of Thin Section Samples from the Gold Creek Volcanics, northeastern NT.

by

C.M. Gardner

Five samples of Gold Creek Volcanics were collected from the Redbank area with the assistance of A. Fleming of Triako Mines. This paper gives the results of thin section examination of some of these samples, as reported to A. Fleming.

The samples are from a 2000 m thick sequence of successively more acid extrusions (benmoreite, trachyte, rhyolite) with intercalated tuff bands, mud flows, sandstone and conglomerate beds. Copper mineralization is localized in narrow vertical pipes in the lower half of the sequence.

Results:

73760900 A, B. (WO5/14/1a, b) Benmoreite.

Fine- even-grained (.7 mm av) holocrystalline rocks with trachytic texture. Sample B slightly less oxidized and finer-grained than A, otherwise indistinguishable. Comprising plagioclase laths (?andesine) (30%), oxidized anhedral interstitial orthoclase (30%), interstitial pseudomorphic chlorite (20%), euhedral magnetite (7%), quartz (7%), accessory sphene, goethite, apatite.

73760902B. (WO5/14/3b) Trachyte

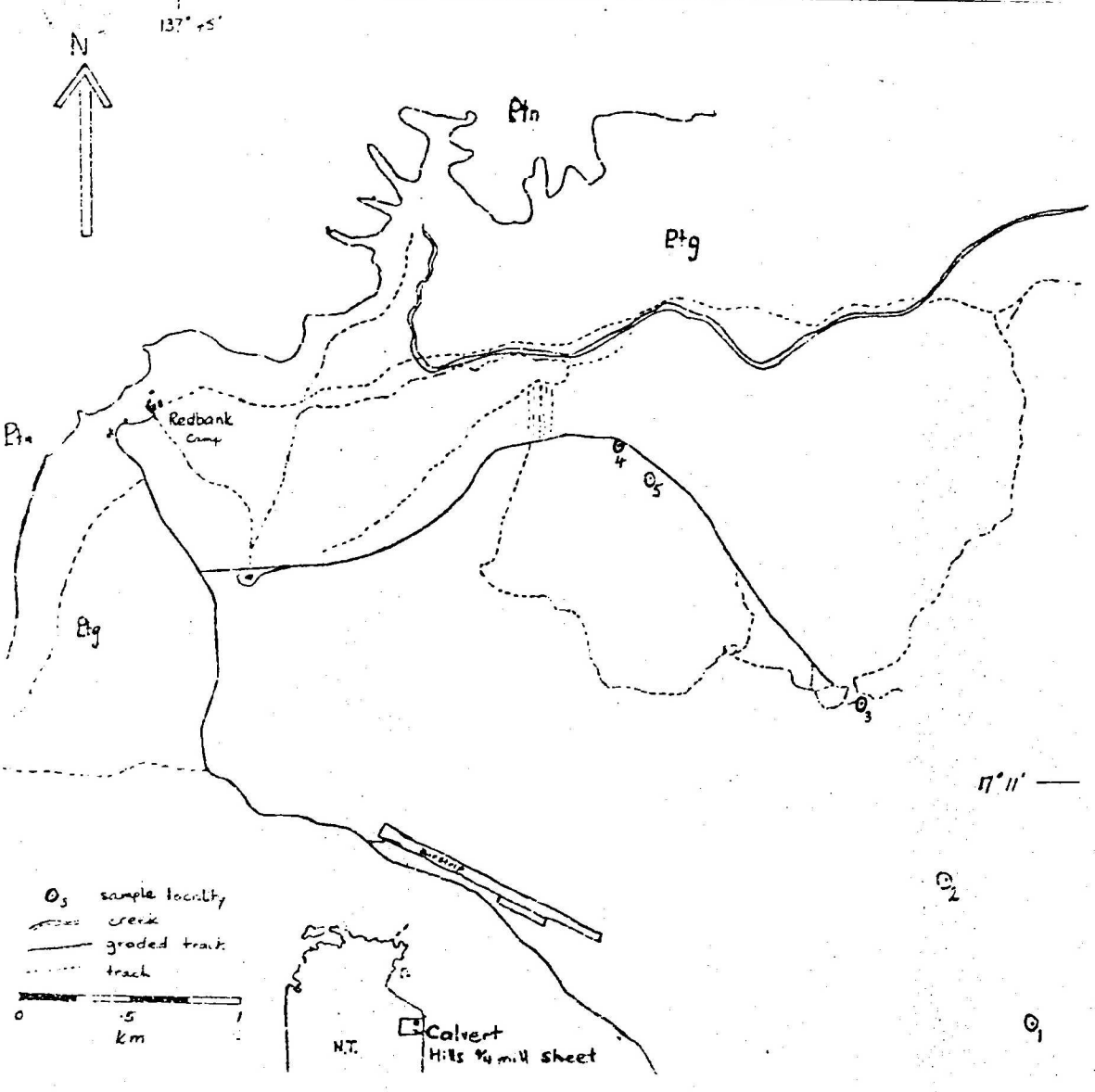
Fine- even-grained (1 mm av) holocrystalline rock with poorly defined trachytic texture. More extensively oxidized than 0900A, B. Comprising subhedral plagioclase laths (30%), their outer zones more extensively sericitized and oxidized than their cores; interstitial alkali-feldspar (30%) occurring as rims around plagioclase; anhedral extremely Fe-rich chlorite pseudomorphs (20%); secondary quartz (5%); euhedral partly hydrated Fe-oxides (7%); accessory apatite, epidote, sphene and rare plagioclase phenocrysts (3%).

73760903A, B (WO5/14/4a, b) Rhyolite

Fine- even-grained oxidized rocks composed mainly of equal proportions of devitrified quartz, plagioclase, K-feldspar. Texture dominated by spherulitic K-feldspar aggregates separated by structureless, less well devitrified material. Disseminated opaque oxides are abundant (15%). Rare chloritized plagioclase phenocrysts (3 mm) and smaller rounded embayed quartz phenocrysts together comprise 10% of the rock.

73760903C (WO5/14/4c) Rhyolite conglomerate

Fine-medium even-grained rock. Similar to A, B but contains veins of sedimentary material. Occasional K-feldspar spherulites are separated by completely devitrified quartz, K-spar in graphic intergrowth. Note that only one feldspar occurs. Rare rounded quartz phenocrysts, replaced K-feldspar phenocrysts and lithic fragments also occur. Veins of coarse quartz carrying K-feldspar prisms are sedimentary. Chlorite (very Fe-rich) and Fe-oxides (magnetite, goethite) are abundant.


137° 45'
N
Ptn
Ptg
Redbank Camp
Ptg
Ptg
O4
O5
O3
O2
O1
11° 11'
O5 sample locality
creek
graded track
track
0
.5
1
km
N.T.
Calvert Hills ¼ mile sheet

LABORATORY REPORT NO. 16 18 September 1975

CHEMICAL ANALYSIS OF OLIVINE BASALTS FROM PAPUA NEW GUINEA

by

J.G. Pyke

Two olivine basalt samples from Papua New Guinea were submitted for major element analysis by D. Mackenzie.

The samples were -

a) G82(48) from the summit area of Mt Giluwe

b) 71073107 from the SW slopes of Mt Bosavi

X-ray fluorescence was used for the determination of SiO_2, TiO_2, Al_2O_3, total Fe as Fe_2O_3, MnO, MgO, CaO, Na_2O, K_2O and P_2O_5. Loss on ignition values were determined by heating the powdered rock to 1000°C, maintaining temperature for 2 hours.

Sample No.	G82(48)	71073107
SiO_2	50.89	46.18
TiO_2	1.01	1.09
Al_2O_3	18.50	12.92
Fe_2O_3	8.89	11.42
MnO	0.14	0.18
MgO	5.40	14.98
CaO	7.47	9.98
Na_2O	2.70	3.09
K_2O	1.79	0.57
P_2O_5	0.61	0.39
Loss on Ign.	3.12	0.10
Total	100.41	100.90

Laboratory Report No. 17. 19th September 1975

CHEMICAL ANALYSIS OF BASAL CHERT FROM THE PARADISE CREEK FORMATION N.W. QLD.

by

J.G. PYKE

Nine samples of basal chert from the Paradise Creek formation (also called "oxide chert" by Carpentaria Exploration Company) were submitted for major element analysis by J. Oehler.

The Paradise Creek formation is approximately 65 kilometres north of Mt Isa in N.W. Qld.

X-ray fluorescence was used for the determination of SiO_2, TiO_2, Al_2O_3, total Fe as Fe_2O_3, MnO, MgO, CaO, Na_2O, K_2O and P_2O_5. Loss on ignition values were obtained by heating the powdered samples to 1000°C, maintaining temperature for 2 hours.

SiO_2	90.67	75.52	67.10	99.14	98.04	98.24	92.92	94.52	98.40
TiO_2	0.13	0.12	0.08	0.01	0.03	0.03	0.23	0.17	0.03
Al_2O_3	3.24	2.67	2.26	0.44	0.63	0.52	2.69	2.36	0.89
Fe_2O_3	2.20	2.14	15.34	0.70	0.72	0.47	1.66	1.46	0.63
FeO									
MnO	0.05	0.06	0.04	0.01	0.00	0.00	0.00	0.01	0.00
MgO	0.69	3.67	2.33	0.00	0.00	0.00	0.12	0.05	0.00
CaO	0.02	5.40	2.71	0.00	0.00	0.00	0.09	0.07	0.00
Na_2O	0.06	0.05	0.05	0.02	0.02	0.03	0.07	0.05	0.04
K_2O	1.40	1.20	0.58	0.02	0.07	0.08	0.90	0.62	0.20
P_2O_5	0.04	0.05	0.05	0.09	0.01	0.01	0.18	0.31	0.02
H_2O+									
H_2O-									
CO_2									
LOSS	0.82	8.82	10.20	0.19	0.29	0.30	0.80	1.00	0.29
TOTAL	99.31	99.71	100.73	100.55	99.81	99.66	99.66	100.62	100.50

LABORATORY REPORT NO.18 19 September 1975

CHEMICAL ANALYSIS OF DRILL CORE SAMPLES FROM RUM JUNGLE

by

J.G. Pyke

Nine heavily mineralised core samples from Rum Jungle were submitted for major element analysis by W. Roberts.

The samples were -

(a) 75426646
75426647
75426648 from drill hole 57B26 at Browns mine
75426649
75426650
75426652
75426653
75426654

(b) 75426651 from drill hole 70B57

X-ray fluorescence was used for the determination of SiO_2, TiO_2, Al_2O_3, total Fe as Fe_2O_3, MnO, MgO, CaO, Na_2O, K_2O and P_2O_5. Loss on ignition values were obtained by heating the powdered sample to 1000°C, maintaining temperature for 2 hours.

	7542 - 6646	6647	6648	6649	6650	6651	6652	6653	6654
SiO_2	68.03	25.91	53.21	30.41	44.17	2.70	48.01	6.19	55.38
TiO_2	1.96	3.59	0.75	4.25	3.80	0.00	0.89	0.17	3.61
Al_2O_3	10.84	11.19	13.96	11.57	16.41	0.19	26.73	4.23	9.86
Fe_2O_3	7.42	20.38	5.33	11.46	17.26	0.98	8.26	3.29	13.06
MnO	0.10	0.32	0.02	0.97	0.25	0.03	0.03	1.09	0.12
MgO	3.40	8.30	1.82	10.28	5.00	45.94	2.46	17.56	8.44
CaO	1.29	16.91	0.20	18.47	7.85	0.25	0.07	28.96	2.17
Na_2O	0.57	0.78	0.02	0.15	2.39	0.01	0.61	0.07	0.18
K_2O	2.09	0.84	3.98	3.08	0.70	0.00	6.69	0.66	3.81
P_2O_5	0.13	0.61	0.06	1.01	0.96	0.06	0.07	0.09	0.70
LOSS	3.62	8.65	19.31	9.37	1.61	50.51	7.19	36.48	2.12
TOTAL	99.45	96.48	98.66	101.01	100.40	100.99	100.99	98.79	99.44

Laboratory Report No. 19 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank, J.C. Weekes & C. Madden

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 20-3-75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	320	7.6	0.14	0.77	0.57'
Honeysuckle Crk (F2)	150	8.0	<0.01	0.02	2.99'
Lake Burley Griffin at					
Scrivener Dam (H4) (410732)	212	7.6	<0.01	0.02	25.00

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 20 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes, C. Madden & B.I. Cruikshank

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 27-3-75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (41075)	312	7.4	0.25	0.56	0.44'
Honeysuckle Crk (F2)	139	7.2	<0.01	0.06	-
Lake Burley Griffin at					
Scrivener Dam (H4)	209	7.1	<0.01	0.05	24.92'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 21 1 October 1975

Zinc Content of Molonglo River Water

by

C. Madden, B.I. Cruikshank & J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 3-4-75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	308	7.5	0.15	0.36	0.41'
Honeysuckle Crk (F2)	170	7.3	<0.01	0.08	2.3'
Lake Burley Griffin at					
Scrivener Dam (H4)	208	7.8	<0.01	0.03	24.95

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 22 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank, J.C. Weekes & C. Madden

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 10-4-75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	331	7.3	0.15	0.31	0.35'
Honeysuckle Crk (F2)	153	7.3	<0.01	0.04	-
Lake Burley Griffin at					
Scrivener Dam (H4)	201	7.5	<0.01	0.04	24.93

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 23 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes, B.I. Cruikshank & C. Madden

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 17-4-75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	345	7.3	0.22	0.31	0.69'
Honeysuckle Crk (F2)	136	7.0	0.02	0.08	
Lake Burley Griffin at					
Scrivener Dam (H4)	185	7.5	<0.01	0.03	24.99'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 24 1 October 1975

Zinc Content of Molonglo River Water

by

C. Madden, B.I. Cruikshank & J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, dissolved zinc and total zinc on water samples taken at 8 hourly intervals from the Molonglo River at Burbong Weir (D2-410705). All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling: 17/4/75 to 21/4/75

Date	Time	Sp. Cond. (umho/cm)	pH	Zn (dissolved)	Zn (Total)	Gauge height
17/4	1030	360	7.5	0.36	2.98	0.66'
	1830	310	7.5	0.22	3.40	1.05'
18/4	0230	241	7.1	0.67	2.80	3.63'
	1030	172	6.7	0.96	2.40	3.25'
	1830	119	6.7	0.96	2.85	4.45'
19/4	0230	110	6.7	0.99	2.60	3.50'
	1030	105	6.7	0.99	2.90	3.28'
	1830	103	6.7	0.99	2.64	3.03'
20/4	0230	108	6.8	0.99	2.68	2.75'
	1030	102	6.8	0.88	2.03	2.55'
	1830	109	6.8	0.86	2.08	2.42'
21/4	0230	111	6.9	0.88	2.40	2.35'

Laboratory Report No. 25 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank, J.C. Weekes & C. Madden

The following results were obtained for the determination of specific conductance at 20°C, dissolved zinc and total zinc on water samples taken at 8 hourly intervals from the Molonglo River at Burbong Weir (D2-410705). All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling: 21/4/75 to 24/4/75

Date	Time	Sp. Cond. (umho/cm)	pH	Zn (dissolved)	Zn (Total)	Gauge height
21/4	1045	110	6.8	0.67	0.98	2.27'
	1845	115	6.7	0.66	0.86	2.19'
22/4	0245	118	6.9	0.60	0.80	2.12'
	1045	119	6.8	0.63	0.88	1.99'
	1845	121	6.9	0.54	0.80	1.89'
23/4	0245	120	6.9	0.66	0.82	1.83'
	1045	128	6.7	0.67	0.92	1.77'
	1845	122	6.9	0.63	0.78	1.63'
24/4	0245	125	6.8	0.58	0.80	1.43'
	1045	128	6.8	0.60	0.82	1.36'

Laboratory Report No. 26 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. WELKES, C. MADDEN & B.I. CRUIKSHANK

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 24/4/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	138	6.8	0.50	0.63	1.33'
Honeysuckle Crk (F2)	96	7.1	0.10	0.15	
Lake Burley Griffin at					
Scrivener Dam (H4)	178	7.3	<0.01	0.02	25.06'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 27 1 October 1975

Zinc Content of Molonglo River Water

by

C. MADDEN, B.I. CRUIKSHANK & J.C. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 1/5/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	176	6.9	0.32	0.52	0.92'
Honeysuckle Crk (F2)	132	6.8	0.08	0.19	-
Lake Burley Griffin at					
Scrivener Dam (H4)	196	6.9	0.02	0.03	24.97

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 28 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK, J.C. WEEKES & C. MADDEN

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 8/5/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	205	5.9	0.46	0.49	0.78
Honeysuckle Crk (F2)	131	7.1	0.10	0.22	-
Lake Burley Griffin at					
Scrivener Dam (H4)	175	7.3	0.03	0.06	24.98

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 29 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. WEEKES, C. MADDEN & B.I. CRUIKSHANK

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 15/5/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	246	7.3	0.22	0.40	0.54
Honeysuckle Crk (F2)	147	7.2	0.02	0.08	-
Lake Burley Griffin at					
Scrivener Dam (H4)	184	7.2	0.02	0.05	24.94

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 30 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank & J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 22-5-75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	243	7.3	0.15	0.36	0.129 m
Honeysuckle Crk (F2)	146	7.3	0.01	0.04	2.38'
Lake Burley Griffin at					
Scrivener Dam (H4)	177	7.5	0.02	0.06	24.93'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 31 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes & B.I. Cruikshank

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 29/5/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	260	7.0	0.29	0.41	0.48
Honeysuckle Crk (F2)	156	7.1	0.02	0.29	-
Lake Burley Griffin at					
Scrivener Dam (H4)	148	6.7	0.02	0.04	29.94

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 32 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank & J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 5/6/75

Sampling Points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	266	7.2	0.18	0.41	0.55
Honeysuckle Crk (F2)	194	7.0	0.03	0.06	-
Lake Burley Griffin at					
Scrivener Dam (H4)	147	7.2	0.02	0.04	24.94

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 33 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. WEEKES & B.I. CRUIKSHANK

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burely Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 12/6/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	248	6.8	0.40	0.48	0.58
Honeysuckle Crk (F2)	173	7.4	0.03	0.11	-
Lake Burley Griffin at					
Scrivener Dam (H4)	146	7.2	0.03	0.06	24.95

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 34 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK & J.C. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 19/6/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	253	6.2	0.47	0.48	0.42
Honeysuckle Crk (F2)	189	6.6	0.04	0.11	-
Lake Burley Griffin at					
Scrivener Dam (H4)	160	7.0	0.02	0.03	24.92

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 35 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes & B.I. Cruikshank

The following results were obtained for the determination of specific conductance at 20°C, dissolved zinc and total zinc on water samples taken at 8 hourly intervals from the Molonglo River at Burbong Weir (D2-410705). All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling: 21/6/75 to 26/6/75

Date	Time	Sp. Cond. (umho/cm)	pH	Zn (dissolved)	Zn (Total)	Gauge height
21/6	1115	307	7.3	0.36	1.33	0.52
	1915	350	7.2	0.33	0.87	0.82
22/6	0315	136	6.2	0.38	1.14	9.43
	1115	65	5.8	0.51	1.02	6.50
	1915	65	5.8	0.51	0.90	6.50
23/6	0315	67	5.8	0.49	0.82	6.10
	1115	67	5.8	0.55	0.95	5.46
	1915	74	5.9	0.57	1.03	4.50
24/6	0315	78	5.9	0.55	0.90	3.78
	1115	88	6.0	0.57	0.94	3.45
	1915	93	6.1	0.52	0.82	3.17
25/6	0315	100	6.1	0.51	0.82	2.95
	1115	104	6.1	0.73	2.07	2.82
	1915	95	6.2	0.49	2.00	4.75
26/6	0315	71	5.9	0.59	1.84	6.70

Laboratory Report No. 36 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank & J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, dissolved zinc and total zinc on water samples taken at 8 hourly intervals from the Molonglo River at Burbong Weir (D2-410705). All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling: 26/6/75 to 29/6/75

Date	Time	Sp. Cond. (umho/cm)	pH	Zn (dissolved)	Zn (Total)	Gauge height
26/6	1110	62	5.9	0.38	0.86	6.69
	1910	120	3.4	0.62	0.70	5.20
27/6	0310	67	6.2	0.36	0.67	4.09
	1110	77	6.3	0.37	0.62	3.63
	1910	82	6.5	0.34	0.70	3.33
28/6	0310	185	3.3	0.64	0.69	3.13
	1110	100	6.4	0.37	0.60	2.92
	1910	102	6.4	0.36	0.58	2.86
29/6	0310	296	2.9	0.57	0.58	2.82
	1110	119	6.6	0.32	0.72	2.82
	1910	134	6.4	0.39	0.63	2.85

Laboratory Report No. 37 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. WEEKES & B.I. CRUIKSHANK

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 10/7/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	184	7.3	0.26	0.48	1.70'
Honeysuckle Crk (F2)	113	7.9	0.04	0.06	-
Lake Burley Griffin at					
Scrivener Dam (H4)	84	7.0	0.06	0.10	25.02

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 38

Zinc Content of Molonglo River Water

by

J.C. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, dissolved zinc and total zinc on water samples taken at 8 hourly intervals from the Molonglo River at Burbong Weir (D2-410705). All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling: 13-17/7/75

Date	Time	Sp. Cond. (umho/cm)	Zn (dissolved)	Zn (Total)	Gauge height
13/7	0220	269	0.18	0.91	3.80
	1020	146	0.25	0.71	4.40
	1820	110	0.42	0.70	8.19
14/7	0220	94	0.42	0.60	7.00
	1020	75	0.24	0.53	5.07
	1820	78	0.26	0.48	4.10
15/7	0220	98	0.29	0.54	3.63
	1020	136	0.56	0.62	3.27
	1820	124	0.35	0.67	3.02
16/7	0220	127	0.38	0.69	2.86
	1020	140	0.34	0.44	2.73
	1820	145	0.44	0.67	2.62
17/7	1020	156	0.44	0.67	2.45

Laboratory Report No. 39 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 17/7/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at Burbong Weir (D2) (410705)	148	6.8	0.28	0.39	2.41'
Honeysuckle Crk (F2)		No	Sample		
Lake Burley Griffin at Scrivener Dam (H4)	80	6.5	0.04	0.03	25.05

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 40 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 24/7/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River on					
Burbong Weir (D2) (410705)	213	6.5	0.37	0.40	1.42'
Honeysuckle Crk (F2)	134	6.5	0.08	0.10	-
Lake Burley Griffin at					
Scrivener Dam (H4)	83	5.9	0.06	0.05	24.96'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 41 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 31/7/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	236	7.0	0.14	0.42	0.340 m
Honeysuckle Crk (F2)	178	8.3	0.02	0.12	
Lake Burley Griffin at					
Scrivener Dam (H4)	87	7.1	0.05	0.06	24.97'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 42 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 7/8/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	271	7.2	0.20	0.42	0.372 m
Honeysuckle Crk (F2)	184	7.2	0.04	0.10	-
Lake Burley Griffin at					
Scrivener Dam (H4)	100	6.5	0.04	0.06	5.928 m

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 43 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 14/8/75

Sampling points	Sp. Con. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	285	6.8	0.23	0.39	1.44'
Honeysuckle Crk (F2)	184	7.1	0.04	0.08	
Lake Burley Griffin at					
Scrivener Dam (H4)	No sample				

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 44 1 October 1975

Zinc Content of Molonglo River Water

by

J.C. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 21/8/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	298	7.3	0.14	0.40	0.246 m
Honeysuckle Crk (F2)	180	6.7	0.06	0.11	-
Lake Burley Griffin at					
Scrivener Dam (H4)	134	6.3	0.03	0.06	5.920 m

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 45 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. CRUIKSHANK & J.C. WELLES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 28/8/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705	305	7.3	0.14	0.31	0.368 m
Honeysuckle Crk (F2)	193	7.1	0.02	0.04	
Lake Burley Griffin at					
Scrivener Dam (H4)	127	7.0	<0.01	0.04	5.93 m

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 46 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 4/9/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	336	7.1	0.17	0.31	0.308 m
Honeysuckle Crk (F2)	241	7.2	0.03	0.09	-
Lake Burley Griffin at					
Scrivener Dam (H4)	158	7.0	0.04	0.08	5.936 m

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 47 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 11/9/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	371	7.2	0.17	0.39	0.69'
Honeysuckle Crk (F2)	207	7.3	0.03	0.08	-
Lake Burley Griffin at					
Scrivener Dam (H4)	176	7.1	0.04	0.14	5.918 m

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 48 1 October 1975

Zinc Content of Molonglo River Water

by

B.I. Cruikshank & J.C. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 18/9/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	315	7.0	0.28	0.39	1.54'
Honeysuckle Crk (F2)	207	7.1	0.06	0.10	-
Lake Burley Griffin at					
Scrivener Dam (H4)	167	7.7	0.01	0.03	25.02'

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 49 22 October 1975

Zinc Content of Molonglo River Water

by

J. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 24/9/75

Sampling points

	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	287	7.2	0.17	0.34	1.00 ft.
Honeysuckle Crk (F2)	215	6.6	0.06	0.12	-
Lake Burley Griffin at					
Scrivener Dam (H4)	190	6.9	N.D.	0.02	25.00 ft.

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 50 22 October 1975

Zinc Content of Molonglo River Water

by

J. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 30/9/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)		No Sample			
Honeysuckle Crk (F2)	115	6.2	0.05	0.13	3.740
Lake Burley Griffin at					
Scrivener Dam (H4)	205	6.8	0.02	0.04	25.09 ft.

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 51 22 October 1975

Zinc Content of Molonglo River Water

by

J. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 2/10/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	178	6.5	0.31	0.49	2.46 ft.
Honeysuckle Crk (F2)	142	6.7	0.09	0.13	-
Lake Burley Griffin at					
Scrivener Dam (H4)	204	6.9	0.02	0.04	24.91 ft.

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 52 22 October 1975

Zinc Content of Molonglo River Water

by

J. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 9/10/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	297	6.8	0.17	0.25	0.89 ft
Honeysuckle Crk (F2)	172	7.1	0.04	0.06	-
Lake Burley Griffin at					
Scrivener Dam (H4)	164	7.0	0.03	0.08	25.03 ft.

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 53 28 October 1975

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20° C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 16/10/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	290	7.1	0.10	0.20	0.76 ft
Honeysuckle Crk (F2)	200	7.0	0.02	0.03	
Lake Burley Griffin at					
Scrivener Dam (H4)	151	6.6	0.03	0.04	24.99 ft

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No 54

Petrographic Description of Upper Silurian Volcanics from the Canberra Region

by

C.M. Gardner

21 thin sections of samples were submitted by P. Lang for petrographic description. The volcanics include dacites, rhyodacites and quartz arenites from the Canberra, Brindabella, Umburra and Hall 1:50 000 Sheet areas. The samples are described in this report.

SUMMARY

Most of the 21 samples described are porphyritic rhyodacites or rhyolites carrying between 30 and 50% of phenocrysts. These generally include unbroken phenocrysts, fragments of broken phenocrysts (fragmentation is a distinctive feature of these rocks) and microphenocrysts. Quartz is the dominant phenocrystic mineral in all of the samples, in terms of abundance and grainsize. It occurs as rounded or hexagonal embayed crystals and always shows complete extinction.

Plagioclase (albite -?andesine) is always present, usually as subhedral, partly sericitized, irregularly twinned, zoned laths. Euhedral microphenocrysts of magnetite also occur in all the samples.

Mafic phenocrysts were originally biotite ± hornblende ± clinopyroxene (Cpx). Orthopyroxene (Opx) was found in one sample. In almost all the samples, the mafics have been completely altered, usually to chlorite + opaque oxides or sericite. Calcite, tremolite, sphene are also common alteration products. Low-grade greenschist metamorphism is inferred from these alteration products.

The groundmass is usually comprised of quartz, plagioclase, K-feldspar, chlorite, sericite, opaque oxides in varying stages of devitrification. Strong flow banding is evident in some samples, the flow enveloping deformed biotite pseudomorphs.

Accessories include apatite, zircon, epidote.

75360021 Phenocrysts (35%): most of these are clear (i.e. not undulose) quartz, up to 5 mm diameter, cracked but not displaced. Sericitized albite and biotite partly replaced by chlorite + opaques make up the remainder of the phenocrysts. Microphenocrysts of biotite and chlorite + opaques (3%), and magnetite also occur.

Groundmass: partly devitrified quartz-feldspar-opaques intergrowth makes up the groundmass. Feldspar is clouded with inclusions of opaque oxides.

75360022 Phenocrysts (50%): Phenocrysts, fragmented phenocrysts and microphenocrysts of clear quartz, plagioclase (oscillatory zoned and twinned) and pseudomorphs after biotite and hornblende.
Groundmass: this is very dark, due to the high density of opaques, and shows only incipient devitrification; flow structure is evident.

75360023 This sample is similar to 75360022 described above. Biotite (now chlorite or sericite, + opaques) is strongly deformed and is strung out to narrow elongate laths concordant with the groundmass flow structure, which is also crenulated. The chlorite replacing biotite is an intermediate biotite → chlorite alteration product, with greater birefringerence than chlorite (i.e. the same order of birefringence as sericite). Magnetite and apatite are accessory.

75360024 Porphyritic dacite. This sample is similar to 75360023.

75360025 The mineralogy of this sample is the same as that of the two preceding samples 75360023 and 75360024. Phenocrysts, fragmented phenocrysts and microphenocrysts comprise 50% of the rock. Red-brown biotite phenocrysts are unaltered and undeformed.

75360026 This sample is similar to 75360025. Phenocrysts (40%): these are nearly all fragmented. Biotite is fresh; pleochroic colours are dark brown to pale green. Plagioclase is sharply twinned and zoned from An_0 to An_{10}. K-spar phenocrysts were not observed. Magnetite phenocrysts are abundant. Fresh orthopyroxene phenocrysts with zircon inclusions occur rarely.
Groundmass: the groundmass is comprised of completely devitrified quartz, albite, K-spar and chlorite.

75360027 Phenocrysts. fragmented phenocrysts and microphenocrysts make up 50% of rock. They include embayed, generally rounded, non-undulose quartz, up to 5 mm diameter; smaller subhedral partly sericitized twinned plagioclase, zoned from An_0 to An_{10}; strongly deformed chlorite+opaque pseudomorphs after biotite, and chlorite pseudomorphs after hornblende.
Groundmass: this consists of a devitrified cryptocrystalline intergrowth, with no flow structure remaining.

75360028 This rock may be sedimentary as quartz phenocrysts are generally not embayed, although some are angular. However, the texture is similar to that of rhyodacites already described. Feldspar phenocrysts are replaced by sericite, clay or calcite; mafics (biotite, hornblende) are replaced by colourless chlorite+opaques.
Groundmass: the consists of quartz, clay, calcite and sericite.

75360029 Phenocrysts (40%): these include large, embayed quartz, heavily corroded feldspars altered to sericite, calcite and clay, and dusted with opaques and mafics altered to epidote or colourless chlorite+opaques. Calcite is abundant in groundmass and has associated with it many tiny (.05 mm) euhedral magnetites.
The rock is partly sedimentary.

75360030 This rock is probably sedimentary. Sub-angular quartz fragments (40%) occur in all sizes ranging from a micro-crystalline matrix to 1.5 mm.

Feldspar fragments comprise 25%.

The matrix consists of quartz, clay, feldspar, calcite, opaques+ chlorite. No structures, either sedimentary or volcanic, were observed.

75360031 This rock is extensively altered. Large areas of recrystallized groundmass may be of sedimentary origin. Quartz phenocrysts (20%) are cracked but not displaced from their original position. Feldspars (10%) are sericitized. Rare original biotite and hornblende have been replaced by opaques+sericite or opaques+ chlorite. Zircon and magnetite microphenocrysts are accessory.

74360060 Rhyodacite.

Phenocrysts (50%): These include clear, sometimes strained, quartz, 30% of total rock, from .05 mm (microphenocrysts) to 5 mm diameter, mostly fragmented as well as embayed. Original crystal faces are either rounded or hexagonal, indicating a high temperature (around 600°) origin. Sericitized anhedral fragmented plagioclase phenocrysts (15%) are smaller than quartz, indicating relatively deep level of derivation. Sericite and chlorite (± opaques) form pseudomorphs after biotite. The strong deformation of the pseudomorphs probably occurred during solidification of the groundmass, as the contortions parallel the groundmass flow structure. Cpx phenocrysts occur rarely.

Groundmass: Cryptocrystalline partly devitrified quartz, K-spar and plagioclase make up the groundmass. It has a well-defined flow structure. Accessories include apatite, magnetite, zircon, goethite.

74360061 Rhyodacite: This sample is similar to 74360060 except that the phenocrysts comprise 35% instead of 50% of total rock and the groundmass is fully devitrified; consequently flow pattern in the groundmass has been destroyed, although deformed biotite laths indicate that it did originally exist.

74360062, 0063 Rhyodacite. These samples have similar mineralogy to the preceding samples 0060, 0061 except for the higher proportion of mafics in 0062, 0063.

Phenocrysts: The phenocryst mineralogy is as for 0061 except that quartz and plagioclase are both commonly 4 mm, indicating shallower level of commencement of crystallization than for 0061. Plagioclase is twinned, euhedral, its composition not determinable because of sericitization.

Mafic phenocrysts, biotite, Cpx are pseudomorphed by quartz-chlorite ± calcite, sphene-chlorite-opaque oxides for sericite aggregates.

Groundmass (50%): This consists of fine-grained recrystallized volcanic quartz and feldspar.

74360064 Rhyodacite.

Phenocrysts (60%): These include rounded fragments of clear quartz, sericitized subhedral feldspar, and pseudomorphs after biotite and hornblende. The pseudomorphs are aggregates of quartz-calcite-tremolite-epidote, calcite-chlorite, or Fe-rich chlorite. Former biotite laths are deformed.

Groundmass: This is structureless cryptocrystalline quartz-chlorite-plagioclase-K-feldspar. Accessories include zircon, sphene, opaques.

74360065 Rhyodacite.

Phenocrysts (60%): These include fragmented irregularly-shaped but well-rounded quartz, dense enough that they are just touching, and partly sericitized untwinned sodic plagioclase. As in the previous sample, 0064, mafic phenocrysts have been altered by low-grade geeenschist metamorphism to aggregates of Fe-poor chlorite, Fe-poor chlorite-sphene, calcite-quartz-sphene. Some of the sphene occurs as radially-grown spherical crystals.
Groundmass: structureless cryptocrystalline quartz-Fe-rich chlorite-albite-calcite make up the groundmass.

74360066 In this sample there is a large hiatus between phenocrysts and groundmass, i.e. there are no fragmented phenocrysts or microphenocrysts. The proportion of phenocrysts relative to groundmass is much smaller than in previously described samples. The rock is cut by long narrow quartz-sericite veins.
Phenocrysts: These include quartz (25%), up to 8 mm long, the larger ones showing incipient undulose extinction; plagioclase (10%), up to 4 mm long, forming subhedral, heavily sericitized laths. Hornblende, ?biotite (total 7%) are replaced by chlorite + opaque oxides. Magnetite phenocrysts are common.
Groundmass: This is only partly devitrified (but no flow structure evident) microcrystalline quartz-albite-opaques-Fe-rich chlorite.

74360067 Rhyolite. This sample is similar to 74360066, except that some of the feldspar phenocrysts may be potash feldspar (orthoclase); these are up to 8 mm long. The quartz and feldspar phenocrysts are commonly split, but the fragments are not displaced from their original position. Hornblende and biotite total 7%.
Groundmass (65%): this consists of partly devitrified quartz, albite, chlorite and opaques.

74360068 Rhyolite.

Phenocrysts: this sample has a low density of phenocrysts (20%). Quartz and plagioclase are present in equal proportions and have the same grainsize. Biotite altered to sericite forms 3%.
Groundmass: this consists of fully devitrified, cryptocrystalline, locally recrystallized (quartz only) quartz, feldspar, chlorite and opaque oxides.

74360069 Rhyolite.

Phenocrysts (40%): most of these are quartz, clear, highly fragmented, all with sharp angular edges. Both albite-twinned plagioclase and microcline-twinned potash feldspar occur. Some K-feldspar phenocrysts are altered to quartz-sericite aggregates. Biotite microphenocrysts (8%) are altered to opaques + epidote, and carry abundant zircon inclusions.
Groundmass: this is devitrified and locally recrystallized.

Laboratory Report No. 55 6 November 1975

Zinc Content of Molonglo River Water

by

J. Weekes

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 23.10.75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn(ppm) (dissolved)	Zn(ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	210	6.3	0.28	0.41	2.43 ft.
Honeysuckle Crk (F2)	150	6.8	0.04	0.07	2.09 ft.
Lake Burley Griffin at					
Scrivener Dam (H4)	153	6.4	0.28	0.49	555.81

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

17 November 1975

Laboratory Report No. 56

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 30/10/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Z (ppm) (Total)	Flow
Molonglo River at Burbong Weir (D2) (410705)	177	7.0	0.17	0.26	1.63 ft.
Honeysuckle Crk (F2)	No sample				
Lake Burley Griffin at Scrivener Dam (H4)	116	6.4	0.03	0.05	25.06 ft.

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 57

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 6/11/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	205	6.8	0.20	0.26	1.49 ft
Honeysuckle Crk (F2)	146	7.0	0.06	0.09	
Lake Burley Griffin at					
Scrivener Dam (H4)	110	6.8	0.04	0.08	555.93 m

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 58

ELECTRON MICROPROBE SEMIQUANTITATIVE ANALYSES OF XENOTIME AND FLORENCITE FROM THE KILLI KILLI HILLS AREA, SOUTHEAST OF THE KIMBERLEY REGION

D.J. Ellis

Analytical operating conditions - a JEOL JXA-3A electron microprobe was used. Operated at 15 KV and 20 KV accelerating voltage, 0.5×10^{-7} amps beam current, forty second counting time on peak and background.

Standards used -

P_2O_5 - natural apatite specimen.

Rare earth elements-synthetic glass standards

Al_2O_3 - both synthetic glass standard and New Spring Mountain hornblende.

The wt % oxides in the standards were as follows -

Al_2O_3	14.26	New Spring Mountain Hornblende
Al_2O_3	30.52	Synthetic glass
P_2O_5	42.00	Natural apatite standard
EuO	4.20	Synthetic glasses
Gd_2O_3	4.46	" "
Tb_2O_3	4.35	" "
Tm_2O_3	4.35	" "
Nd_2O_3	4.26	" "
Sm_2O_3	4.26	" "
Yb_2O_3	4.26	" "
Lu_2O_3	4.26	" "
Y_2O_3	4.08	" "
La_2O_3	4.28	" "
Ce_2O_3	4.00	" "
Pr_2O_3	4.44	" "
Dy_2O_3	4.36	" "
Ho_2O_3	4.41	" "
Er_2O_3	4.36	" "

The REE (rare earth elements) and Al_2O_3 synthetic glass standards are as described by Drake, M.J., and Weill, D.F., Chem. Geol, 10, 1972, pp. 179-181, "New Rare Earth Element Standards for Electron Microprobe Analysis".

Raw data were processed using the correction programs of Frazer, J.Z., Fitzgerald, R.W., and Reid, A.M., Scripps Institute of Oceanography, Uni. Cal. Unpublished report. SIO Reference 66-14, June 20, 1966.

Results

Considerable difficulty was obtained in the analysis of these minerals because of the fine grain size, pronounced compositional zoning and volatilization of specimens during the probe work. For the rare earth elements, a high operating voltage (20 KV) was necessary for their detection. This high operating voltage also resulted in volatilization of water present in the florencite.

Florencite

Ideal formula $CeAl_3(PO_4)_2(OH)_6$.

Occurring as isotropic euhedral clear cubes in the specimens.

	72490309	0315			
	1	2	3	4	5
Al_2O_3	33.87	35.54	44.85	42.12	48.24
P_2O_5	33.91	31.72	25.75	24.68	12.6
CaO	4.19	4.87	3.24	4.21	3.98
La_2O_3	1.92	0.77	0.41	1.21	1.58
Ce_2O_3	5.94	2.67	1.34	3.95	4.84
Nd_2O_3	5.63	2.57	0.05	0.30	3.23
Am_2O_3	0.48	0.34	0.07	0.43	0.34
Gd_2O_3	0.49	0.27	0.15	0.37	0.39
Pr_2O_3	1.07	0.36	0.00	0.74	0.70
Total	87.50	79.08	75.86	78.01	75.90

These results must be considered semiquantitative only. The low totals are due to several factors. Florencite contains an appreciable quantity of water (e.g. 11.11 wt % H_2O in florencite from Russia - Somina and Bulakh, 1966). The necessity of using a high KV for detection of the REE resulted in drastic volatilization in the samples, and, therefore, erratic counting statistics compared to the synthetic standards. The possible presence of other elements in the minerals which were not analyzed for (especially Pb, Sr, though cursory peak scans did not indicate its presence).

All REE were searched for, and those not reported in the table were present below the detection limit (0.01 wt %).

The minerals were markedly zoned. It is of interest to note from the analyses that although there is a very wide range in Al_2O_3 and P_2O_5 abundances, their combined totals are usually close to 66 wt percent.

Xenotime YPO_4.

Disseminated anhedral grains of browny-orange xenotime from the same rock samples were also analyzed.

	1	2
Y_2O_3	48.04	48.52
P_2O_5	20.72	16.51
Gd_2O_3	0.29	0.41
EuO	0.09	0.09
Nd_2O_3	0.05	0.09
Sm_2O_3	0.13	0.20
Yb_2O_3	0.19	0.12
Dy_2O_3	0.43	0.53
Er_2O_3	0.26	0.26

All REE and Al_2O_3 were analyzed for, with peak scans being undertaken for other elements, however, they were not present in quantities above the detectable limit (0.07 wt%).

The extremely low totals are, in part, due to the very inaccurate analysis of P_2O_5 (xenotime analyses presented by Amli, 1975, contain 34 wt % P_2O_5 and 46 wt % Y_2O_3).

At best these results should be regarded as semiquantitative, confirming that the mineral is xenotime containing low concentrations of the above rare earth elements.

References

Amli, R., 1975. Am. Miner., 60, pp. 607-620. Mineralogy and rare earth geochemistry of apatite and xenotime from the Gloserheia Granite Pegmatite, Froland, Southern Norway.

Drake, M.J., and Weill, D.F., 1972. Chem. Geol., 10, pp 179-181. new rare earth element standards for electron microprobe analysis.

Somina, M. Ya., and Bulakh, A.G., 1966. Zap. Vses. Min. Obshch. 95, pp. 537-550. Florencite from the carbonatites of Eastern Sayan and the chemical constitution of the Crandallite Group (In Russian) Chemical analyses from this paper are given in Mineralogical Abstracts, Vol. 18, p. 204, 1967.

Laboratory Report No. 59

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 13/11/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	234	6.8	0.12	0.18	0.91 ft
Honeysuckle Crk (F2)	170	7.0	0.02	0.08	
Lake Burley Griffin at					
Scrivener Dam (H4)	127	7.1	0.06	0.09	25.01 ft

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 60 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	2/1/75
Sp. Cond. (20°C)	-	3,000 umho/cm
pH	-	8.3
T.D.S. (180°C)	-	1,750 ppm

Laboratory Report No. 61 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK & P.J. SWAN

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	4/2/75
Sp. Cond. (20°C)	-	3,650 umho/cm
pH	-	8.6
T.D.S. (180°C)	-	1,990 ppm

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK & J.C. WEEKES

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	11/3/75
Sp. Cond. (20°C)	-	3,300 umho/cm
pH	-	8.3
T.D.S. (180°C)	-	1,970 ppm

Laboratory Report No. 63 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK & P.J. SWAN

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	1/4/75
Sp. Cond. (20°C)	-	3,630 unho/cm
pH	-	7.7
T.D.S. (180°C)	-	2,210 ppm

Laboratory Report No. 64 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK & J.C. WEEKES

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	1/5/75
Sp. Cond. (20°C)	-	3,750 umho/cm
pH	-	7.7
T.D.S. (180°C)	-	2,170 ppm

Laboratory Report No. 65 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	2/6/75
Sp. Cond. (20°C)	-	4,090 umho/cm
pH	-	8.2
T.D.S. (180°C)	-	2,380 ppm

Laboratory Report No. 66 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	2/7/75
Sp. Cond. (20°C)	-	3,690 umho/cm
pH	-	7.9
T.D.S. (180°C)	-	2,120 ppm

Laboratory Report No. 67 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	1/8/75
Sp. Cond. (20°C)	-	3,120 umho/cm
pH	-	6.8
T.D.S. (180°C)	-	1,680 ppm

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	1/9/75
Sp. Cond. (20°C)	-	3,210 umho/cm
pH	-	6.7
T.D.S. (180°C)	-	1,730 ppm

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	1/10/75
Sp. Cond. (19°C)	-	2,610 umho/cm
pH	-	6.9
T.D.S. (180°C)	-	1,540 ppm

Laboratory Report No. 70 25 November 1975

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

B.I. CRUIKSHANK

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	31/10/75
Sp. Cond. (22°C)	-	2,260 umho/cm
pH	-	7.1
T.D.S. (180°C)	-	1,320 ppm

LABORATORY REPORT NO. 71 2nd December 1975

CHEMICAL ANALYSIS OF ROCK SAMPLES FROM THE ARUNTA BLOCK

by

J.G. Fyke

One hundred and thirty four rock samples from the Arunta block N.T. were submitted by P.G. Wilkes for trace element analysis of uranium, thorium and rubidium. The analyses were carried out using the Philips PW 1210 X-ray fluorescence spectrometer on unignited material pressed into boric acid backed pellets.

Calculated detection limits are:-

- Uranium 2ppm
- Thorium 2ppm
- Rubidium 2ppm

N.B. ND = Not detected.

Sample No.	U ppm	Th ppm	Rb ppm	Sample No.	U ppm	Th ppm	Rb ppm
7509 1000	4	22	160	7509 1022	ND	13	119
7509 1001	ND	17	145	7509 1023	ND	19	158
7509 1003	4	23	162	7509 1024	4	14	116
7509 1004	3	20	164	7509 1025	ND	15	148
7509 1005	4	20	156	7509 1026	3	19	158
7509 1006	ND	11	137	7509 1027	4	16	136
7509 1007	2	18	2	7509 1029	ND	ND	ND
7509 1008(1)	4	21	144	7509 1030	ND	ND	2
7509 1008(2)	ND	13	153	7509 1031	ND	7	17
7509 1009	ND	13	144	7509 1032	ND	ND	3
7509 1011	ND	ND	26	7509 1033	ND	ND	5
7509 1012	ND	ND	94	7509 1037	ND	ND	2
7509 1013	ND	ND	5	7509 1038	ND	ND	6
7509 1014	ND	13	97	7509 1048	3	18	151
7509 1016	ND	25	166	7509 1049	ND	18	205
7509 1017	4	16	87	7509 1050	2	17	138
7509 1018	4	17	148	7509 1051	6	32	309
7509 1019	6	21	427	7509 1052	ND	19	148
7509 1020	ND	21	161	7509 1054	4	28	5
7509 1021	ND	37	75	7509 1055	ND	26	218

Sample No.	U ppm	Th ppm	Rb ppm	Sample No.	U ppm	Th ppm	Rb ppm
7509 1056	ND	7	270	7509 1122	ND	8	130
7509 1058	ND	ND	59	7509 1127	ND	14	348
7509 1059	6	33	217	7509 1128	ND	18	108
7509 1060	4	24	200	7509 1131	ND	11	104
7509 1061	ND	6	36	7509 1136	4	28	204
7509 1062	ND	8	69	7509 1140	3	12	188
7509 1063	ND	4	31	7509 1142	ND	13	90
7509 1064	ND	3	15	7509 1144	ND	10	71
7509 1066	ND	16	88	7509 1145	ND	18	185
7509 1067	4	17	91	7509 1147	ND	8	74
7509 1068	ND	13	161	7509 1148	2	40	174
7509 1070	8	36	284	7509 1149	5	19	103
7509 1071	10	41	351	7509 1150	ND	7	104
7509 1072	7	37	286	7509 1151	ND	12	101
7509 1074	4	17	189	7509 1152	ND	23	195
7509 1080	ND	ND	3	7509 1153	ND	30	105
7509 1081	ND	3	30	7509 1154	ND	5	80
7509 1082	ND	3	21	7509 1156	ND	7	94
7509 1083	ND	4	55	7509 1157	ND	12	76
7509 1086	ND	ND	8	7509 1162	2	25	163
7509 1087	ND	ND	149	7509 1163	2	32	160
7509 1088	ND	ND	140	7509 1164	3	27	183
7509 1089	ND	13	169	7509 1165	ND	18	130
7509 1090	3	23	188	7509 1166	3	21	94
7509 1091	9	100	409	7509 1167	2	24	97
7509 1092	2	21	170	7509 1168	8	45	274
7509 1094	4	23	171	7509 1170	3	24	146
7509 1095	ND	10	190	7509 1171	4	46	104
7509 1096	ND	12	136	7509 1177	ND	39	99
7509 1097	3	19	3	7509 1178	ND	13	220
7509 1098	3	18	122	7509 1183	2	20	108
7509 1100	3	21	184	7509 1184	ND	18	206
7509 1105	ND	5	178	7509 1185	ND	6	52
7509 1107	ND	15	14	7509 1189	3	24	230
7509 1108	ND	8	43	7509 1190	3	25	189
7509 1109	ND	11	65	7509 1192	ND	ND	5
7509 1110	ND	9	54	7509 1194	2	8	96
7509 1111	3	15	165	7509 1198	ND	8	127

Sample No.	U ppm	Th ppm	Rb ppm	Sample No.	U ppm	Th ppm	Rb ppm
7509 1199	3	17	84	7509 0506	2	7	24
7509 0100	2	10	90	7509 0507	ND	ND	4
7509 0104	ND	ND	2	7509 0509	3	15	192
7509 0106	4	21	684	7509 0510	4	24	135
7509 0108	ND	4	3	7509 0511	ND	7	197
7509 0109	ND	ND	29	7509 0512	2	5	93
7509 0110	ND	17	69	7509 1202	2	ND	3
7509 0501	5	26	211	7509 1206B	9	2	ND
7509 0502	ND	13	164	7509 1207B	ND	ND	ND

Laboratory Report No. 72

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 20/11/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn(ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	286	7.1	0.06	0.16	0.30ft.
Honeysuckle Crk (F2)	168	7.3	0.02	0.05	
Lake Burley Griffin at					
Scrivener Dam (H4)	133	6.6	0.03	0.04	555.93 m.

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 73

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 27/11/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn(ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	246	6.9	0.03	0.15	0.58 ft
Honeysuckle Crk (F2)	200	7.4	0.01	0.05	
Lake Burley Griffin at					
Scrivener Dam (H4)	140	6.8	0.03	0.07	24.97 ft

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 74 9 December 1975

CHEMICAL ANALYSIS OF DRILL CORE FROM THE WOODLAWN AREA

by

J.G. Pyke and K. Ellingsen

Two hundred and seventy four drill core samples were submitted by I. Lambert (C.S.I.R.O.) for trace element analysis of uranium, thorium, yttrium, rubidium, zirconium, niobium, strontium, lead, arsenic, barium, cerium, lanthanum and titanium.

The samples were taken from drill holes within one kilometre of the Woodlawn ore body seventy kilometres north east of Canberra.

Calculated detection limits are:

Uranium	2 ppm	Strontium	2 ppm
Thorium	2 ppm	Lead	2 ppm
Yttrium	2 ppm	Arsenic	2 ppm
Rubidium	2 ppm	Barium	10 ppm
Zirconium	2 ppm	Cerium	5 ppm
Niobium	2 ppm	Lanthanum	5 ppm

Titanium 20 ppm

N.B. ND = Not detected. All results in p.p.m.

Sample No.	01-1	01-2	01-3	01-4	01-5	01-6	01-7	01-8	01-9	02-1
U	7	8	20	5	7	11	8	4	6	5
Th	9	6	12	10	14	8	9	14	12	20
Y	11	13	17	17	25	19	23	20	22	47
Rb	73	51	101	38	66	96	74	137	162	214
Zr	ND	ND	38	126	209	ND	ND	43	ND	ND
Mb	6	5	8	8	13	5	5	11	9	10
Sr	12	10	10	9	12	4	12	18	11	49
Pb	ND	3	ND	40	ND	27	ND	7	14	10
As	ND	4	ND	ND	ND	ND	4	ND	13	ND
Ba	930	570	780	340	440	840	1090	1080	950	1140
Ce	53	59	58	59	72	34	33	59	52	55
La	11	5	14	15	19	5	5	17	12	9
Ti	1820	1450	2160	2390	2710	1650	1590	3150	2670	530

Sample No	02-2	02-3	02-4	02-5	02-6	03-1	03-2	03-3	03-4	03-5
U	ND	ND	ND	3	4	ND	4	3	ND	3
Th	5	4	6	18	17	18	13	25	22	14
Y	13	12	14	33	33	21	17	38	14	16
Rb	69	15	10	165	137	57	27	96	38	108
Zr	53	109	105	64	72	134	123	286	106	74
Nb	6	5	5	14	14	10	8	17	6	5
Sr	50	67	63	20	21	31	30	29	29	10
Pb	ND	ND	ND	55	18	11	23	ND	72	ND
As	ND	ND	6	ND	ND	14	41	13	42	ND
Ba	740	220	180	1310	1220	200	130	410	ND	450
Ce	22	38	30	81	82	77	59	42	30	53
La	ND	ND	ND	23	22	18	12	21	ND	12
Ti	6070	8160	6970	3980	3620	2050	1950	7640	2940	1890

Sample No	03-6	03-7	03-8	03-9	04-1	04-2	04-3	04-4	04-5	04-6
U	3	4	3	3	5	ND	6	ND	ND	ND
Th	9	19	19	15	16	18	24	7	18	16
Y	9	55	32	30	32	24	45	18	32	33
Rb	15	91	128	55	131	127	106	19	124	132
Zr	66	48	72	39	ND	86	29	124	ND	11
Nb	4	7	11	6	8	12	9	8	8	14
Sr	ND	25	10	11	34	8	15	106	88	21
Pb	109	ND	ND	8	34	ND	ND	ND	13	4
As	46	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ba	120	450	740	220	810	1030	490	320	720	1640
Ce	42	57	80	41	44	67	26	25	59	69
La	ND	9	20	6	6	11	ND	ND	10	15
Ti	1080	490	2470	360	470	3880	300	6730	390	3510

Sample No.	04-7	05-1	05-2	06-1	06-2	07-1	07-2	08	09-1	09-2
U	ND	ND	6	7	10	15	16	5	3	ND
Th	21	14	11	13	14	11	15	24	18	14
Y	29	16	26	18	21	18	27	40	15	20
Rb	106	156	103	107	138	88	117	175	161	125
Zr	40	13	2	27	45	16	20	ND	95	101
Nb	8	8	8	8	11	7	10	6	15	11
Sr	43	18	18	15	17	18	23	149	17	8
Pb	ND	14	ND	38	16	ND	53	33	49	111
As	ND	3	5	ND	ND	ND	ND	ND	385	ND
Ba	730	750	920	630	910	670	890	1950	860	550
Ce	57	59	49	58	69	43	53	60	119	63
La	6	10	13	15	18	10	11	7	16	11
Ti	980	2480	2250	2080	3050	2090	2500	380	3710	3720

Sample No.	09-3	09-4	09-5	09-6	09-7	09-8	09-9	09-10	09-11	09-12
U	ND	3	5	ND	9	7	4	25	ND	ND
Th	12	17	33	20	39	18	20	10	16	17
Y	11	23	31	20	35	25	23	18	69	22
Rb	113	165	290	153	320	128	145	92	149	148
Zr	71	108	50	112	216	194	139	40	85	73
Nb	8	14	25	14	19	15	17	7	12	11
Sr	9	12	21	12	25	11	12	6	22	12
Pb	48	69	97	91	64	20	59	25	39	5
As	11	72	3035	ND	41	9	546	22	19	55
Ba	490	730	1040	650	1120	530	600	300	780	1040
Ce	37	86	360	63	190	79	154	47	98	82
La	ND	18	23	20	81	19	40	ND	24	18
Ti	2460	3620	2180	3900	5440	4190	4120	1270	3410	3600

Sample No.	09-13	09-14	09-15	09-16	09-17	09-18	10-1	10-2	10-3	10-4
U	ND	5	4	7	5	ND	ND	4	ND	4
Th	8	53	32	32	20	266	ND	25	19	59
Y	12	53	ND	51	84	ND	25	22	10	ND
Rb	ND	ND	19	142	ND	9	8	148	121	104
Zr	57	47	48	ND	39	13	78	29	33	ND
Nb	6	13	10	12	10	ND	4	11	12	16
Sr	ND	8	5	6	ND	ND	58	4	7	37
Pb	ND	261	7482	51	58	1135	36	18	450	20590
As	ND	80	98	19	ND	120	24	ND	ND	ND
Ba	50	36	ND	1180	50	90	360	1100	1940	2430
Ce	26	13	ND	30	13	ND	ND	40	44	400
La	ND	ND	ND	ND	ND	ND	ND	ND	ND	48
Ti	1640	310	140	240	180	90	7890	1720	4210	3820

Sample No.	10-5	10-6	10-7	10-8	10-9	10-10	11-1	11-2	11-3	11-4
U	3	3	ND	4	3	9	ND	4	5	7
Th	28	16	15	11	33	34	14	17	16	27
Y	ND	23	ND	22	24	69	14	ND	17	50
Rb	160	106	43	34	3	71	168	182	80	94
Zr	ND	35	47	49	60	ND	42	100	9	36
Nb	10	13	9	10	11	14	14	15	6	12
Sr	5	9	6	4	3	3	13	10	3	8
Pb	6450	286	3440	3	125	12	92	2100	42	ND
As	111	ND	ND	ND	73	ND	85	3860	12	ND
Ba	2070	1750	670	850	90	3620	950	730	250	380
Ce	130	75	112	47	7	30	140	412	35	32
La	ND	13	5	ND	ND	ND	6	18	ND	ND
Ti	3050	3720	2680	2520	300	320	1990	3770	90	180

Sample No.	11-5	11-6	11-7	11-8	11-9	11-10	11-11	11-12	11-13	11-14
U	4	ND	3	ND	5	3	3	ND	10	4
Th	30	13	21	ND	20	28	15	15	48	22
Y	62	ND	49	36	44	52	7	29	80	38
Rb	121	121	177	20	156	215	111	127	274	145
Zr	27	8	15	209	33	122	94	45	158	80
Nb	14	7	17	18	15	21	11	14	31	15
Sr	7	ND	9	208	8	6	5	2	10	3
Pb	904	1890	13	2	10	11	1465	57	48	161
As	ND	ND	ND	17	ND	ND	ND	ND	ND	ND
Ba	640	680	1190	420	830	760	410	520	1300	590
Ce	42	70	54	30	55	120	195	48	66	59
La	ND	ND	5	ND	ND	47	81	ND	5	5
Ti	190	200	340	13100	370	740	2880	330	1040	480

Sample No.	11-15	11-16	11-17	11-18	11-19	11-20	11-21	11-22	11-23	11-24
U	4	5	4	8	3	ND	ND	ND	4	ND
Th	17	17	18	16	20	12	15	9	18	11
Y	24	24	56	34	40	19	24	16	41	16
Rb	124	134	28	122	122	51	16	58	11	8
Zr	61	53	95	42	63	23	40	19	81	48
Nb	11	12	14	12	11	8	7	6	12	7
Sr	4	4	ND	4	3	3	ND	3	ND	ND
Pb	12	ND	ND	ND	ND	24	19	ND	ND	ND
As	ND	ND	ND	ND	ND	71	168	21	69	29
Ba	620	610	210	620	590	350	160	250	150	100
Ce	54	45	48	61	59	23	12	18	5	12
La	5	5	8	11	8	ND	ND	ND	ND	ND
Ti	450	380	490	340	420	240	230	180	420	230

Sample No.	11-25	11-26	11-27	11-28	11-29	12-1	12-2	12-3	12-4	12-5
U	ND	ND	3	8	ND	5	ND	4	8	5
Th	39	13	13	39	31	23	ND	12	8	23
Y	173	38	21	92	16	29	41	19	16	53
Rb	4	20	95	56	59	115	27	104	48	41
Zr	78	64	44	166	30	49	134	ND	ND	33
Nb	16	9	7	28	7	11	5	10	4	15
Sr	ND	ND	3	2	ND	66	138	56	46	95
Pb	3	ND	ND	50	71	23	ND	6	ND	2
As	471	ND	6	107	131	ND	5	ND	ND	ND
Ba	130	170	420	380	320	1070	220	1820	830	840
Ce	80	16	34	54	11	95	8	52	32	77
La	5	ND	ND	ND	ND	34	ND	ND	5	23
Ti	430	280	290	750	290	2000	12830	3180	1460	520

Sample No.	13-1	13-2	14-1	14-2	15-1	15-2	15-3	15-4	15-5	15-6
U	10	14	4	ND	3	4	ND	ND	ND	4
Th	9	10	23	21	19	17	11	ND	3	19
Y	18	27	25	23	19	19	18	28	ND	ND
Rb	81	73	240	229	161	173	76	16	141	189
Zr	2	2	13	20	68	13	ND	86	ND	112
Nb	5	5	16	14	14	13	9	2	ND	13
Sr	14	17	46	57	5	6	54	36	65	7
Pb	9	13	ND	14	5	3	9	34	1970	6604
As	ND	ND	ND	ND	ND	ND	ND	31	6	ND
Ba	750	920	1180	1060	1370	2250	8780	330	7870	380
Ce	35	48	103	77	68	8	37	ND	14	106
La	5	11	37	17	19	17	ND	ND	ND	11
Ti	1570	1680	4470	3970	4000	4240	1990	9100	9140	3220

Sample No.	15-7	15-8	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16
U	3	7	4	3	ND	3	ND	ND	11	3
Th	19	34	16	18	6	33	5	ND	50	21
Y	35	98	6	28	ND	ND	6	23	112	28
Rb	149	156	152	206	5	73	17	102	253	198
Zr	119	54	128	97	ND	ND	30	154	65	108
Nb	14	16	10	13	ND	3	4	11	22	13
Sr	10	4	12	4	71	11	2	68	15	11
Pb	46	7	1015	134	4997	20090	20	ND	24	26
As	57	3	7	18	45	618	26	37	ND	6
Ba	490	540	590	710	9000	1430	150	550	870	830
Ce	97	64	78	99	52	125	33	27	71	105
La	22	8	14	26	ND	ND	ND	ND	9	28
Ti	4290	290	3380	3950	7440	1030	940	9150	340	3770

Sample No.	15-17	15-18	15-19	15-20	15-21	15-22	16-1	16-2	16-3	16-4
U	ND	ND	5	9	ND	ND	ND	9	4	ND
Th	16	12	25	30	14	18	16	33	21	18
Y	13	13	60	93	20	21	21	95	56	24
Rb	161	113	133	141	106	148	170	99	216	185
Zr	107	76	23	38	81	113	112	48	138	103
Nb	12	85	14	14	11	12	12	16	15	15
Sr	6	35	73	56	25	17	8	8	14	12
Pb	231	85	41	19	24	36	31	ND	45	31
As	ND	17	9	5	ND	ND	38	ND	12	23
Ba	530	460	370	400	630	640	590	440	680	1160
Ce	75	48	40	43	56	84	70	30	110	94
La	17	7	ND	ND	10	20	7	ND	31	28
Ti	3620	2310	150	180	2630	3520	3740	270	4500	3950

Sample No.	16-5	16-6	16-7	16-8	16-9	16-10	16-11	16-12	16-13	16-17
U	ND	ND	7	3	ND	8	ND	3	ND	6
Th	15	16	20	20	14	35	10	17	19	18
Y	15	20	25	23	22	95	25	18	23	22
Rb	165	131	204	207	167	218	138	160	152	196
Zr	14	105	146	142	78	54	68	115	108	144
Nb	13	11	16	15	10	19	10	12	14	14
Sr	43	21	17	17	11	121	127	21	31	20
Pb	52	37	40	25	30	20	41	22	29	47
As	28	ND	ND	2	4	ND	3	5	ND	ND
Ba	1540	660	610	530	480	320	390	690	960	600
Ce	52	78	74	98	89	54	60	78	91	88
La	ND	18	26	26	26	5	16	19	22	27
Ti	2790	3390	3760	3820	3380	230	2060	3620	3470	3720

Sample No.	17-1	17-2	17-3	17-4	17-5	17-6	17-7	17-8	17-9	17-10
U	3	ND	ND	3	3	ND	ND	5	6	3
Th	12	ND	17	19	21	3	12	19	22	12
Y	23	26	24	28	27	30	3	50	17	8
Rb	148	4	164	166	167	42	62	94	11	16
Zr	73	99	57	79	77	90	36	22	146	84
Nb	13	ND	10	15	15	3	8	11	12	9
Sr	12	147	8	14	19	69	2	ND	5	2
Pb	13	ND	ND	ND	46	7	354	389	59	13
As	ND	15	ND	ND	ND	ND	40	ND	2	ND
Ba	1340	130	1700	1570	1550	390	680	320	110	70
Ce	61	78	69	66	69	ND	69	28	ND	35
La	10	ND	8	5	9	ND	ND	ND	ND	ND
Ti	3560	8450	3590	4250	4180	9240	2410	180	4970	2440

Sample No.	17-11	17-12	18-1	18-2	18-3	18-4	18-5	18-6	19-1	20-1
U	4	ND	6	ND	3	ND	ND	ND	ND	ND
Th	18	15	ND	3	19	16	133	8	12	18
Y	25	8	ND	29	ND	14	ND	9	9	19
Rb	196	165	6	6	161	132	25	54	35	8
Zr	115	85	113	151	103	66	43	36	80	70
Nb	16	10	4	6	13	14	4	7	11	8
Sr	12	12	96	32	9	17	ND	4	13	33
Pb	54	100	1290	24	1900	14	13280	62	177	96
As	10	45	52	6	26	ND	434	36	3	ND
Ba	620	440	740	390	670	1390	ND	260	300	100
Ce	105	73	130	ND	108	65	110	61	100	53
La	26	10	6	ND	17	6	ND	ND	59	13
Ti	3930	2740	14410	16050	3700	3810	500	1280	1660	380

Sample No.	20-2	20-3	20-4	20-5	20-6	20-7	20-8	20-9	20-10	20-11
U	3	4	ND	ND	4	3	ND	ND	3	3
Th	20	26	ND	5	21	20	17	16	18	14
Y	28	12	29	6	23	30	ND	13	31	27
Rb	144	110	ND	16	154	152	159	149	176	156
Zr	ND	ND	209	97	73	66	70	71	ND	5
Nb	8	8	14	6	15	13	13	12	15	14
Sr	14	58	197	20	6	5	7	8	8	8
Pb	68	9	9	323	2	3	1015	100	186	32
As	ND	ND	ND	ND	ND	ND	118	25	ND	5
Ba	1350	1430	130	280	790	900	780	880	1890	1450
Ce	54	60	26	21	63	70	100	49	82	76
La	ND	9	ND	ND	11	16	18	10	23	19
Ti	450	530	10920	8020	550	510	2990	2800	610	560

Sample No.	20-12	20-13	20-15	20-16	20-17	20-18	20-19	20-20	20-21	20-22
U	3	4	4	ND	3	ND	5	ND	4	4
Th	9	21	24	22	26	13	30	10	24	16
Y	55	32	28	ND	ND	ND	53	37	47	29
Rb	98	191	242	150	86	116	197	45	141	98
Zr	23	17	17	22	38	65	138	50	85	52
Nb	9	15	17	12	8	10	22	7	16	11
Sr	16	8	13	6	2	11	11	3	8	6
Pb	38	1096	761	3558	7512	709	ND	ND	ND	ND
As	19	ND	ND	20	ND	ND	33	ND	ND	ND
Ba	650	1418	2310	1350	760	670	1010	240	640	560
Ce	56	96	103	125	170	80	120	42	54	56
La	7	15	23	13	9	12	39	9	8	13
Ti	1430	560	670	460	370	2110	830	310	520	420

Sample No.	20-23	20-24	20-25	20-26	03-10	03-11	03-12	03-13	03-14	03-15
U	4	5	3	4	ND	ND	ND	ND	ND	3
Th	24	19	19	14	ND	13	15	19	14	17
Y	37	35	38	27	22	15	20	19	19	19
Rb	172	80	128	80	9	41	12	22	18	111
Zr	74	49	19	30	176	125	134	157	141	65
Nb	16	13	14	9	9	9	8	10	7	7
Sr	10	ND	3	5	327	36	32	45	34	8
Pb	ND	ND	ND	ND	7	21	9	11	6	ND
As	ND	ND	ND	ND	9	21	4	13	11	3
Ba	830	850	1400	680	190	180	130	150	130	520
Ce	56	44	54	44	29	63	61	85	66	49
La	8	ND	9	7	ND	12	13	30	27	5
Ti	560	520	460	330	12130	2150	2360	2350	1740	1880

Sample No.	03-16	03-20	09-19	09-20	09-21	09-22	10-11	10-12	10-14	10-15
U	ND	3	ND	ND	ND	ND	ND	6	ND	4
Th	13	14	ND	26	7	10	12	19	9	12
Y	19	28	32	70	6	6	5	42	17	15
Rb	23	44	48	9	16	7	4	29	35	78
Zr	154	44	190	51	35	32	76	ND	57	43
Nb	10	6	14	22	3	5	7	11	8	9
Sr	33	31	149	ND	ND	ND	2	4	ND	6
Pb	13	17	4	122	16	2	381	20	4	3
As	8	ND	32	20	67	7	21	7	13	5
Ba	140	340	300	100	120	70	80	880	380	900
Ce	70	53	27	ND	44	17	18	20	55	56
La	24	6	ND	ND	ND	ND	ND	ND	7	12
Ti	2280	470	11630	2030	770	160	2400	160	2270	2850

Sample No.	10-17	17-2	17-4	17-5	17-6	17-7	17-8	17-9	17-10	17-11
U	ND	3	3	ND	3	ND	4	4	ND	ND
Th	6	22	26	19	18	25	23	22	19	19
Y	10	23	48	22	24	38	42	35	28	22
Rb	23	52	101	94	167	51	38	167	155	194
Zr	45	53	61	29	63	75	51	ND	90	102
Nb	6	7	8	6	14	9	7	6	14	15
Sr	ND	65	52	69	10	47	50	84	10	11
Pb	11	9	10	43	ND	23	16	17	ND	69
As	3	ND	ND	ND	ND	ND	5	ND	15	13
Ba	130	360	840	980	1400	390	360	1200	1310	600
Ce	ND	60	63	68	50	92	70	59	86	96
La	ND	17	19	15	10	33	21	12	20	24
Ti	950	490	1000	790	3580	620	530	490	3580	3850

Sample No.	17-12	17-14	17-15	17-16	17-17	17-18	17-19	17-20	17-21	17-22
U	ND	ND	6	ND	ND	ND	ND	6	ND	ND
Th	18	10	67	ND	13	19	19	16	18	64
Y	23	6	ND	22	9	20	21	ND	ND	ND
Rb	154	61	55	118	102	157	162	118	52	38
Zr	77	50	83	ND	4	2	ND	ND	12	ND
Nb	13	8	ND	3	9	12	13	ND	5	ND
Sr	9	8	ND	73	5	15	10	741	ND	269
Pb	18	906	57362	235	513	13	165	1339	12233	46435
As	11	66	2558	49	27	ND	78	101	388	2649
Ba	1260	640	ND	9380	1420	2090	2630	78450	180	37540
Ce	61	53	425	ND	72	56	85	ND	155	93
La	8	ND	ND	ND	9	8	17	ND	ND	ND
Ti	3620	2210	320	9900	2150	4090	3140	1800	410	50

Sample No.	17-23	17-24	17-25	17-26	17-27	18-1	18-2	18-3	18-4	18-5
U	ND	3	ND	ND	3	ND	ND	ND	ND	ND
Th	23	18	ND	ND	19	ND	21	17	36	14
Y	ND	27	28	28	26	28	25	10	ND	12
Rb	5	125	18	5	87	37	157	122	60	82
Zr	ND	ND	87	109	65	ND	82	50	67	71
Nb	7	14	2	7	11	3	15	6	3	7
Sr	11	9	20	141	32	212	12	13	ND	13
Pb	2690	51	6	5	ND	23	7	105	36685	57
As	318	9	5	4	ND	14	ND	19	1059	55
Ba	2410	2720	350	160	1620	2510	1580	1170	200	610
Ce	ND	62	ND	6	70	ND	80	44	240	52
La	ND	13	ND	ND	20	ND	22	ND	ND	8
Ti	710	3190	7740	8640	2310	7470	4260	2550	930	2480

Sample No.	18-6	18-7	18-8	18-9	18-10	18-11	19-1	19-2	19-3	19-4
U	ND	ND	3	ND	ND	ND	ND	ND	ND	3
Th	20	3	19	ND	ND	3	14	56	13	23
Y	22	8	26	33	32	34	25	3	24	45
Rb	147	ND	58	10	10	5	4	8	35	89
Zr	71	39	109	88	99	116	156	69	54	88
Nb	15	2	14	4	5	4	10	5	5	9
Sr	27	199	165	209	249	138	31	ND	18	21
Pb	23	11	ND	5	5	3	9	111	5	8
As	ND	14	ND	ND	ND	ND	9	3	18	ND
Ba	1490	110	760	380	340	180	130	140	190	400
Ce	86	ND	66	ND	6	12	11	ND	34	70
La	30	ND	14	ND	ND	ND	32	ND	ND	14
Ti	4010	3060	3620	8520	7760	9440	3840	1230	570	1230

Sample No.	19-5	19-6	19-7	19-8	20-1	20-2	20-3	20-4	20-5	20-6
U	ND	ND	ND	ND	ND	ND	3	ND	ND	4
Th	16	21	17	15	13	14	41	14	28	14
Y	28	26	33	19	13	15	32	21	13	26
Rb	145	121	71	65	5	ND	ND	53	4	39
Zr	26	155	125	145	93	132	207	136	94	40
Nb	6	14	13	10	10	8	12	11	9	8
Sr	8	9	5	66	4	ND	2	22	32	31
Pb	ND	ND	6	ND	30	7	53	7	82	12
As	ND	11	25	8	100	8	16	ND	4	11
Ba	560	570	390	450	110	100	130	370	130	280
Ce	37	108	80	47	9	24	ND	49	ND	44
La	ND	36	23	6	ND	ND	ND	18	ND	5
Ti	750	4140	3180	5160	1380	2060	3660	3160	2450	330

Sample No.	20-7	20-8	20-9	20-10	20-11	20-12	21-1	21-2	21-3	21-5
U	8	3	ND	ND	3	ND	ND	ND	4	ND
Th	24	15	15	26	26	21	ND	3	19	20
Y	52	28	14	34	46	35	33	27	10	22
Rb	177	41	81	80	135	103	18	12	144	95
Zr	45	76	107	119	8	81	134	96	7	ND
Nb	11	6	10	10	13	8	3	5	13	6
Sr	12	22	6	24	47	59	233	277	7	64
Pb	6	ND	5	3	3	5	3	6	450	19
As	6	ND	6	9	ND	ND	27	11	204	ND
Ba	660	270	470	400	1030	490	150	290	2240	3960
Ce	60	61	50	115	63	98	5	5	17	40
La	9	12	7	47	18	31	ND	ND	11	ND
Ti	590	1040	2740	1320	990	1070	8640	8900	3790	500

Sample No.	21-6	21-7	21-8	21-9	21-10	21-11	21-12	21-14	21-15	21-16
U	ND	ND	5	ND	ND	ND	ND	ND	ND	ND
Th	15	20	31	21	17	ND	8	15	24	3
Y	17	32	22	22	17	ND	3	14	6	22
Rb	118	138	177	139	125	44	34	95	16	9
Zr	ND	ND	ND	41	77	149	31	89	25	145
Nb	13	9	9	12	11	ND	4	10	3	5
Sr	23	83	43	14	7	ND	ND	6	4	107
Pb	194	106	67	ND	18	66024	38	12	298	21
As	5	ND	6	ND	7	2274	45	6	8	18
Ba	3960	7310	5710	2030	1290	ND	250	460	100	160
Ce	60	58	80	80	82	382	53	64	5	14
La	5	5	12	16	24	ND	ND	10	ND	ND
Ti	2250	890	1030	3770	3670	470	1130	2860	790	13710

Sample No.	21-17	21-18	21-19	21-20
U	ND	ND	ND	ND
Th	20	15	21	3
Y	25	18	22	29
Rb	150	135	146	10
Zr	139	11	59	121
Nb	16	12	16	2
Sr	28	23	24	126
Pb	55	17	7	7
As	ND	ND	13	ND
Ba	720	2080	1510	140
Ce	72	69	75	5
La	23	14	12	ND
Ti	380	3730	3930	6960

LABORATORY REPORT NO. 75 16th DECEMBER 1975

CHEMICAL ANALYSIS OF OLIVINE BASALTS FROM PAPUA NEW GUINEA

by

J.G. Pyke and K. Ellingsen

Two olivine basalt samples from Papua New Guinea were submitted for chemical analysis by D. Mackenzie.

The samples were :-

a) G82(48) from the summit area of Mt Giluwe.

b) 71073107 from the southwest slopes of Mt Bosavi.

The analyses were carried out using X-ray fluorescence, on boric acid backed powder pellets.

Calculated detection limits are :-

U	2 ppm	Nb	2 ppm	Pb	2 ppm	V	3 ppm
Th	2 ppm	Sr	2 ppm	As	2 ppm	Co	2 ppm
Y	2 ppm	Ti	5 ppm	Cu	2 ppm	Mo	3 ppm
Rb	2 ppm	Ce	3 ppm	Zn	2 ppm	Cr	2 ppm
Zr	2 ppm	Ba	3 ppm	Ni	2 ppm	Sn	3 ppm

All results in ppm

	7107-3107	G82(48)
U	ND	ND
Th	4	3
Y	14	15
Rb	64	43
Zr	80	48
Nb	10	4
Sr	602	670
Ti	6740	6920
Ce	30	37
Ba	430	263
Pb	2	8
As	3	ND
Cu	93	121
Zn	71	78
Ni	338	37
V	245	229
Co	125	53
Mo	314	340
Cr	1040	88
Sn	ND	ND

Laboratory Report No. 76. 17 December 1975

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling - 4/12/75

Sampling points	Sp Cond. (umho/cm)	pH	An (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	254	7.0	0.04	0.15	0.162 m
Honeysuckle Crk (F2)	208	7.0	N.D.	N.D.	-
Lake Burley Griffin at					
Scrivener Dam (H4)	147	6.8	0.01	0.05	555.915

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

Laboratory Report No. 77 15 January 1976

ANALYSIS OF LAKE GEORGE WATER SAMPLES

by

J. WEEKES

A sample of water from Lake George, N.S.W., was submitted by A.W. Schuett for determination of specific conductance, pH and total dissolved solids (180°C).

Date of sampling	-	27/11/75
Sp. Cond. (°C)	-	2,800
pH	-	7.4
T.D.S. (180°C)	-	1,670 ppm

Laboratory Report No. 78 15 January 1976

Zinc Content of Molonglo River Water

by

J. WEEKES

The following results were obtained for the determination of specific conductance at 20°C, pH, dissolved zinc and total zinc on water samples as listed below from the Molonglo River/Lake Burley Griffin system. All samples were acidified with hydrochloric acid prior to the determination of total zinc.

Samples were collected by the Department of Housing and Construction for the Joint Government Technical Committee on Mine Waste Pollution in the Molonglo River.

Date of sampling 18/12/75

Sampling points	Sp. Cond. (umho/cm)	pH	Zn (ppm) (dissolved)	Zn (ppm) (Total)	Flow
Molonglo River at					
Burbong Weir (D2) (410705)	285	7.1	0.02	0.10	0.110 m
Honeysuckle Crk (F2)	198	7.9	ND	0.03	-
Lake Burley Griffin at					
Scrivener Dam (H4)	160	7.7	0.02	0.06	24.95 ft

Bracketed numbers are Department of Housing and Construction stream gauge reference numbers.

LABORATORY REPORT No. 79 11th DECEMBER 1975.

CHEMICAL ANALYSIS OF NEWCASTLE RANGE VOLCANICS

by

J.G. Pyke and K. Ellingsen

Fourteen rock samples of the Newcastle Range volcanics from the George town area north central Qld. were submitted by B. Oversby for chemical analysis.

All analyses were carried out using X ray fluorescence.

Glass discs were prepared for the analysis of SiO_2, TiO_2, Al_2O_3, total Fe as Fe_2O_3, MnO, MgO, CaO, K_2O and P_2O_5.

Na_2O and all trace elements were determined using boric acid backed powder pellets.

Loss on ignitions values were determined by heating the powdered rock to 1000°C, maintaining temperature for 2 hours.

Trace element detection limits were calculated to be:-

U	2ppm	Nb	2ppm	Zn	2ppm	Cr	2ppm
Th	2ppm	Sr	2ppm	Ni	2ppm	V	3ppm
Y	2ppm	Pb	2ppm	Ba	5ppm	Co	2ppm
Rb	2ppm	As	2ppm	Ce	5ppm	Mo	2ppm
Zr	2ppm	Cu	2ppm	La	5ppm	Ga	2ppm

N.B. ND = Not detected.

Sample No.	7330-0041	7330-0265	7330-0284	7330-0293	7330-0301	7330-0322	7330-0323	7330-0325	7330-0340
SiO_2	78.28	72.21	65.26	73.62	67.31	75.39	57.18	69.92	73.40
TiO_2	0.10	0.25	0.90	0.29	0.74	0.08	1.23	0.49	0.24
Al_2O_3	11.62	13.81	14.05	12.61	14.08	13.02	15.29	14.43	13.22
Fe_2O_3	0.59	2.33	5.84	2.24	4.86	1.21	8.51	3.54	2.70
MnO	0.01	0.04	0.11	0.02	0.09	0.03	0.09	0.08	0.03
MgO	0.00	0.54	1.24	0.29	1.47	0.71	3.00	0.78	0.09
CaO	0.01	1.51	2.47	1.29	2.82	0.39	8.14	2.90	0.63
Na_2O	3.53	4.19	3.54	3.40	3.44	2.23	3.99	4.38	3.74
K_2O	4.34	3.53	3.97	4.41	3.67	5.43	0.49	1.91	5.19
P_2O_5	0.02	0.07	0.30	0.06	0.19	0.01	0.40	0.12	0.03
LOSS	1.33	1.39	1.38	0.82	1.07	0.92	2.53	2.05	1.07
TOTAL	99.84	99.86	99.06	99.04	99.74	99.41	100.05	100.40	100.14
U	ND	ND	ND	3	ND	ND	3	ND	5
Th	21	15	19	25	17	23	19	16	30
Y	42	17	36	24	27	16	22	29	46
Rb	148	117	115	170	121	192	16	84	174
Zr	255	47	246	125	214	24	182	321	152
Nb	16	11	15	9	12	9	15	13	18
Sr	43	138	209	88	176	108	879	256	61
Pb	14	19	13	19	34	22	28	20	14
As	ND	ND	ND	ND	ND	2	7	13	2
Cu	4	112	12	11	16	ND	143	4	ND
Zn	83	24	79	35	93	39	90	57	30
Ni	3	2	6	ND	12	ND	103	ND	3
Ba	1690	980	1720	670	940	970	220	740	660
Ce	210	72	115	98	86	61	100	102	84
La	146	22	46	36	25	19	47	92	22
Cr	2	11	31	4	14	5	251	10	2
V	3	24	50	17	56	ND	141	23	2

U	ND	ND	ND	3	ND	ND	3	ND	5
Co	76	112	70	62	67	78	71	53	108
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ga	16	16	19	15	17	14	24	18	17

Sample No.	7430-0165	7430-0662	7430-0663	7430-0664	7430-0665
SiO_2	64.97	76.98	76.31	74.42	73.06
TiO_2	0.98	0.20	0.16	0.23	0.28
Al_2O_3	7.92	11.50	12.17	11.60	13.01
Fe_2O_3	3.70	1.53	2.16	1.36	1.92
MnO	0.03	0.03	0.05	0.04	0.04
MgO	0.74	0.19	0.06	0.15	0.41
CaO	14.49	0.62	0.26	1.31	0.35
Na_2O	3.48	3.47	3.06	3.42	3.83
K_2O	0.28	4.38	5.27	4.66	4.90
P_2O5	0.16	0.03	0.02	0.05	0.04
LOSS	2.47	0.79	0.66	2.04	1.23
TOTAL	99.23	99.72	100.18	99.30	99.09
U	112	4	ND	7	3
Th	290	31	20	45	34
Y	119	29	40	38	34
Rb	12	202	149	197	214
Zr	405	99	174	121	133
Nb	14	11	19	14	12
Sr	138	63	25	55	61
Pb	59	20	37	15	25
As	7	ND	ND	ND	ND
Cu	10	2	36	15	4
Zn	36	27	134	50	33
Ni	14	ND	ND	4	2
Ba	95	420	920	330	590
Cc	90	103	252	102	125
La	21	36	137	31	60
Cr	ND	5	6	5	3

Sample No.	7430-0165	7430-0662	6430-0663	7430-0664	7430-0665
V	47	9	ND	15	4
Co	49	126	88	129	74
Mo	480	ND	ND	7	ND
Ga	16	14	16	14	16

LABORATORY REPORT No 80 11 December 1975

CHEMICAL ANALYSIS OF DRILL CORE FROM THE BURSTALL GRANITE

by

J.G. Pyke and K. Ellingson

Fifteen drill core samples from the Burstall granite and associated rhyolite/microgranite dyke rocks were submitted for chemical analysis by G. Derrick. The Burstall granite is situated 7 km east and southeast of the Mary Kathleen open cut mine, NW Qld.

The analyses were carried out using X-ray fluorescence on boric acid backed powder pellets.

Calculated detection limits are:

U	2 ppm	Sr	2 ppm	Ba	5 ppm	Mo	2 ppm
Th	2 ppm	Pb	2 ppm	Ce	5 ppm	W	2 ppm
Y	2 ppm	As	2 ppm	La	5 ppm	Bi	2 ppm
Rb	2 ppm	Cu	2 ppm	Cr	2 ppm	Sn	2 ppm
Zr	2 ppm	Zn	2 ppm	V	3 ppm		
Nb	2 ppm	Ni	2 ppm	Co	2 ppm		

NB. ND means not detected.

Sample No	237A	237B	237C	237D	237F	237H	238	239	240A	240B
U	16	11	12	22	7	16	10	12	13	9
Th	78	44	47	80	72	67	61	60	81	73
Y	21	22	24	57	37	40	34	38	8	7
Rb	235	273	272	258	242	275	342	350	50	41
Zr	96	112	108	98	117	88	156	157	202	271
Nb	28	19	22	28	25	28	20	23	21	18
Sr	16	16	15	13	22	21	45	45	38	45
Pb	9	9	9	14	12	10	15	14	6	5
As	7	ND	2	ND	ND	2	ND	ND	2	2
Cu	5	4	2	5	5	13	4	2	10	9
Zn	14	10	11	13	13	16	8	12	ND	ND
Ni	4	4	5	3	3	5	6	6	2	ND
Ba	636	659	651	627	602	904	380	439	90	92
Ce	43	32	36	150	40	120	150	148	27	35
La	8	ND	ND	32	13	47	69	68	ND	ND
Cr	155	121	142	132	134	140	158	146	103	110
V	3	3	6	2	2	4	18	16	4	6
Co	5	2	3	3	2	4	10	10	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
W	3	10	3	7	6	7	ND	2	ND	ND
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	3	ND	2	ND	ND	2	ND	ND	ND	ND

Sample No	240C	241D	242B	242C	242D
U	17	4	6	3	6
Th	84	44	41	45	96
Y	12	41	36	38	39
Rb	40	265	269	296	399
Zr	245	225	210	211	183
Nb	23	23	22	20	27
Sr	36	35	44	31	15
Pb	9	10	9	13	41
As	2	ND	ND	ND	2
Cu	16	4	7	2	5
Zn	ND	14	12	19	99
Ni	ND	3	5	4	3
Ba	84	487	1080	460	219
Ce	61	152	174	126	240
La	ND	72	79	54	71
Cr	96	160	158	138	159
V	6	14	18	7	ND
Co	2	10	9	6	5
Mo	ND	220	ND	ND	ND
W	2	3	2	3	5
Bi	ND	ND	ND	ND	ND
Sn	ND	2	ND	2	3