DATA BOOK

CHAPTER 5 WELL CONSTRUCTION

JICA

LOG OF WELL A-1

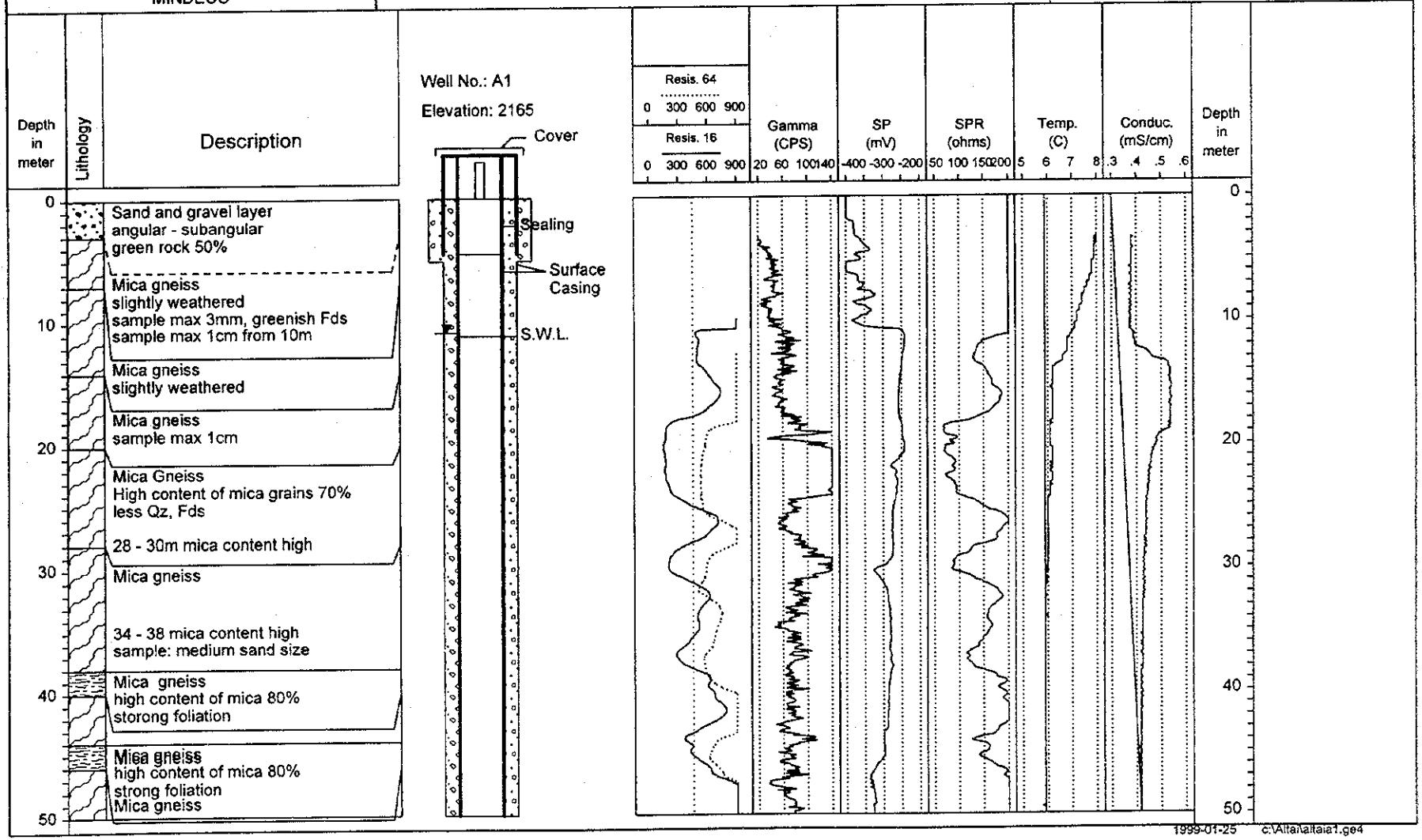
(Page 1 of 4)

The Study on
Groundwater Development
for Altai City, MONGOLIA

Pacific Consultants International

MINDECO

Date of Completion	: 3rd Sep. 1998	Sampling Date	: 8th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 200.3m	N Coord.	: N 46, 22, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 14, 50



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JICA

LOG OF WELL A-1

(Page 2 of 4)

The Study on
Groundwater Development
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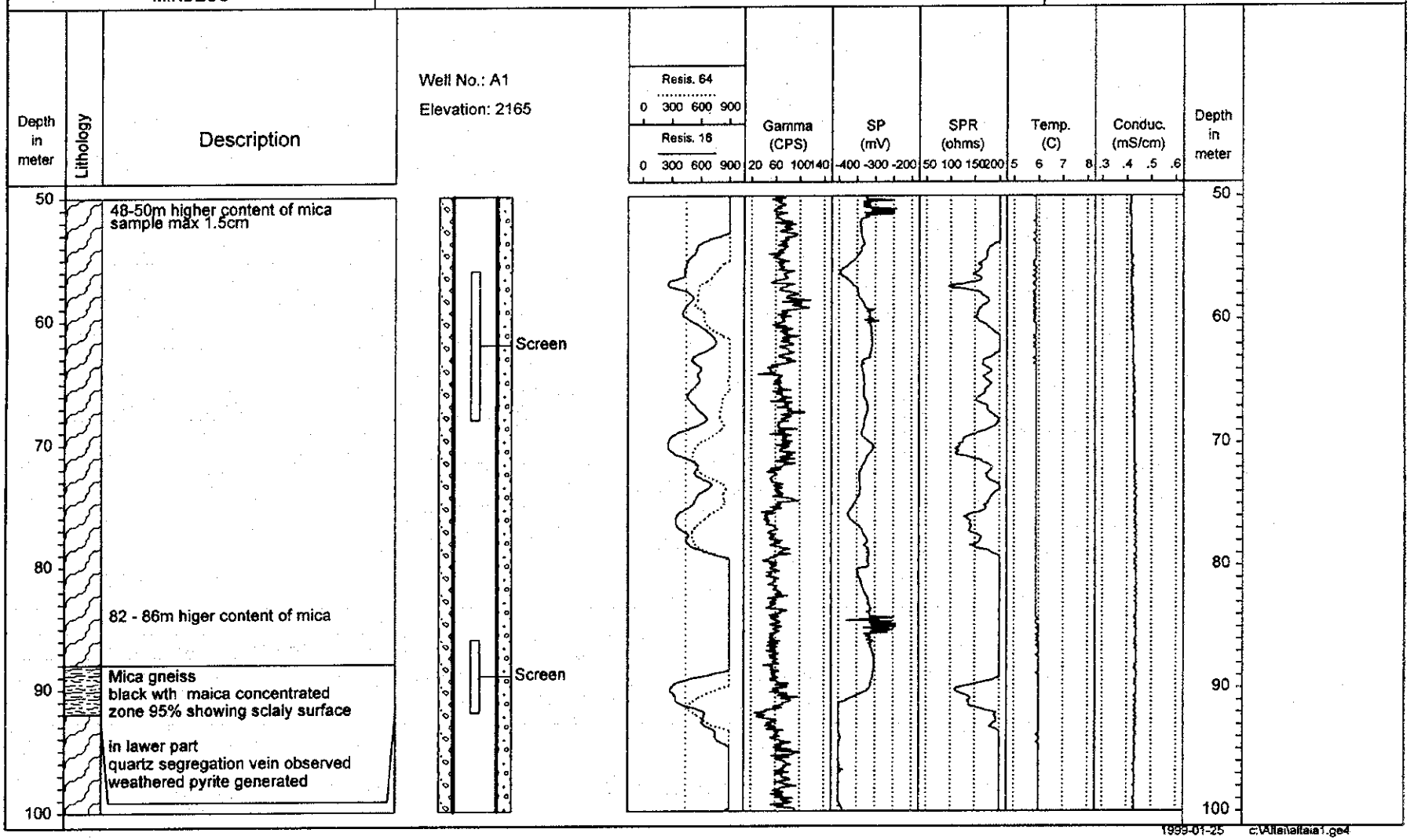
MINDECO

Date of Completion	: 3rd Sep. 1998	Sampling Date	: 8th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 200.3m	N Coord.	: N 46, 22, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 14, 50

Well No.: A1

Elevation: 2165



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LOG OF WELL A-1

The Study on
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MINDECO

Date of Completion	: 3rd Sep. 1998	Sampling Date	: 8th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 200.3m	N Coord.	: N 46, 22, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 14, 50

Well No.: A1

Elevation: 2165

Depth in meter	Description
100	Mica gneiss
110	Mica gneiss quartz segregation vein observed sample: max 2cm Qz content 30-40%
	Mica gneiss
120	Mica gneiss slightly altered with powdery white Flds and Qz and pyrite
130	Mica gneiss sample: white Qz Flds 20%
140	Mica gneiss sample: white Qz Flds about 40%
150	

Screen

Screen

Resis. 64: 0 300 600 900

Resis. 16: 0 300 600 900

Gamma (CPS): 20 60 100 140

SP (mV): -400 -300 -200

SPR (ohms): 50 100 150 200

Temp. (C): 5 6 7 8

Conduc. (mS/cm): .3 .4 .5 .6

Depth in meter: 100 110 120 130 140 150

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JICA

LOG OF WELL A-1

The Study on
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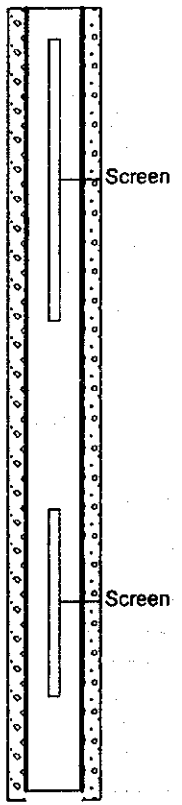
MINDECO

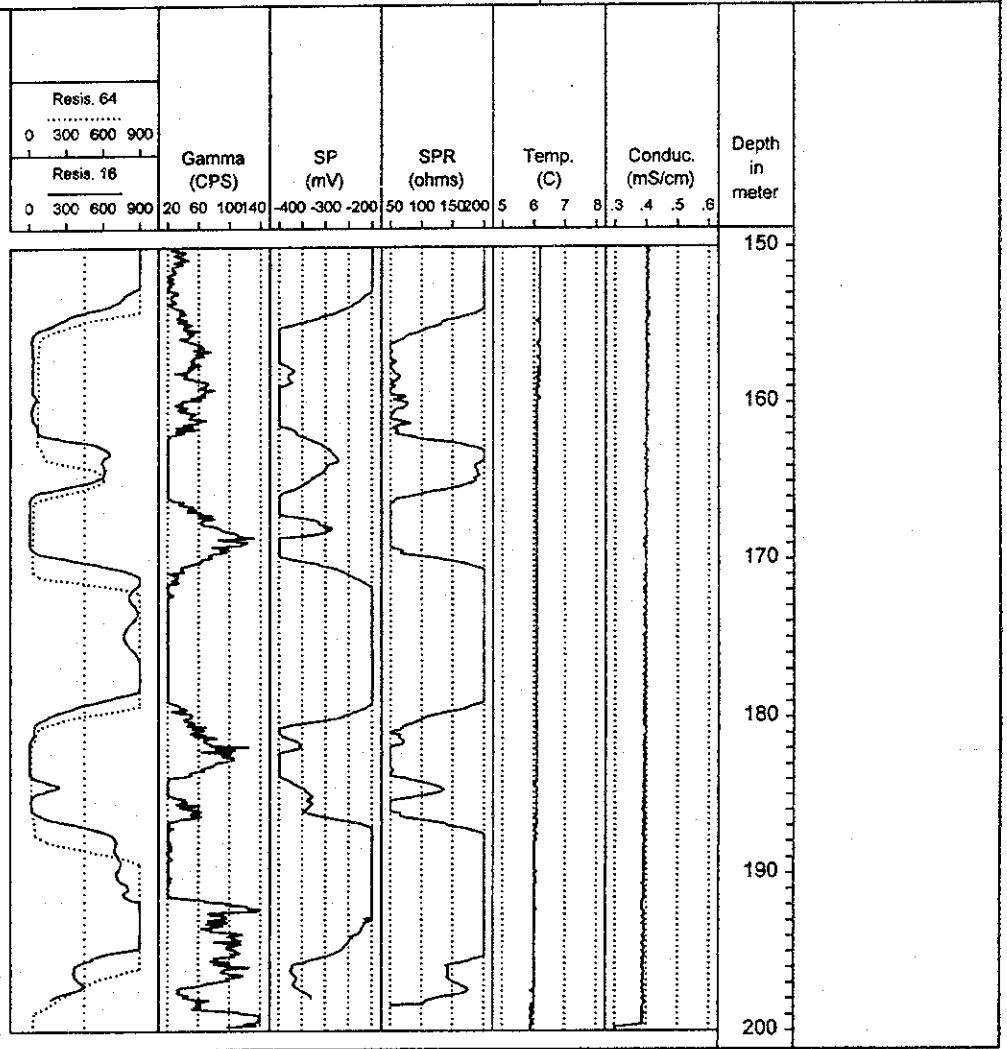
Date of Completion	: 3rd Sep. 1998	Sampling Date	: 8th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 200.3m	N Coord.	: N 46, 22, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 14, 50

Well No.: A1

Elevation: 2165

Depth in meter	Lithology	Description
150		
160		Mica gneiss sample: white Qz Flds about 20%
170		Mica gneiss sample max. 5mm white Qz Flds content 40%
180		
190		
200		





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JICA

LOG OF WELL A-2

The Study on
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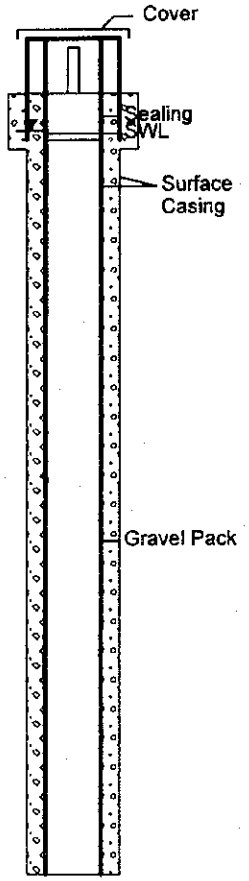
MINDECO

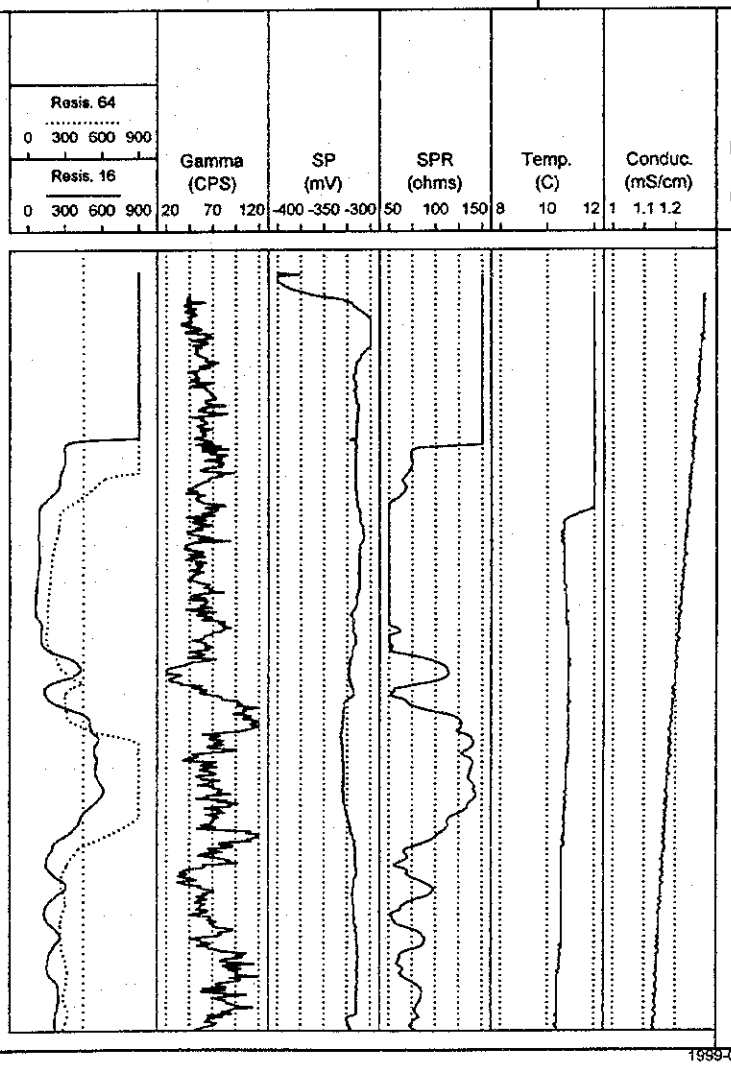
Date of Completion	: 4th Aug. 1998	Sampling Date	: 6th Aug.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 193.0m	N Coord.	: N 46, 24, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 18, 19

Depth in meter	Lithology	Description
0		Sand layer medium - coarse sand with black grains 50%
		Sand and gravel layer gravels of green rock is typically obseved
10		Granitic gneiss sample fragments of quartz and feldspar with rare mafic mineral of max. 1.5cm
20		Granitic gneiss sample fine - medium grains
		Mica Gneiss remarkably weathered showing powdery yellowish appearance
30		Granitic gneiss upper part slightly weathered sample contains higher ratio of mica
		Granitic gneiss quartz and feldspar dominant
40		Granitic gneiss interculated with minor amhibolite layers slightly weathered sample contains 15 % of amphibolite fragments
50		

Well No.: A2

Elevation: 2060





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JICA

LOG OF WELL A-2

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The Study on
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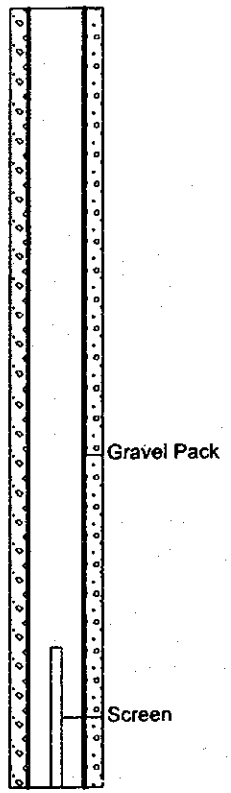
MINDECO

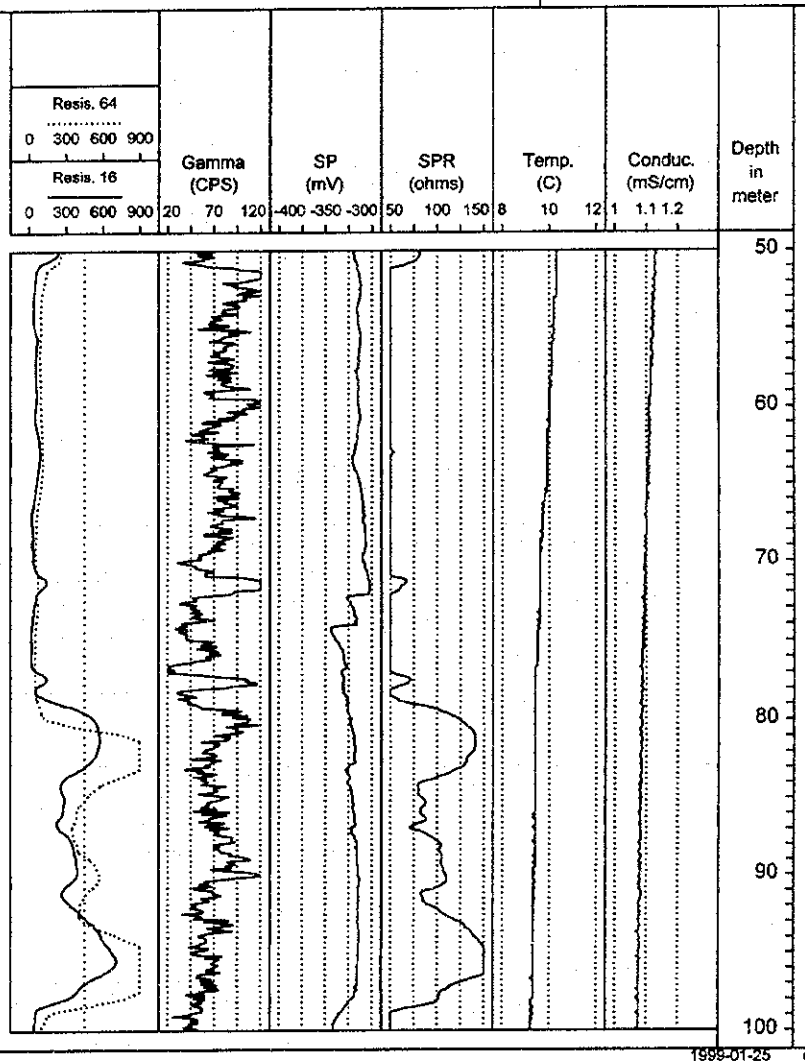
Date of Completion	: 4th Aug. 1998	Sampling Date	: 6th Aug.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 193.0m	N Coord.	: N 46, 24, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 18, 19

Well No.: A2

Elevation: 2060

Depth in meter	Lithology	Description
50		Granitic gneiss pale yellowish gray
70		Granitic gneiss pale gray and containing many small mica sample 70 % of the fragments contains small mica, max. 2cm
90		Granitic gneiss pale gray wth less maica content sample max. 1cm
100		





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LOG OF WELL A-2

The Study on
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for Altai City, MONGOLIA

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MINDECO

Date of Completion	: 4th Aug. 1998	Sampling Date	: 6th Aug.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 193.0m	N Coord.	: N 46, 24, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 18, 19

Well No.: A2

Elevation: 2060

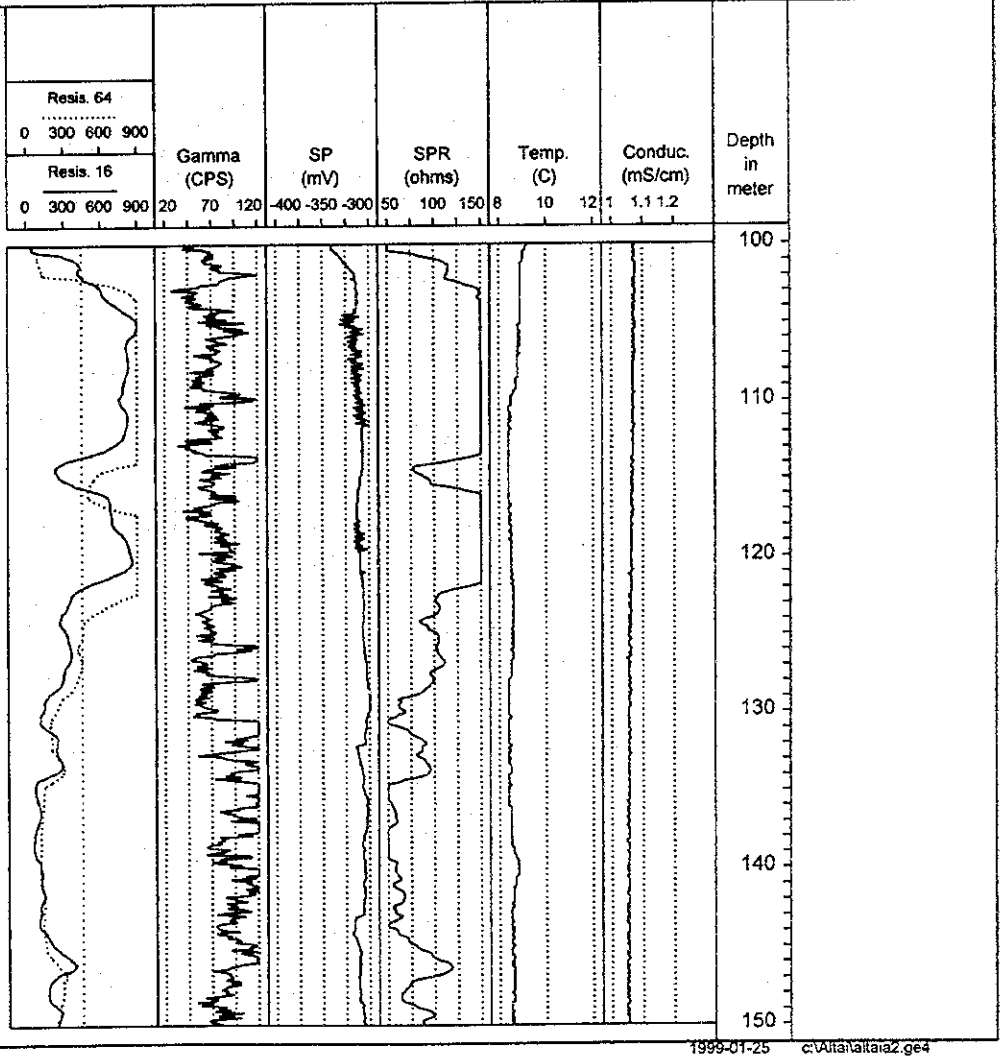
Depth in meter	Description
100	
110	Granitic gneiss with higher mica bearing fragments about 50%
120	Granitic gneiss with less micabearing fragments about 20%
130	Granitc gneiss with higter mica bearing fragments about 40%
140	Granitic gneiss about 20 %
150	

Screen

Screen

Gravel Pack

Screen



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LOG OF WELL A-2

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The Study on
Groundwater Development
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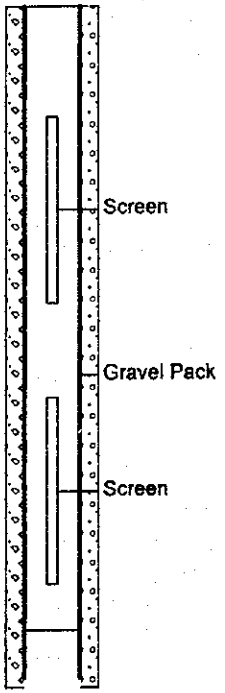
MINDECO

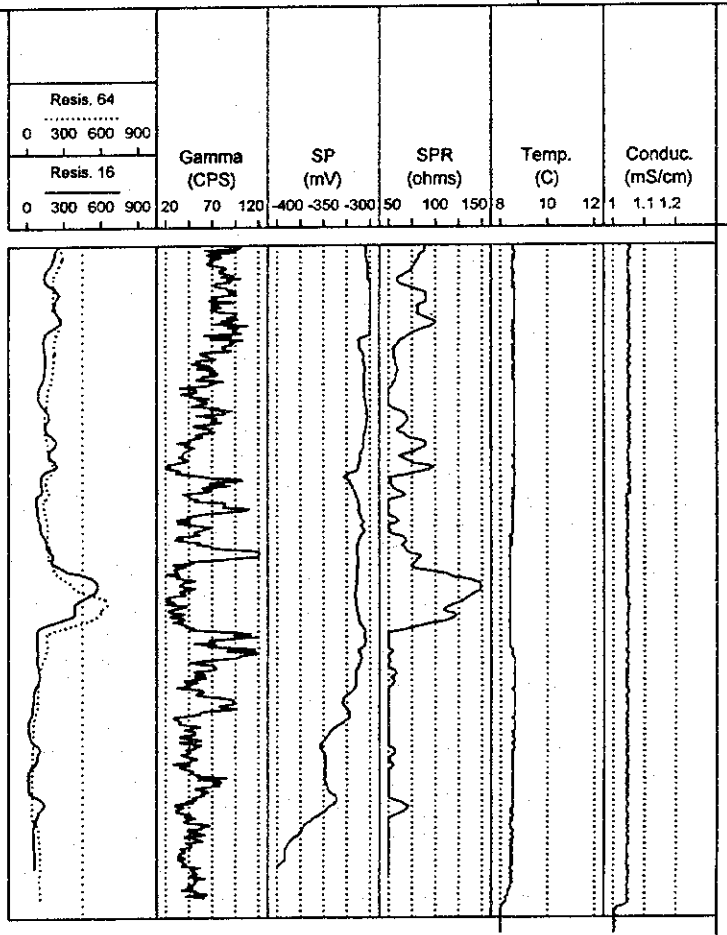
Date of Completion	: 4th Aug. 1998	Sampling Date	: 6th Aug.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 193.0m	N Coord.	: N 46, 24, 19
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 18, 19

Well No.: A2

Elevation: 2060

Depth in meter	Lithology	Description
150		
		Granitic gneiss about 40% sample finer grains, max. 5mm
160		
		Granitic gneiss about 20%
170		
		Granitic gneiss about 40%
180		Mica gneiss sample max. 1cm
190		
200		





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JICA

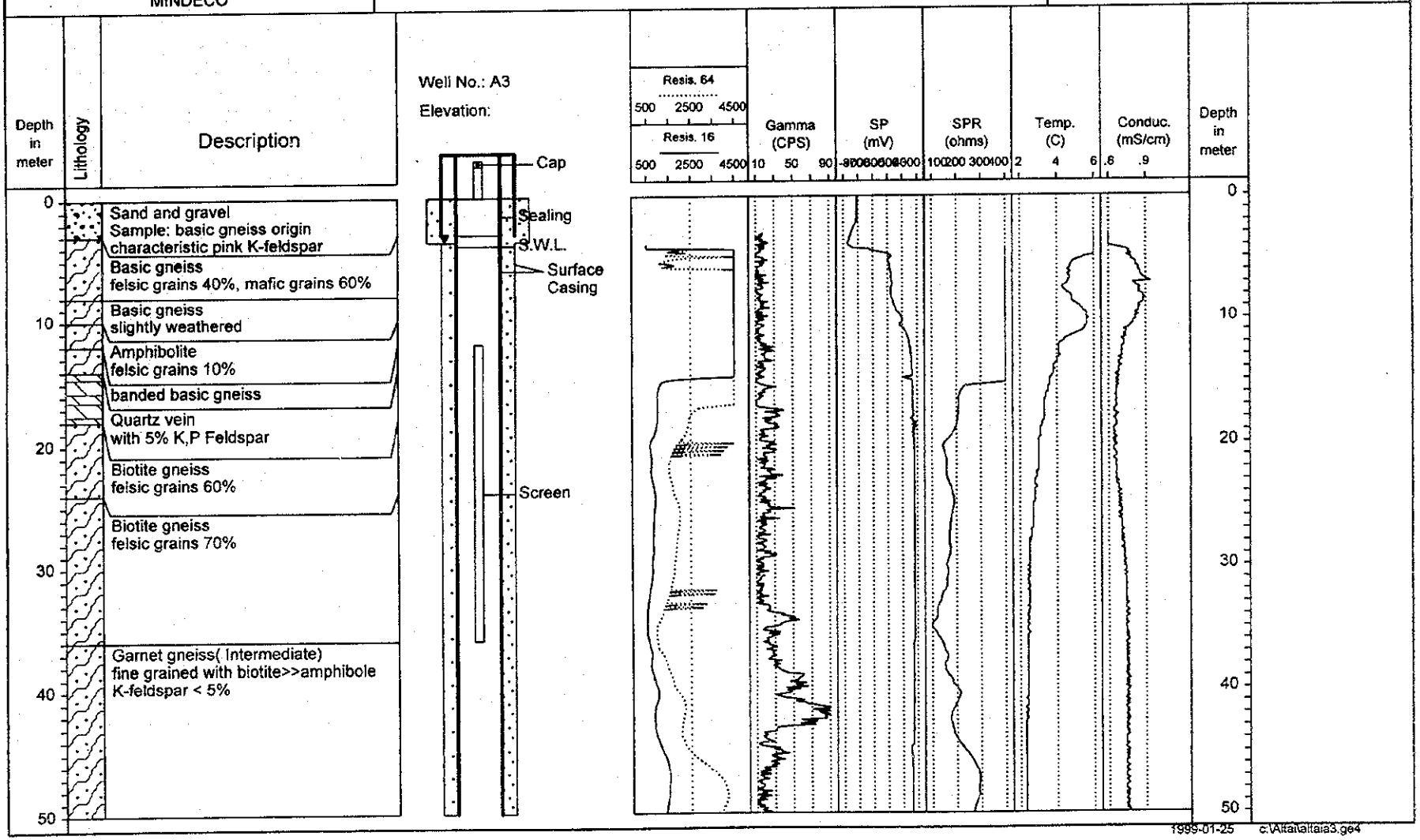
LOG OF WELL A-3

The Study on
Groundwater Development
for Altai City, MONGOLIA

Pacific Consultants International

MINDECO

Date of Completion	: 10th Oct. 1998	Sampling Date	: 13th Oct.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 150.3m	N Coord.	: N 46, 24, 29
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 11, 39



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LOG OF WELL A-3

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The Study on
Groundwater Development
for Altai City, MONGOLIA

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MINDECO

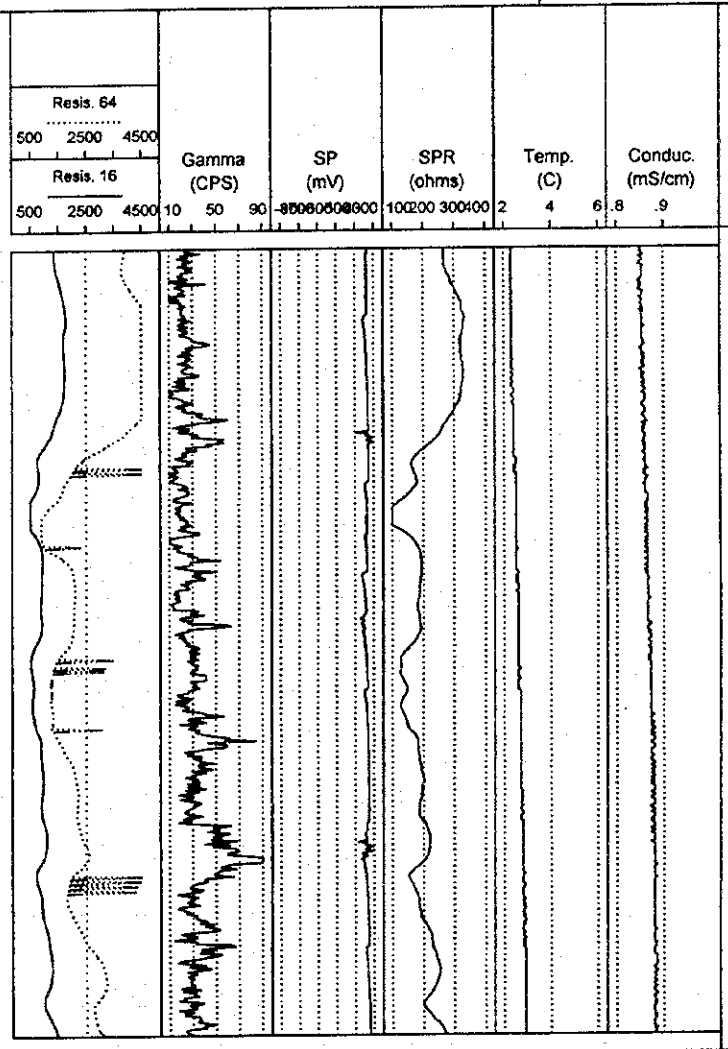
Date of Completion	: 10th Oct. 1998	Sampling Date	: 13th Oct.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 150.3m	N Coord.	: N 46, 24, 29
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 11, 39

Well No.: A3

Elevation:

Depth in meter	Description
50	Biotite gneiss slightly weathered
	Biotite gneiss
60	Quartz vein with small amount of K-feldspar
	Biotite gneiss felsic grains 30-40%
70	sample: sand size, easily crumble
	Basic volcanic intrusion greenish black,slightly altered
80	Biotite gneiss(intemediate) clear gneisochlty and cleavage with slight sliken side(upper part) K-feldspar <5%
90	
100	Biotite gneiss

Screen



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LOG OF WELL A-3

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The Study on
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for Altai City, MONGOLIA

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MINDECO

Date of Completion	: 10th Oct. 1998	Sampling Date	: 13th Oct.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 150.3m	N Coord.	: N 46, 24, 29
Drilling Method	: Rotary, DTH	E Coord.	: E 96, 11, 39

Well No.: A3

Elevation:

Depth in meter	Description
100	small amount of felsic layer
	Biotite gneiss cleavage developed, rusty grains slightly weathered, crumbled
110	Banded biotite gneiss felsic layer 80-90% sample slightly weathered esp. 114-118m with rusty grains
120	Biotite gneiss 120-122m sample cleavage developed, with pyrite stain
130	Biotite gneiss clevage developed
	Biotite gneiss with small amount of amphibolite
	sample 138-140m: crumbled sand like
140	Biotite gneiss cleavage developed, slightly weathered
	Biotite gneiss with small amount of amphiolite
150	

Screen

Screen

Resis. 64
500 2500 4500

Resis. 16
500 2500 4500

Gamma (CPS)
10 50 90

SP (mV)

SPR (ohms)
100 200 300 400

Temp. (C)
2 4 6

Conduc. (mS/cm)
.8 .9

Depth in meter

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LOG OF WELL A-4

The Study on
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for Altai City, MONGOLIA

Pacific Consultants International

MINDECO

Date of Completion	: 23rd Sep. 1998	Sampling Date	: 5th Oct.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 160.2m	N Coord.	: N 46, 22, 50
Drilling Method	: Rotary	E Coord.	: E 96, 16, 42

Well No.: A4

Elevation: 2120

Depth in meter	Description
0	Sand and gravel Sample granitic orign grains rusty surface
10	Quartzite and acidic gneiss weathered and rusty surface
	Quartzite and acidic gneiss Sample greyish white, slightly weathered
20	Quartzite and acidic gneiss Sample White powdery look fragments are stained with tiny mica and pyrite
30	Quartzite and acidic gneiss Sample grey, more stained grains alternation with yellowish white feldspar vein
40	Quartzite and acidic gneiss
	Quartzite and acidic gneiss Sample geryish white with less stained grains (20%)
50	

Cover
Sealing
S.W.L.
Surface Casing
Screen
Screen

Resis. 64: 0 500 1000 1500
Resis. 16: 0 500 1000 1500
Gamma (CPS): 0 60 120 180
SP (mV): -450 -250 50
SPR (ohms): 0 200 400
Temp. (C): 2 4 6
Conduc. (mS/cm): 0 .5 1

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LOG OF WELL A-4

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The Study on
Groundwater Development
for Altai City, MONGOLIA

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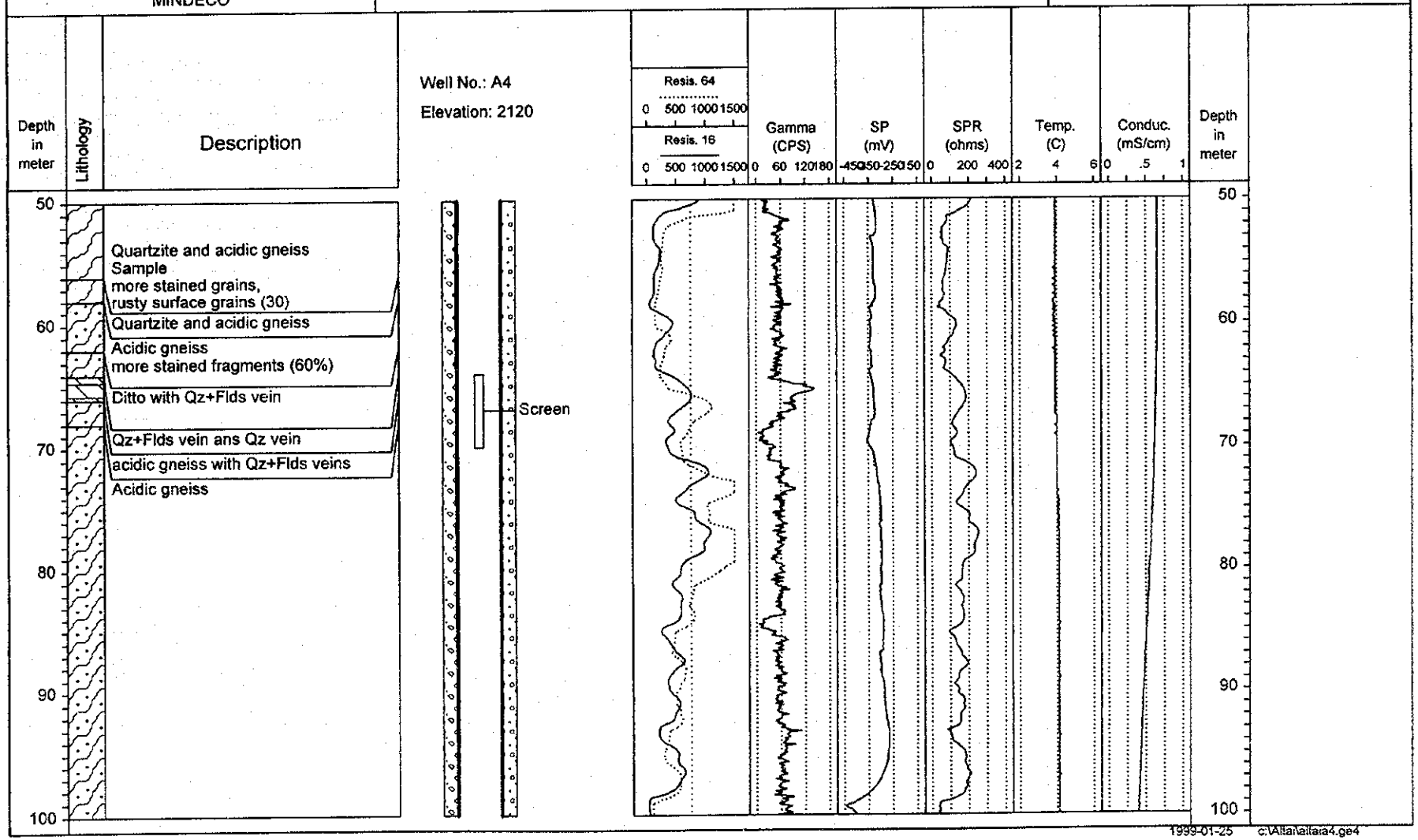
MINDECO

Date of Completion	: 23rd Sep. 1998	Sampling Date	: 5th Oct.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 160.2m	N Coord.	: N 46, 22, 50
Drilling Method	: Rotary	E Coord.	: E 96, 16, 42

Well No.: A4

Elevation: 2120



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LOG OF WELL A-4

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The Study on
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for Altai City, MONGOLIA

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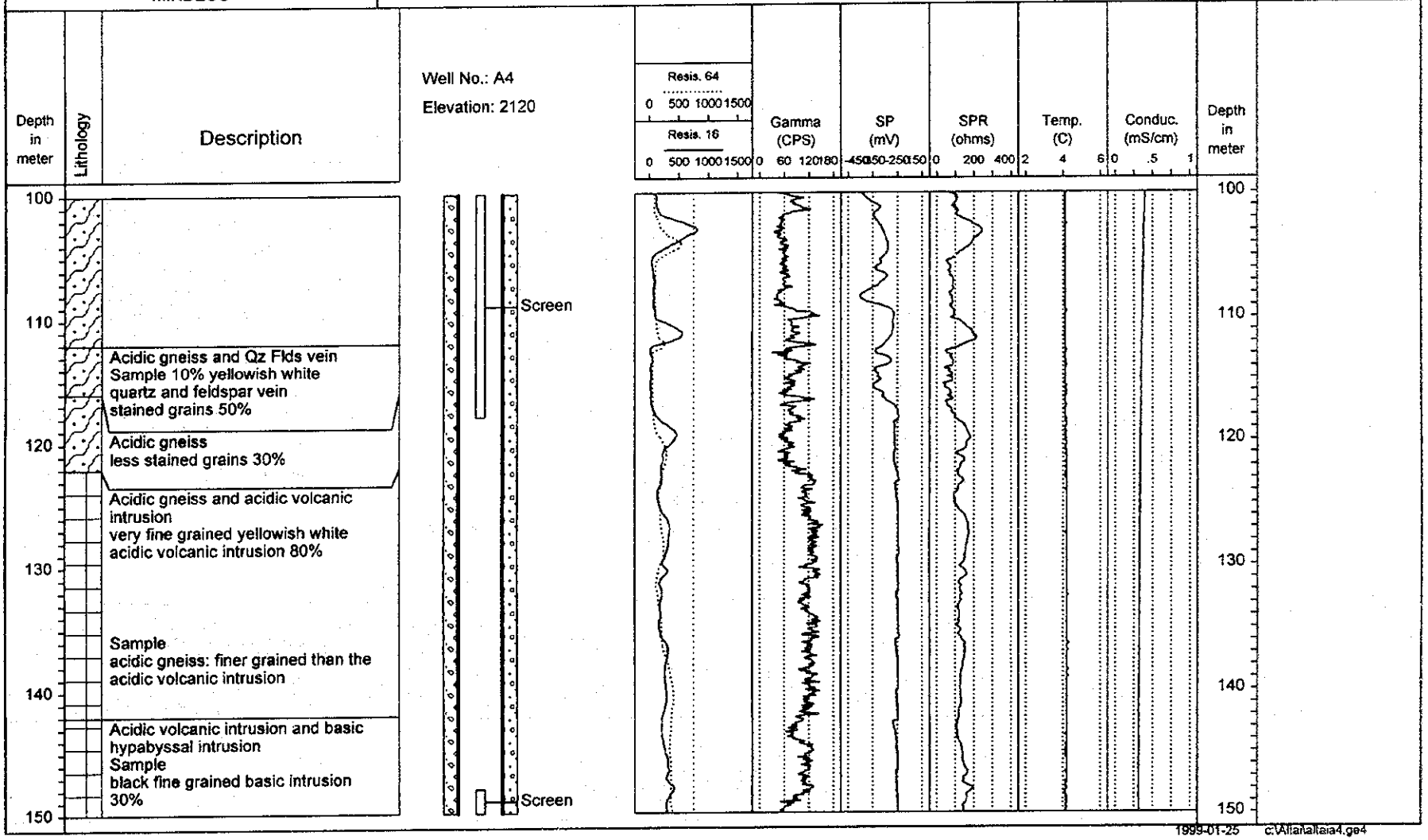
MINDECO

Date of Completion	: 23rd Sep. 1998	Sampling Date	: 5th Oct.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 160.2m	N Coord.	: N 46, 22, 50
Drilling Method	: Rotary	E Coord.	: E 96, 16, 42

Well No.: A4

Elevation: 2120



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LOG OF WELL A-4

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The Study on
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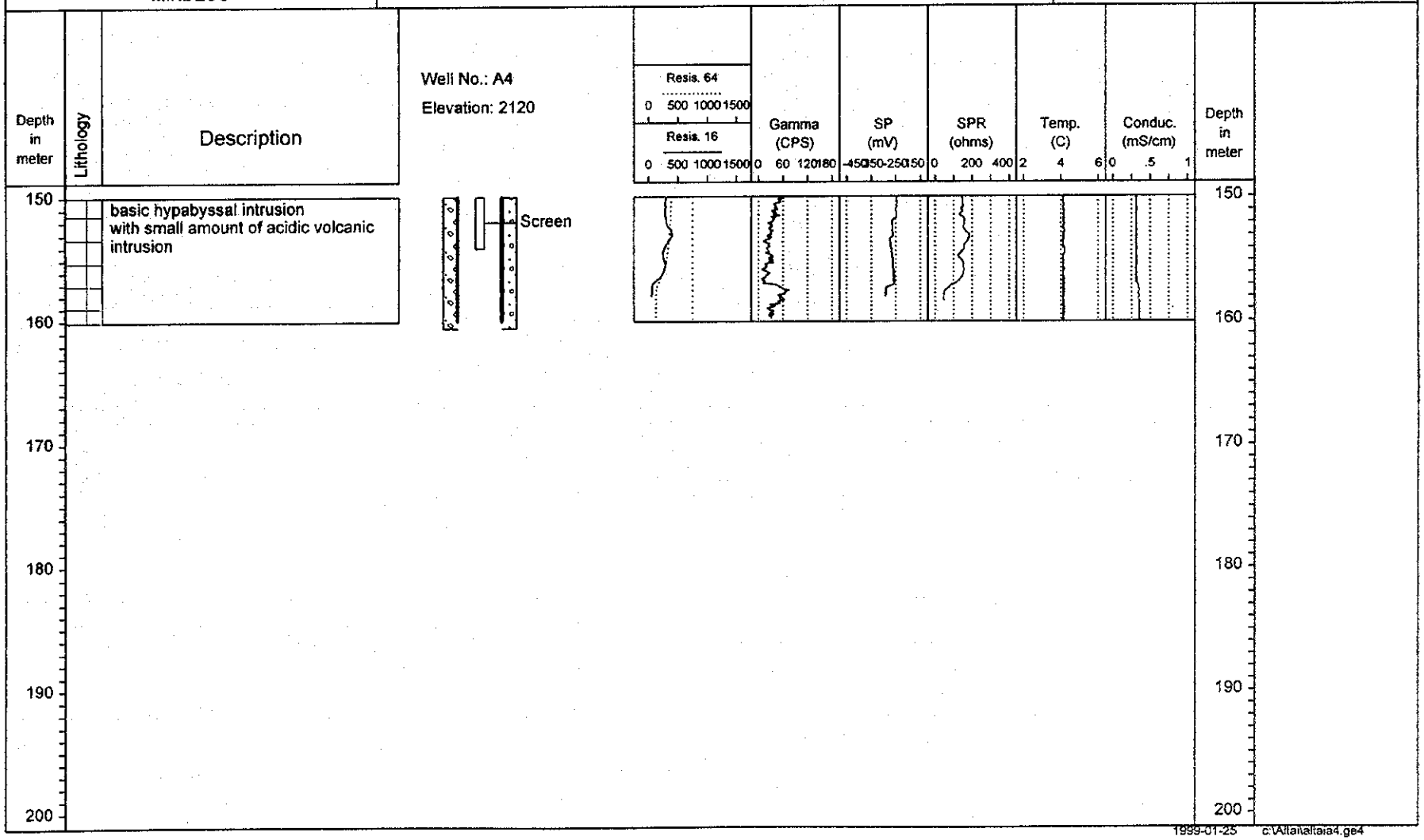
MINDECO

Date of Completion	: 23rd Sep. 1998	Sampling Date	: 5th Oct.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 160.2m	N Coord.	: N 46, 22, 50
Drilling Method	: Rotary	E Coord.	: E 96, 16, 42

Well No.: A4

Elevation: 2120



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JICA

LOG OF WELL B-1

(Page 1 of 1)

The Study on
Groundwater Development
for Altai City, MONGOLIA

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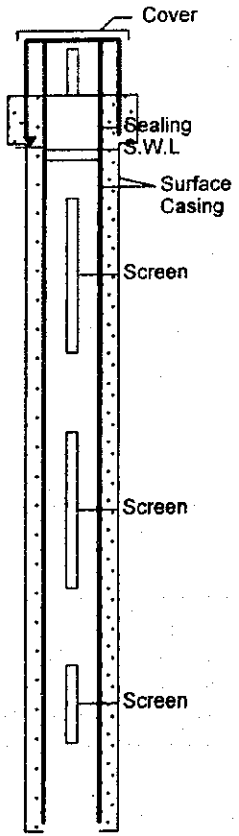
MINDECO

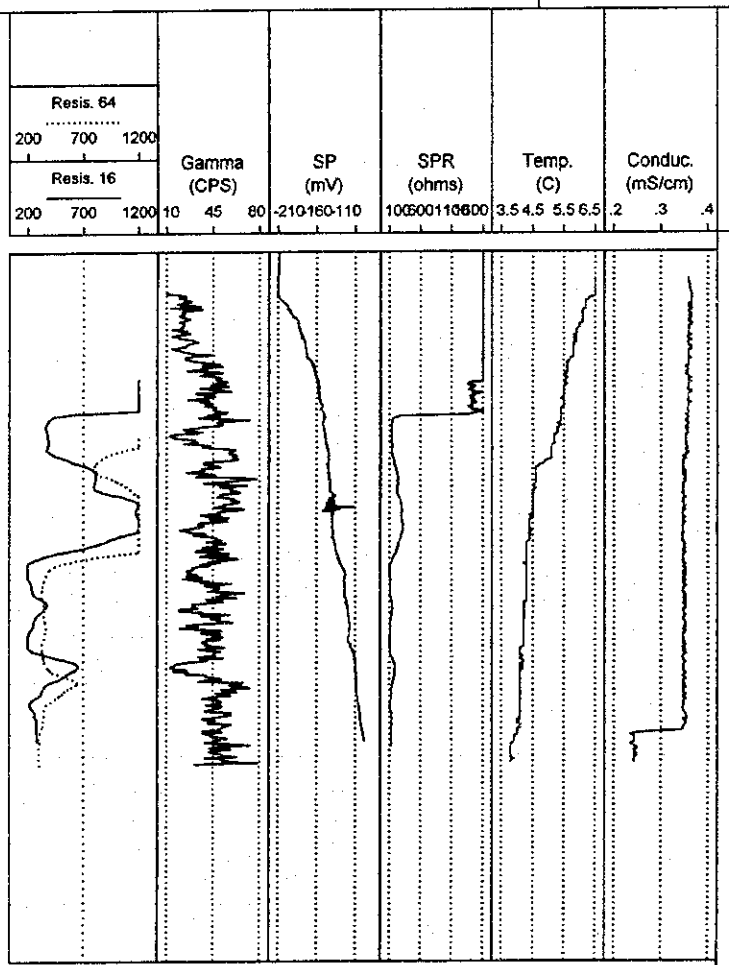
Date of Completion	: 5th Sep. 1998	Sampling Date	: 17th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 56.2m	N Coord.	: N 46, 22, 10
Drilling Method	: Rotary	E Coord.	: E 96, 14, 17

Depth in meter	Lithology	Description
0		Sand layer fine - medium sand
5		
		Sand and gravel layer
10		Acidic gneiss fine grained acidic gneiss
15		
		sample Quartz, tiny mica bearing quartz fragment of max 5mm
20		
25		Acidic geniss fine grained
		sample Quartz fragment 30% of max 3mm
30		
35		
40		
45		
50		
55		
60		

Well No.: B1

Elevation: 2175





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JICA

LOG OF WELL B-2

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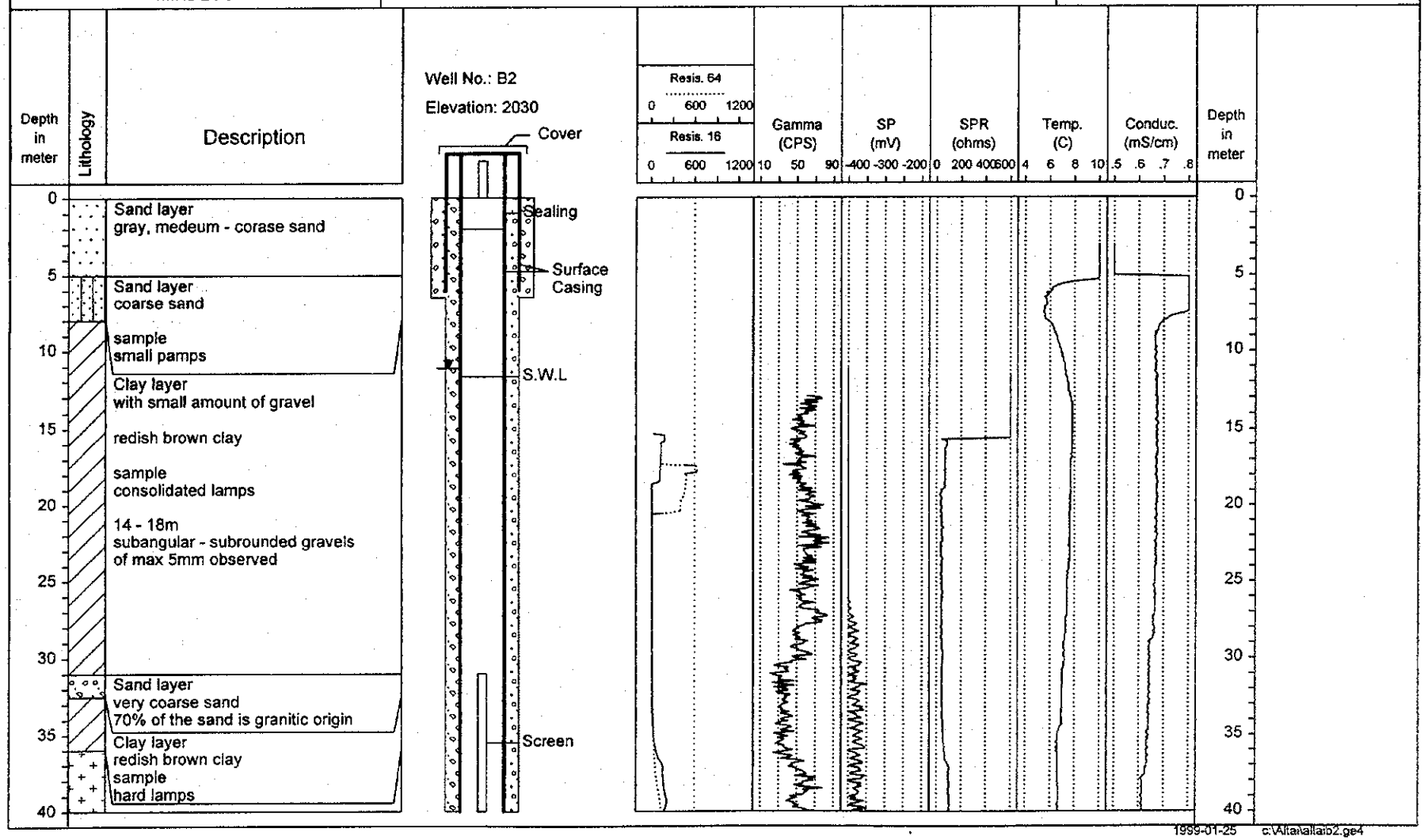
The Study on
Groundwater Development
for Altai City, MONGOLIA

Pacific Consultants International

MINDECO

Date of Completion	: 7&8th Aug. 1998	Sampling	: 15th Aug.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 73.6m	N Coord.	: N 46, 25, 36
Drilling Method	: Rotary	E Coord.	: E 96, 18, 12



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JICA

LOG OF WELL B-2

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The Study on
Groundwater Development
for Altai City, MONGOLIA

Pacific Consultants International

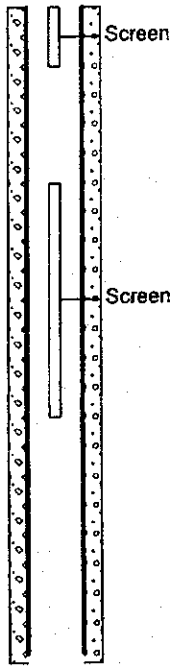
MINDECO

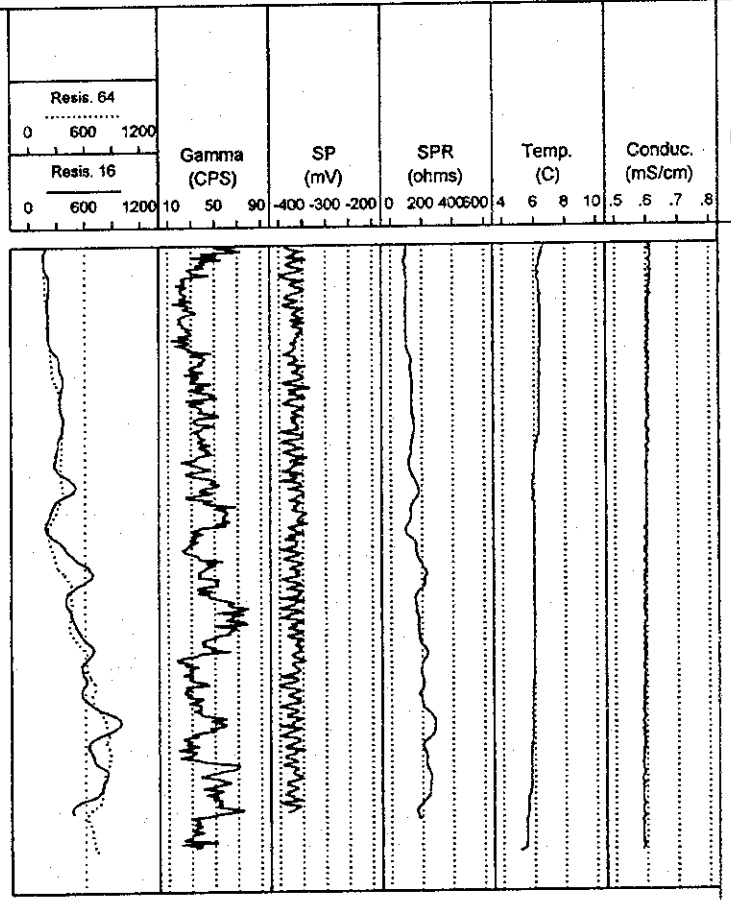
Date of Completion	: 78th Aug. 1998	Sampling	: 15th Aug.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 73.6m	N Coord.	: N 46, 25, 36
Drilling Method	: Rotary	E Coord.	: E 96, 18, 12

Well No.: B2

Elevation: 2030

Depth in meter	Lithology	Description
40		Granitic rock slightly weathered
45		sample sand grains of granitic origin with very small amount of mafic mineral
50		Granitic rock sample coarse grained Qz, Fds, with small amount of mica
55		
60		
65		
70		
75		
80		





Depth in meter: 40, 45, 50, 55, 60, 65, 70, 75, 80

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JICA

LOG OF WELL B-3

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The Study on
Groundwater Development
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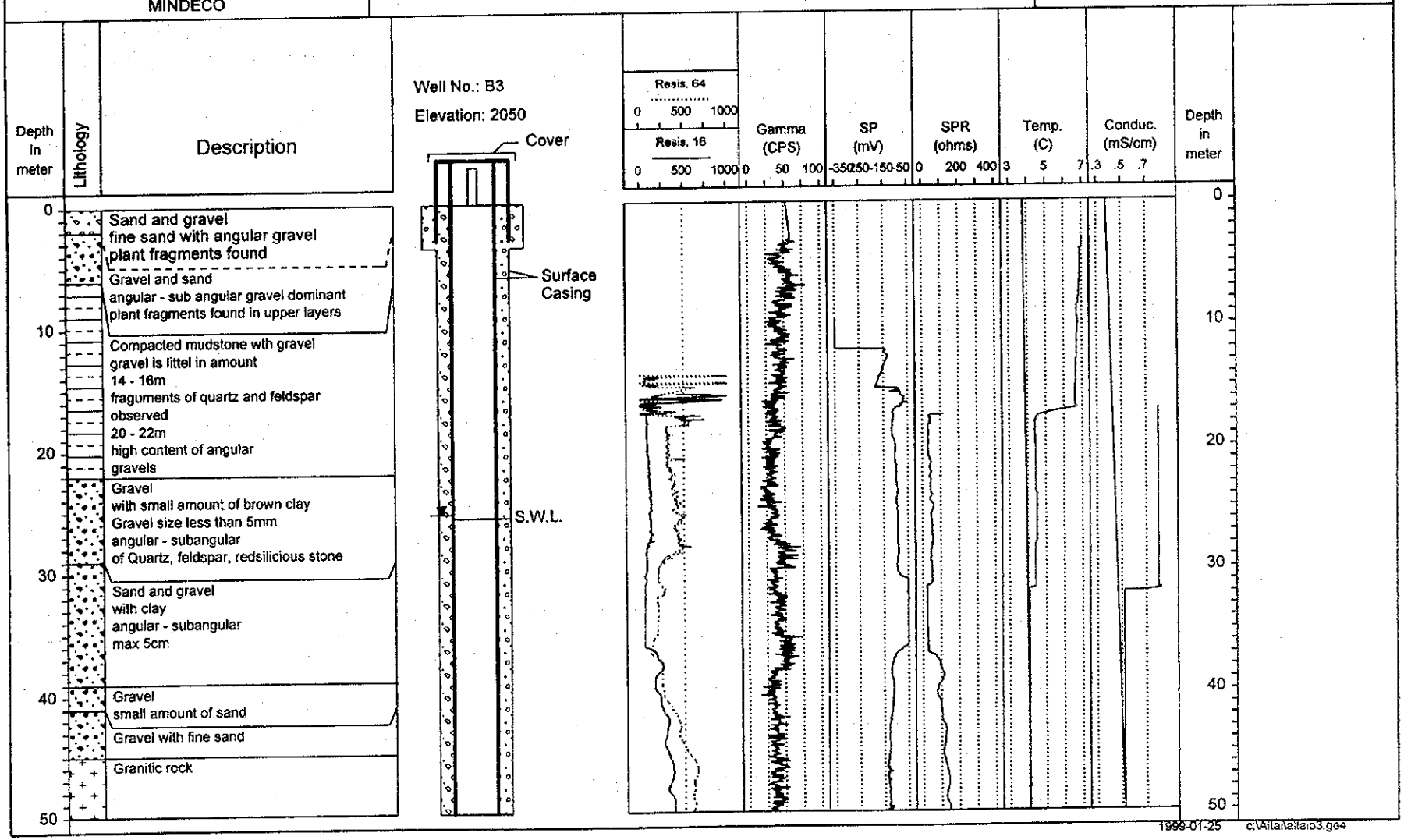
Pacific Consultants International

MINDECO

Date of Completion	: 10th July, 1998	Sampling	: 6th July
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 131.0m	N Coord.	: N 46, 24, 55
Drilling Method	: Rotary	E Coord.	: E 96, 18, 26



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LOG OF WELL B-3

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The Study on
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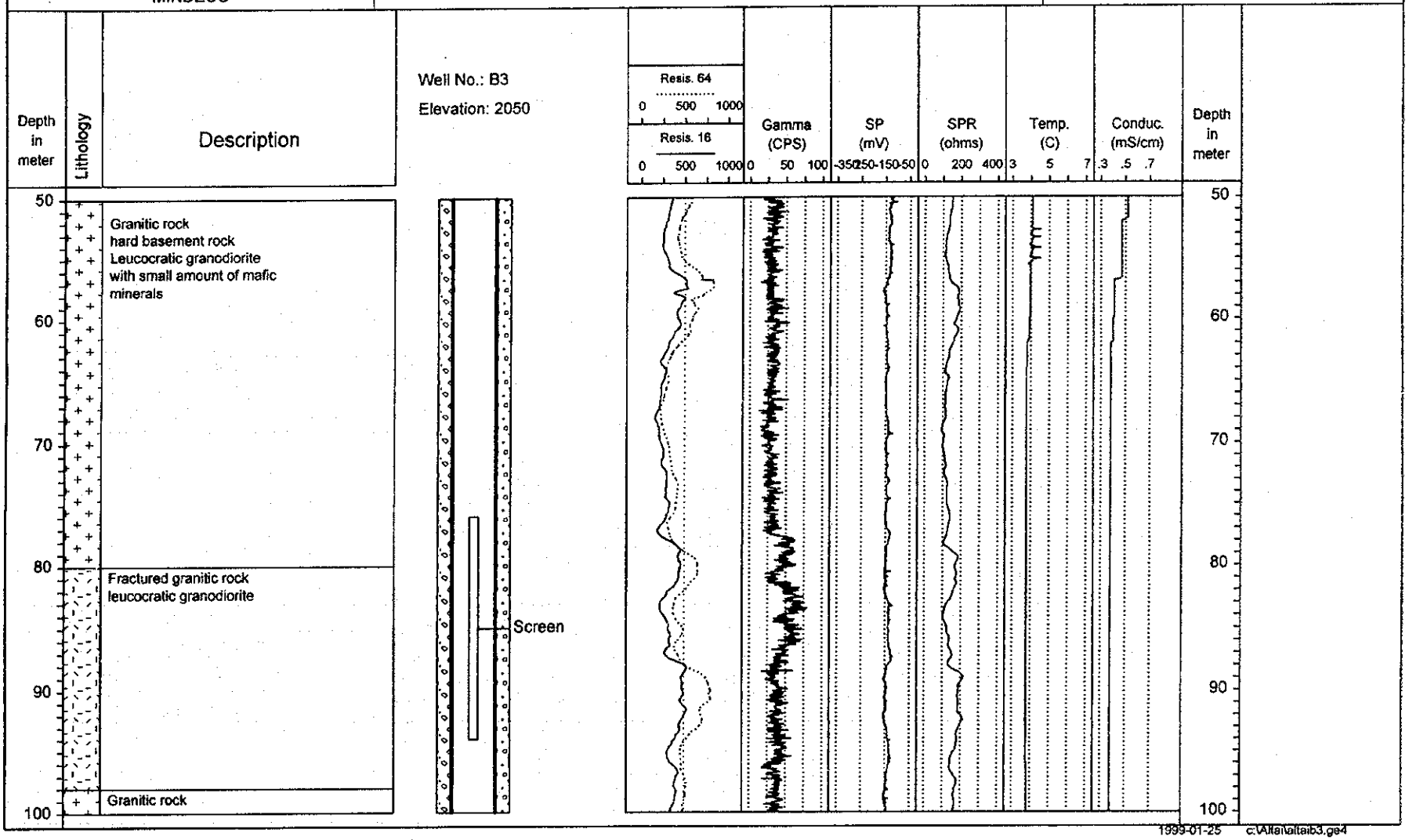
Pacific Consultants International

MINDECO

Date of Completion	: 10th July, 1998	Sampling	: 6th July
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 131.0m	N Coord.	: N 46, 24, 55
Drilling Method	: Rotary	E Coord.	: E 96, 18, 26

Well No.: B3

Elevation: 2050



JICA

LOG OF WELL B-3

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The Study on
Groundwater Development
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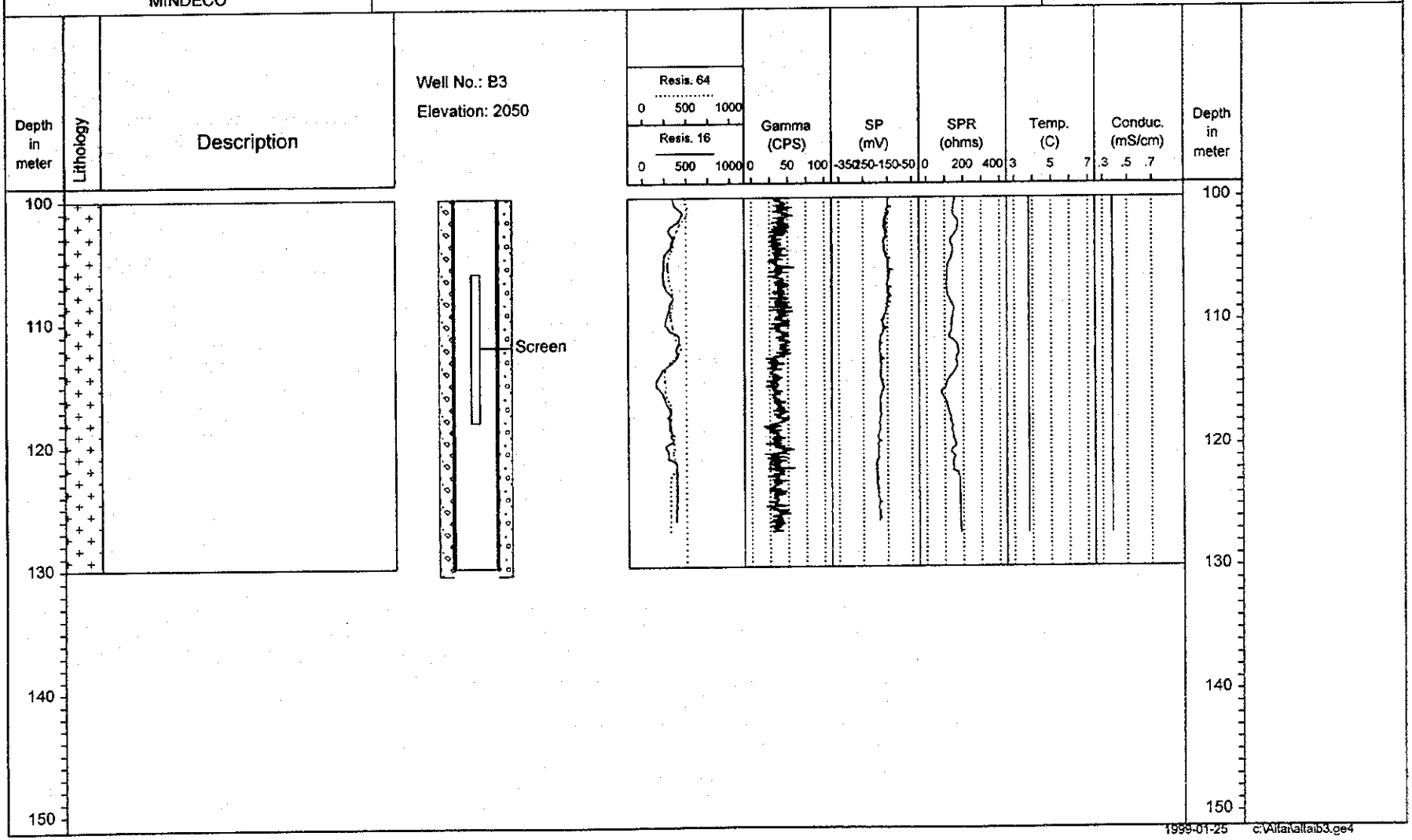
Pacific Consultants International

MINDECO

Date of Completion	: 10th July, 1998	Sampling	: 6th July
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 131.0m	N Coord.	: N 46, 24, 55
Drilling Method	: Rotary	E Coord.	: E 96, 18, 26

Well No.: B3

Elevation: 2050



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JICA

LOG OF WELL B-4

The Study on
Groundwater Development
for Altai City, MONGOLIA

Pacific Consultants International

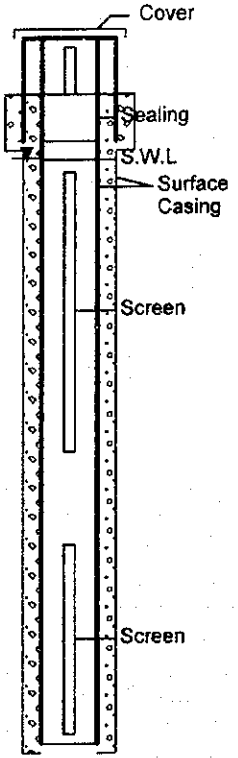
MINDECO

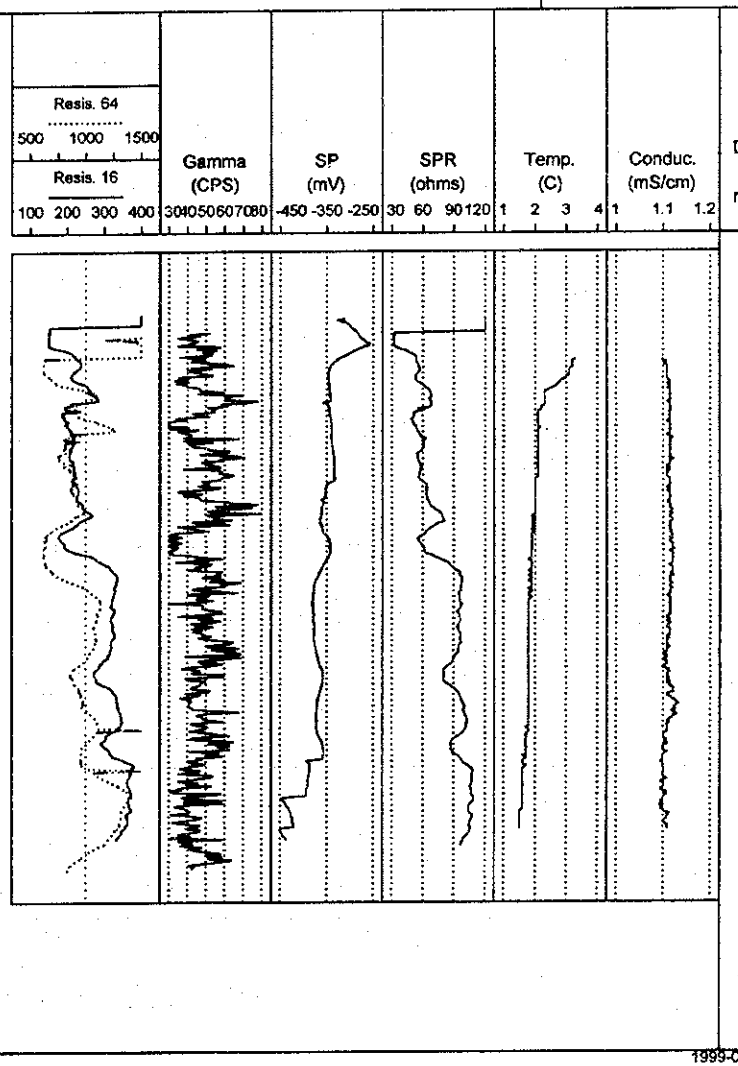
Date of Completion	: 20th June, 1998	Sampling Date	: 2nd July
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 41.6m	N Coord.	: N 46, 26, 04
Drilling Method	: Rotary	E Coord.	: E 98, 19, 38

Depth in meter	Lithology	Description
0 - 5		Sand and gravel fine - medeum sand with gravel
5 - 10		Weathered granitic rock large mica crystals observed
10 - 50		Granitic rock 16 - 31m small anount of mafic minerals observed 31m - Coarse rained granitic rock with small amount of mafic minerals

Well No.: B4

Elevation: 2020





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JICA

LOG OF WELL B-5

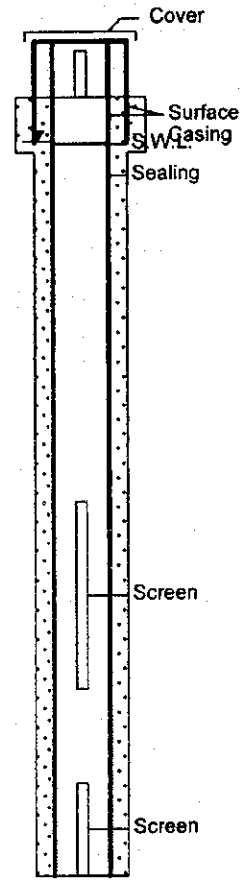
The Study on
Groundwater Development
for Altai City, MONGOLIA

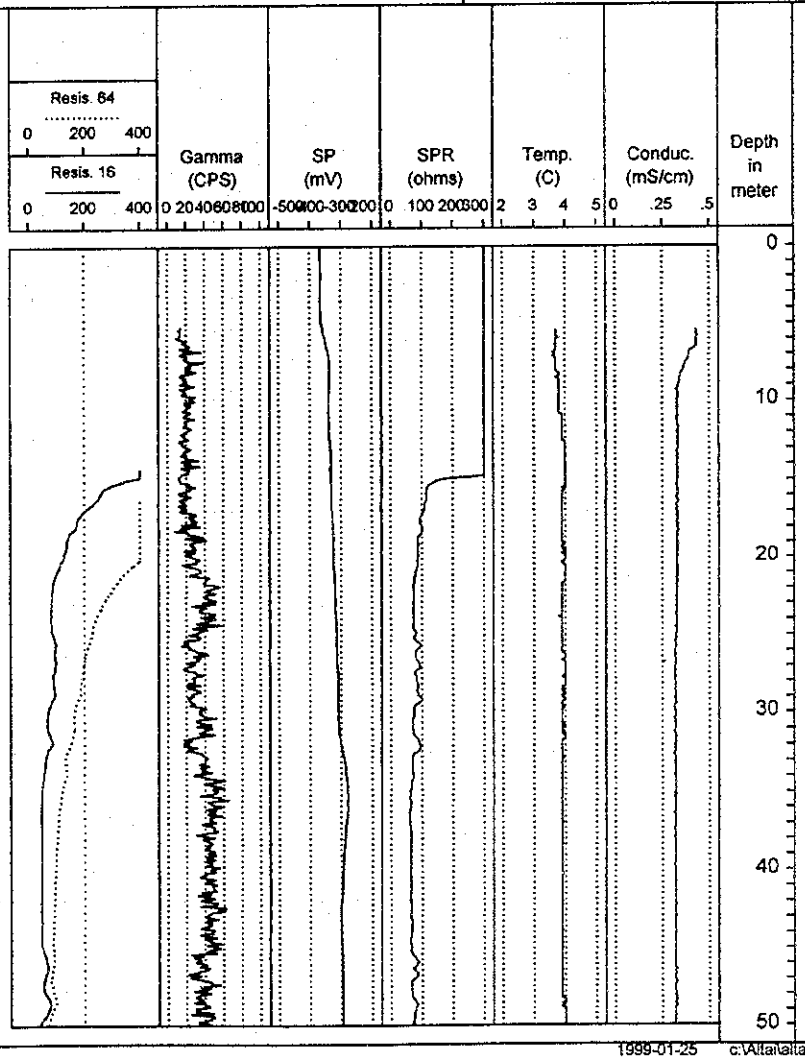
Pacific Consultants International

MINDECO

Date of Completion	: 10th July, 1998	Sampling	: 19th July
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 80.0m	N Coord.	: N 46, 20, 24
Drilling Method	: Rotary	E Coord.	: E 96, 19, 01

Depth in meter	Surf. Elevation 2157	Description
0	2157	Sand and gravel
10	2147	Gravel and sand gravel dominant
20	2137	Coarse sand with gravel Gravel size less than 3mm
30	2127	
40	2117	Medium - course sand with gravel with small amount of brown clay Gravel size less than 5mm
50		





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LOG OF WELL B-5

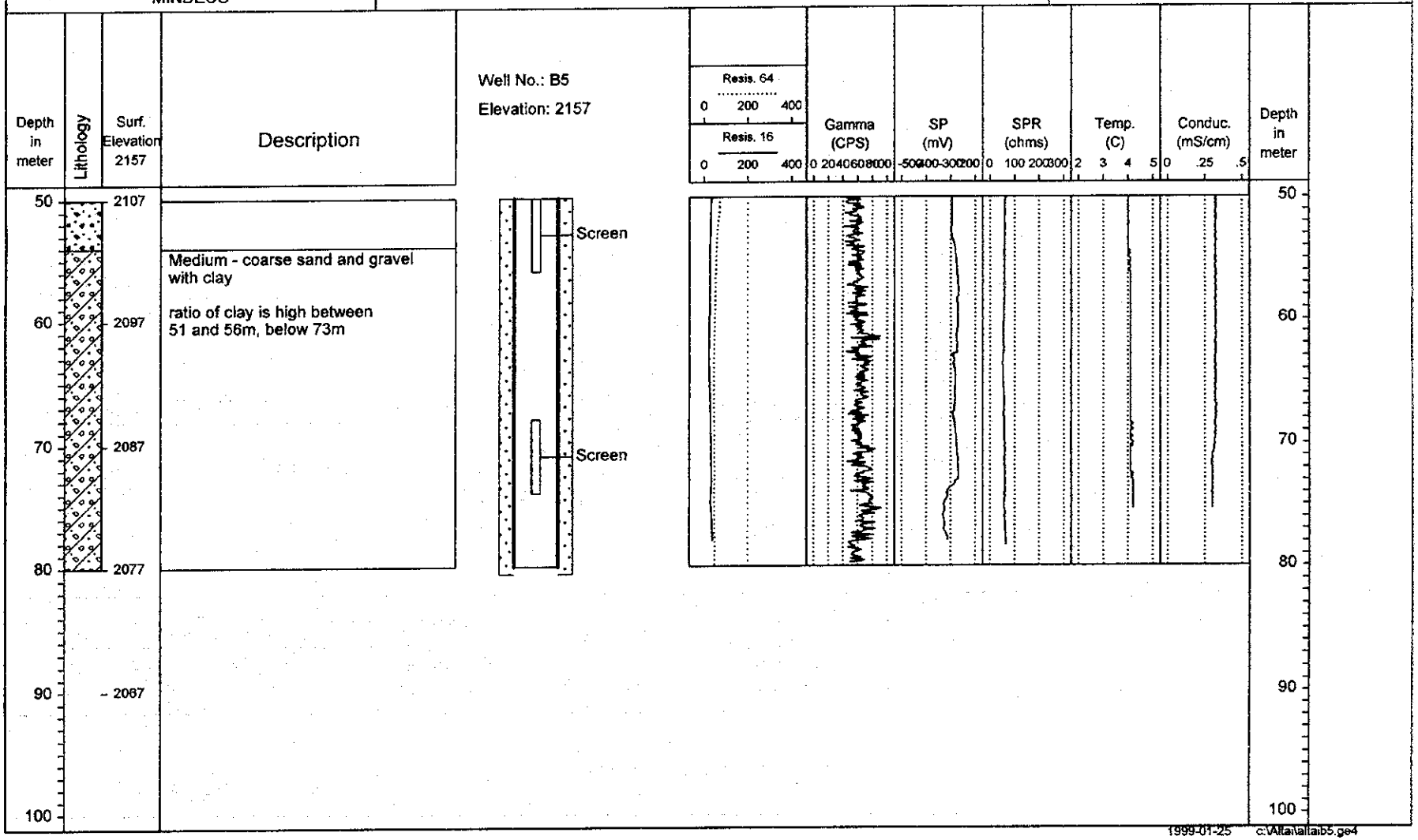
(Page 2 of 2)

The Study on
Groundwater Development
for Altai City, MONGOLIA

Pacific Consultants International

MINDECO

Date of Completion	: 10th July, 1998	Sampling	: 19th July
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 80.0m	N Coord.	: N 46, 20, 24
Drilling Method	: Rotary	E Coord.	: E 96, 19, 01



JICA

LOG OF WELL B-6

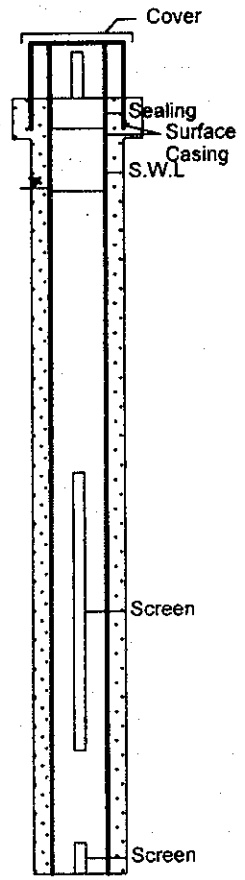
The Study on
Groundwater Development
for Altai City, MONGOLIA

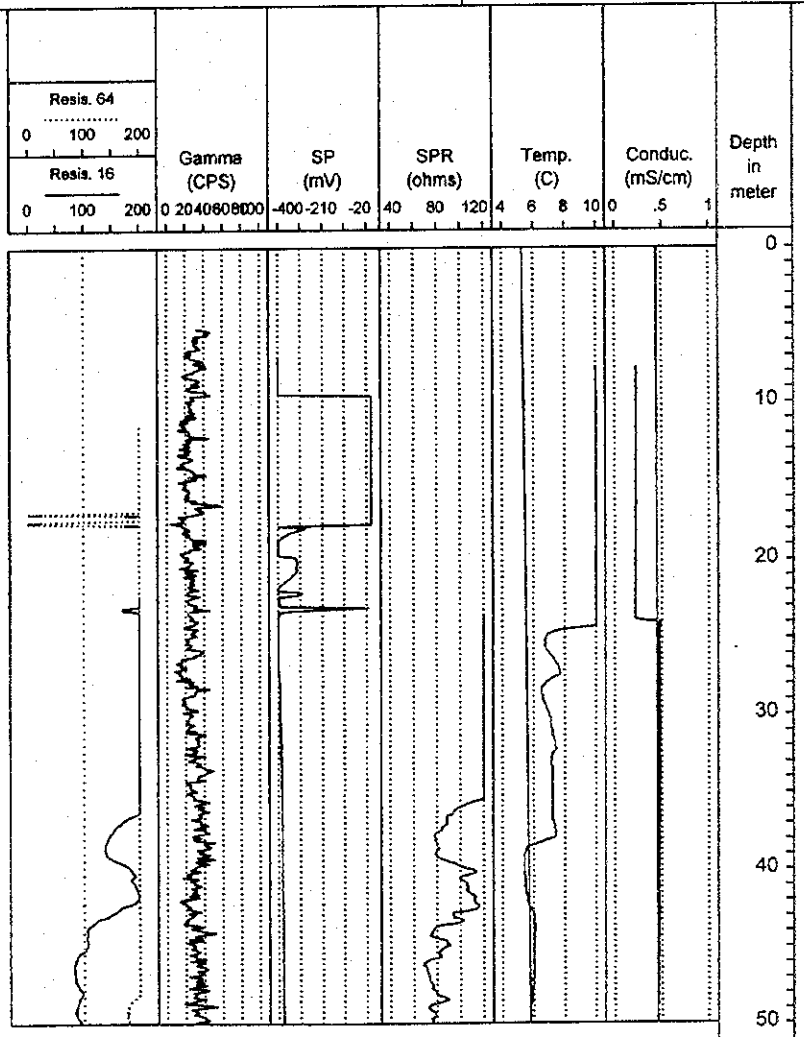
Pacific Consultants International

MINDECO

Date of Completion	: 5th Aug. 1998	Sampling Date	: 24th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 120.0m	N Coord.	: N 46, 19, 11
Drilling Method	: Rotary	E Coord.	: E 96, 20, 45

Depth in meter	Surf. Elevation 2190	Description
0	2190	Sand layer fine - medium sand pale yellowish gray
10	2180	Sand layer coarse sand, moderately sorted
		Sand and gravel layer angular - sub angular gravel dominant fragments of quartz, feldspar, granitic rock, green rock
20	2170	
		Sand and gravel layer subangular - angular gravels of quartz, feldspar, green rock(red colored) small amount of peridotite
30	2160	
40	2150	around 40m sample contains small amount of redish brown clay
50		





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JICA

LOG OF WELL B-6

The Study on
Groundwater Development
for Altai City, MONGOLIA

Pacific Consultants International

MINDECO

Date of Completion	: 5th Aug. 1998	Sampling Date	: 24th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 120.0m	N Coord.	: N 46, 19, 11
Drilling Method	: Rotary	E Coord.	: E 96, 20, 45

Well No.: B6

Elevation: 2190

Depth in meter	Surf. Elevation 2190	Description
50	2140	
60	2130	Clay layer with small amount of sand and gravel sample consolidated redish brown clay
70	2120	
80	2110	74 - 78m sand content low include subrounded gravel of max. 5mm.
90	2100	Clay layer redish brown clay with rare inclusion of sand and gravel sample well consolidated lamp of redish brown clay
100		92 - 104m subangular gravels of max. 5cm

Screen

Screen

Resis. 64 (0 100 200)

Resis. 16 (0 100 200)

Gamma (CPS) (0 20 40 60 80 100)

SP (mV) (-400 -210 -20)

SPR (ohms) (40 80 120)

Temp. (C) (4 6 8 10)

Conduc. (mS/cm) (0 .5 1)

Depth in meter (50 60 70 80 90 100)

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JICA

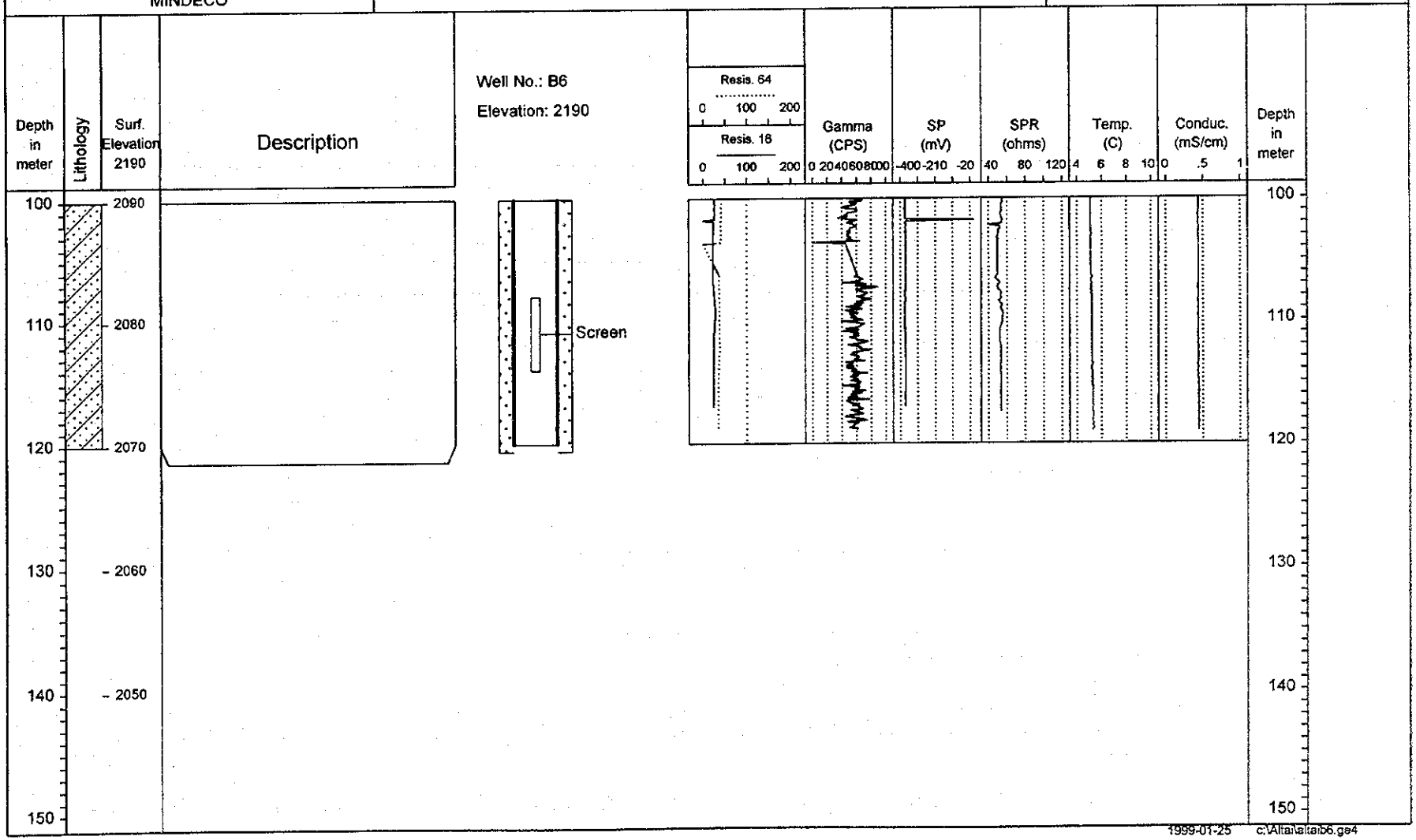
LOG OF WELL B-6

The Study on
Groundwater Development
for Altai City, MONGOLIA

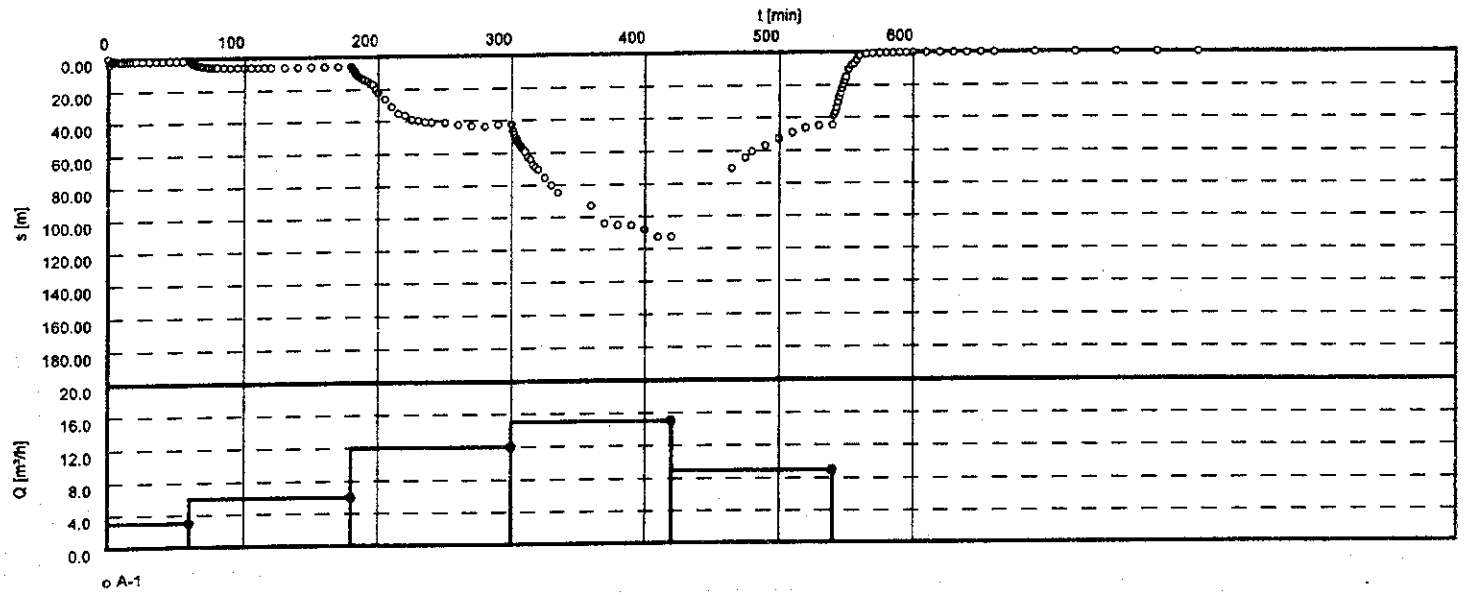
Pacific Consultants International

MINDECO

Date of Completion	: 5th Aug. 1998	Sampling Date	: 24th Sep.
Hole diameter	: 244mm	Company Rep.	: Mr Dagvadorj
Total Depth	: 120.0m	N Coord.	: N 46, 19, 11
Drilling Method	: Rotary	E Coord.	: E 96, 20, 45



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 07.09.1998	A-1 Step Drawdown, Page 1
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	
Pumping Test No. A-1 Step Drawdown		Test conducted on: 06. Sep. 1998	
A-1			
Discharge 9.667 m³/h			



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 07.09.1998	A-1 Step Drawdown, Page 2
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-1 Step Drawdown	Test conducted on: 06. Sep. 1998
A-1	A-1
Discharge 9.667 m³/h	Distance from the pumping well 0.124 m

Static water level: 11.300 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
1	0.00	11.300	0.000	
2	1.00	14.600	3.300	
3	2.00	13.050	1.750	
4	3.00	13.000	1.700	
5	4.00	13.120	1.820	
6	5.00	13.130	1.830	
7	6.00	13.130	1.830	
8	7.00	13.150	1.850	
9	8.00	13.130	1.830	
10	9.00	13.130	1.830	
11	10.00	13.130	1.830	
12	12.00	13.110	1.810	
13	14.00	13.090	1.790	
14	16.00	12.970	1.670	
15	18.00	12.970	1.670	
16	20.00	12.970	1.670	
17	25.00	12.980	1.680	
18	30.00	12.970	1.670	
19	35.00	12.970	1.670	
20	40.00	12.970	1.670	
21	45.00	12.970	1.670	
22	50.00	12.970	1.670	
23	55.00	12.970	1.670	
24	60.00	12.970	1.670	
25	61.00	13.870	2.570	
26	62.00	14.460	3.160	
27	63.00	14.780	3.480	
28	64.00	15.160	3.860	
29	65.00	15.500	4.200	
30	66.00	15.740	4.440	
31	67.00	15.920	4.620	
32	68.00	16.120	4.820	
33	69.00	16.230	4.930	
34	70.00	16.350	5.050	
35	72.00	16.550	5.250	
36	74.00	16.730	5.430	
37	76.00	16.830	5.530	
38	78.00	16.870	5.570	
39	80.00	16.940	5.640	
40	85.00	17.040	5.740	
41	90.00	17.160	5.860	
42	95.00	17.180	5.880	
43	100.00	17.210	5.910	
44	105.00	17.280	5.980	
45	110.00	17.260	5.960	
46	115.00	17.260	5.960	
47	120.00	17.300	6.000	
48	130.00	17.340	6.040	
49	140.00	17.280	5.980	
50	150.00	17.280	5.980	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 07.09.1998	A-1 Step Drawdown, Page 3
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-1 Step Drawdown	Test conducted on: 06. Sep. 1998
A-1	A-1
Discharge 9.667 m³/h	Distance from the pumping well 0.124 m

Static water level: 11.300 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]
51	160.00	17.250	5.950
52	170.00	17.260	5.960
53	180.00	17.250	5.950
54	181.00	18.910	7.610
55	182.00	19.860	8.560
56	183.00	21.000	9.700
57	184.00	22.090	10.790
58	185.00	22.870	11.570
59	186.00	23.590	12.290
60	187.00	24.300	13.000
61	188.00	24.580	13.280
62	189.00	24.970	13.670
63	190.00	25.350	14.050
64	192.00	26.180	14.880
65	194.00	27.670	16.370
66	196.00	28.220	16.920
67	198.00	31.200	19.900
68	200.00	33.140	21.840
69	205.00	37.400	26.100
70	210.00	42.160	30.860
71	215.00	46.520	35.220
72	220.00	47.650	36.350
73	225.00	50.330	39.030
74	230.00	50.930	39.630
75	235.00	51.820	40.520
76	240.00	52.130	40.830
77	250.00	52.320	41.020
78	260.00	53.730	42.430
79	270.00	54.530	43.230
80	280.00	54.860	43.560
81	290.00	53.900	42.600
82	300.00	53.730	42.430
83	301.00	57.800	46.500
84	302.00	59.990	48.690
85	303.00	61.760	50.460
86	304.00	63.390	52.090
87	305.00	64.640	53.340
88	306.00	66.010	54.710
89	307.00	67.250	55.950
90	308.00	68.280	56.980
91	309.00	69.190	57.890
92	310.00	70.410	59.110
93	312.00	73.720	62.420
94	314.00	75.280	63.990
95	316.00	78.500	67.200
96	318.00	80.120	68.820
97	320.00	81.600	70.300
98	325.00	86.700	75.400
99	330.00	91.220	79.920
100	335.00	95.900	84.600

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 07.09.1998	A-1 Step Drawdown, Page 4
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-1 Step Drawdown	Test conducted on: 06. Sep. 1998
A-1	A-1
Discharge 9.667 m³/h	Distance from the pumping well 0.124 m

Static water level: 11.300 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]
101	360.00	104.250	92.950
102	370.00	115.260	103.960
103	380.00	116.240	104.940
104	390.00	116.630	105.330
105	400.00	119.230	107.930
106	410.00	123.850	112.550
107	420.00	123.900	112.600
108	465.00	81.950	70.650
109	475.00	75.330	64.030
110	480.00	71.600	60.300
111	490.00	68.090	56.790
112	500.00	63.990	52.690
113	510.00	60.400	49.100
114	520.00	57.650	46.350
115	530.00	56.320	45.020
116	540.00	55.900	44.600
117	541.00	49.960	38.660
118	542.00	48.150	36.850
119	543.00	45.300	34.000
120	544.00	41.900	30.600
121	545.00	38.700	27.400
122	546.00	36.080	24.780
123	547.00	33.440	22.140
124	548.00	31.070	19.770
125	549.00	28.500	17.200
126	550.00	26.220	14.920
127	552.00	21.500	10.200
128	554.00	19.250	7.950
129	556.00	18.110	6.810
130	558.00	15.890	4.590
131	560.00	13.750	2.450
132	565.00	12.460	1.160
133	570.00	12.100	0.800
134	575.00	11.910	0.610
135	580.00	11.780	0.480
136	585.00	11.740	0.440
137	590.00	11.670	0.370
138	595.00	11.670	0.370
139	600.00	11.660	0.360
140	610.00	11.640	0.340
141	620.00	11.600	0.300
142	630.00	11.580	0.280
143	640.00	11.560	0.260
144	650.00	11.550	0.250
145	660.00	11.540	0.240
146	690.00	11.520	0.220
147	720.00	11.510	0.210
148	750.00	11.500	0.200
149	780.00	11.500	0.200
150	810.00	11.480	0.180

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 07.09.1998	A-1 Step Drawdown, Page 5
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-1 Step Drawdown	Test conducted on: 06. Sep. 1998
A-1	A-1
Discharge 9.667 m³/h	Distance from the pumping well 0.124 m
Static water level: 11.300 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]	

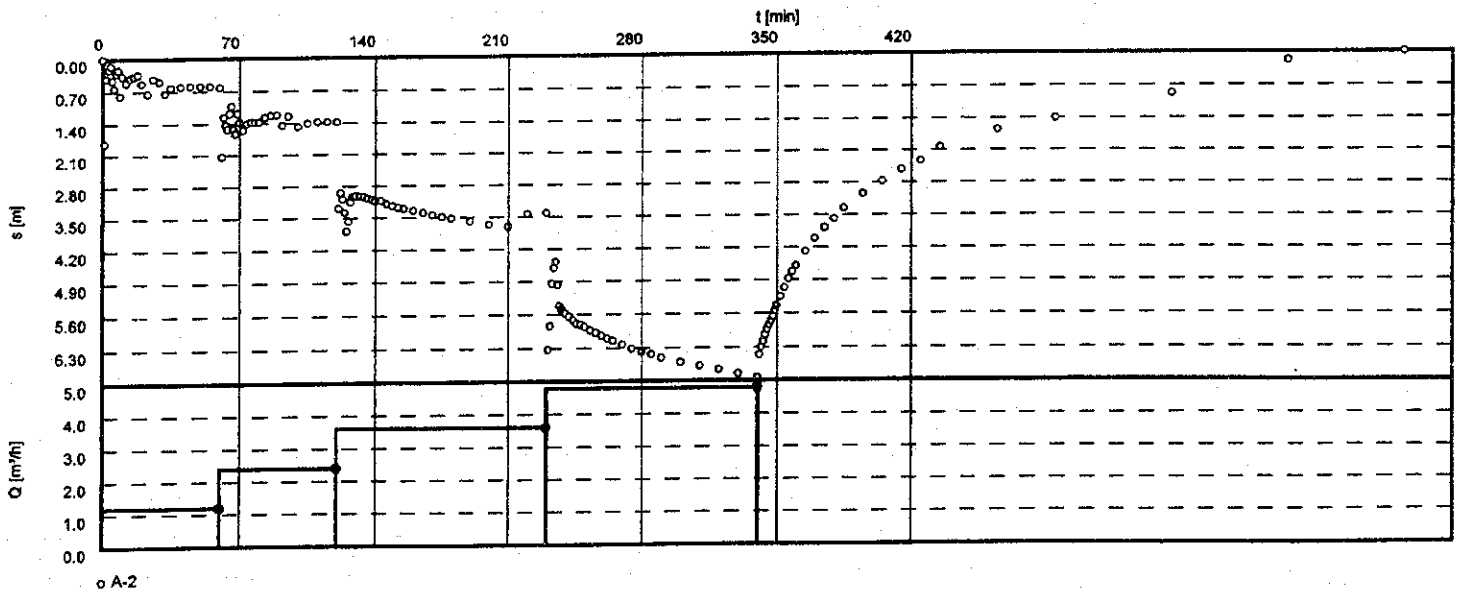
Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 07.09.1998	A-1 Step Drawdown, Page 6
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-1 Step Drawdown	Test conducted on: 06. Sep. 1998
A-1	A-1
Discharge 9.667 m³/h	

	Pumping test duration [min]	Discharge [m³/h]
1	60.00	3.000
2	180.00	6.000
3	300.00	12.000
4	420.00	15.000
5	540.00	9.000

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	A-2 Step Drawdown , Page 1
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-2 Step Drawdown	Test conducted on: 04.Aug.1998
A-2	
Discharge 3.353 m³/h	



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	A-2 Step Drawdown , Page 2
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-2 Step Drawdown	Test conducted on: 04.Aug.1998
A-2	A-2
Discharge 3.353 m³/h	Distance from the pumping well 0.077 m
Static water level: 2.820 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]
1	0.00	2.820	0.000
2	1.00	4.650	1.830
3	2.00	3.230	0.410
4	3.00	3.040	0.220
5	4.00	2.960	0.140
6	5.00	3.270	0.450
7	6.00	3.450	0.630
8	7.00	3.120	0.300
9	8.00	3.050	0.230
10	9.00	3.610	0.790
11	10.00	3.180	0.360
12	12.00	3.330	0.510
13	14.00	3.220	0.400
14	16.00	3.190	0.370
15	18.00	3.150	0.330
16	20.00	3.340	0.520
17	23.00	3.570	0.750
18	26.00	3.250	0.430
19	29.00	3.310	0.490
20	32.00	3.560	0.740
21	35.00	3.440	0.620
22	40.00	3.420	0.600
23	45.00	3.410	0.590
24	50.00	3.410	0.590
25	55.00	3.410	0.590
26	60.00	3.430	0.610
27	61.00	4.950	2.130
28	62.00	4.080	1.260
29	63.00	4.250	1.430
30	64.00	4.350	1.530
31	65.00	4.000	1.180
32	66.00	3.840	1.020
33	67.00	4.350	1.530
34	68.00	4.450	1.630
35	69.00	4.000	1.180
36	70.00	4.190	1.370
37	72.00	4.370	1.550
38	74.00	4.230	1.410
39	76.00	4.190	1.370
40	78.00	4.190	1.370
41	80.00	4.190	1.370
42	83.00	4.090	1.270
43	86.00	4.050	1.230
44	89.00	4.040	1.220
45	92.00	4.270	1.450
46	95.00	4.070	1.250
47	100.00	4.300	1.480
48	105.00	4.230	1.410
49	110.00	4.200	1.380
50	115.00	4.200	1.380

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	A-2 Step Drawdown , Page 3
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-2 Step Drawdown	Test conducted on: 04.Aug.1998
A-2	A-2
Discharge 3.353 m³/h	Distance from the pumping well 0.077 m
Static water level: 2.820 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]
51	120.00	4.200	1.380
52	121.00	6.100	3.280
53	122.00	5.760	2.940
54	123.00	5.900	3.080
55	124.00	6.190	3.370
56	125.00	6.600	3.780
57	126.00	6.390	3.570
58	127.00	5.970	3.150
59	128.00	5.850	3.030
60	129.00	5.840	3.020
61	130.00	5.830	3.010
62	132.00	5.840	3.020
63	134.00	5.850	3.030
64	136.00	5.880	3.060
65	138.00	5.910	3.090
66	140.00	5.940	3.120
67	143.00	5.940	3.120
68	146.00	6.010	3.190
69	149.00	6.050	3.230
70	152.00	6.090	3.270
71	155.00	6.110	3.290
72	160.00	6.160	3.340
73	165.00	6.210	3.390
74	170.00	6.260	3.440
75	175.00	6.300	3.480
76	180.00	6.340	3.520
77	190.00	6.410	3.590
78	200.00	6.480	3.660
79	210.00	6.530	3.710
80	220.00	6.250	3.430
81	230.00	6.230	3.410
82	231.00	9.150	6.330
83	232.00	8.650	5.830
84	233.00	7.770	4.950
85	234.00	7.430	4.610
86	235.00	7.300	4.480
87	236.00	7.800	4.980
88	237.00	8.240	5.420
89	238.00	8.310	5.490
90	239.00	8.360	5.540
91	240.00	8.390	5.570
92	242.00	8.460	5.640
93	244.00	8.530	5.710
94	246.00	8.600	5.780
95	248.00	8.620	5.800
96	250.00	8.670	5.850
97	253.00	8.740	5.920
98	256.00	8.790	5.970
99	259.00	8.850	6.030
100	262.00	8.910	6.090

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	A-2 Step Drawdown , Page 4
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-2 Step Drawdown	Test conducted on: 04.Aug.1998
A-2	A-2
Discharge 3.353 m³/h	Distance from the pumping well 0.077 m
Static water level: 2.820 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
101	265.00	8.960	6.140	
102	270.00	9.040	6.220	
103	275.00	9.130	6.310	
104	280.00	9.200	6.380	
105	285.00	9.250	6.430	
106	290.00	9.330	6.510	
107	300.00	9.430	6.610	
108	310.00	9.500	6.680	
109	320.00	9.580	6.760	
110	330.00	9.670	6.850	
111	340.00	9.780	6.940	
112	341.00	9.280	6.460	
113	342.00	9.120	6.300	
114	343.00	8.990	6.170	
115	344.00	8.860	6.040	
116	345.00	8.740	5.920	
117	346.00	8.650	5.830	
118	347.00	8.560	5.740	
119	348.00	8.470	5.650	
120	349.00	8.360	5.540	
121	350.00	8.260	5.440	
122	352.00	8.070	5.250	
123	354.00	7.890	5.070	
124	356.00	7.700	4.880	
125	358.00	7.550	4.730	
126	360.00	7.420	4.600	
127	365.00	7.110	4.290	
128	370.00	6.830	4.010	
129	375.00	6.600	3.780	
130	380.00	6.410	3.590	
131	385.00	6.170	3.350	
132	395.00	5.860	3.040	
133	405.00	5.590	2.770	
134	415.00	5.340	2.520	
135	425.00	5.150	2.330	
136	435.00	4.850	2.030	
137	465.00	4.470	1.650	
138	495.00	4.220	1.400	
139	555.00	3.700	0.880	
140	615.00	3.000	0.180	
141	675.00	2.820	0.000	

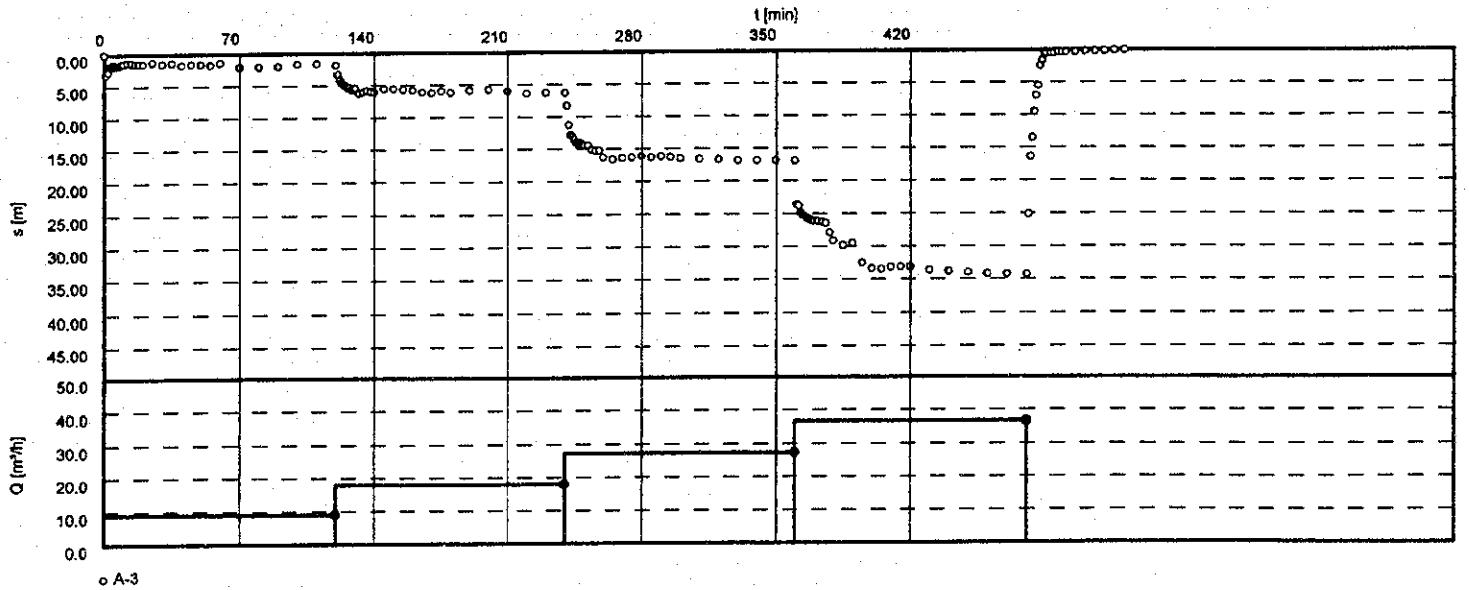
Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	A-2 Step Drawdown , Page 5
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-2 Step Drawdown	Test conducted on: 04.Aug.1998
A-2	A-2
Discharge 3.353 m³/h	

	Pumping test duration [min]	Discharge [m³/h]
1	60.00	1.200
2	120.00	2.400
3	230.00	3.600
4	340.00	4.800

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 12.10.1998	A-3 Step Drawdown, Page 1
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-3 Step Drawdown	Test conducted on: 11.Oct.1998
A-3	
Discharge 22.775 m³/h	



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 12.10.1998	A-3 Step Drawdown, Page 2
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-3 Step Drawdown	Test conducted on: 11.Oct.1998
A-3	A-3
Discharge 22.775 m³/h	Distance from the pumping well 0.124 m
Static water level: 4.370 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]
1	0.00	4.370	0.000
2	1.00	7.540	3.170
3	2.00	7.110	2.740
4	3.00	6.170	1.800
5	4.00	6.220	1.850
6	5.00	5.900	1.530
7	6.00	6.100	1.730
8	7.00	6.190	1.820
9	8.00	6.030	1.660
10	9.00	5.920	1.550
11	10.00	5.750	1.380
12	12.00	5.670	1.300
13	14.00	5.720	1.350
14	16.00	5.840	1.470
15	18.00	5.800	1.430
16	20.00	5.870	1.500
17	25.00	5.600	1.230
18	30.00	5.850	1.480
19	35.00	5.740	1.370
20	40.00	6.070	1.700
21	45.00	5.960	1.590
22	50.00	5.920	1.550
23	55.00	6.050	1.680
24	60.00	5.710	1.340
25	70.00	6.440	2.070
26	80.00	6.400	2.030
27	90.00	6.350	1.980
28	100.00	5.980	1.610
29	110.00	5.920	1.550
30	120.00	6.200	1.830
31	121.00	7.640	3.270
32	122.00	8.530	4.160
33	123.00	9.000	4.630
34	124.00	9.300	4.930
35	125.00	9.440	5.070
36	126.00	9.760	5.390
37	127.00	9.660	5.290
38	128.00	10.100	5.730
39	129.00	10.140	5.770
40	130.00	9.800	5.430
41	132.00	10.670	6.300
42	134.00	10.480	6.110
43	136.00	10.230	5.860
44	138.00	10.380	6.010
45	140.00	10.490	6.120
46	145.00	9.980	5.610
47	150.00	9.980	5.610
48	155.00	10.110	5.740
49	160.00	10.200	5.830
50	165.00	10.530	6.160

Waterloo Hydrogeologic 160 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 12.10.1998	A-3 Step Drawdown, Page 3
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-3 Step Drawdown	Test conducted on: 11.Oct.1998
A-3	A-3
Discharge 22.775 m³/h	Distance from the pumping well 0.124 m

Static water level: 4.370 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
51	170.00	10.610	6.240	
52	175.00	10.370	6.000	
53	180.00	10.620	6.250	
54	180.00	10.250	5.880	
55	200.00	10.160	5.790	
56	210.00	10.380	6.010	
57	220.00	10.790	6.420	
58	230.00	10.700	6.330	
59	240.00	10.700	6.330	
60	241.00	12.670	8.300	
61	242.00	15.630	11.260	
62	243.00	17.200	12.830	
63	244.00	17.430	13.060	
64	245.00	17.870	13.500	
65	246.00	18.360	13.990	
66	247.00	18.650	14.280	
67	248.00	18.440	14.070	
68	249.00	18.640	14.270	
69	250.00	18.750	14.380	
70	252.00	18.790	14.420	
71	254.00	19.430	15.060	
72	256.00	19.610	15.240	
73	258.00	19.580	15.210	
74	260.00	20.650	16.280	
75	265.00	20.970	16.600	
76	270.00	20.740	16.370	
77	275.00	20.660	16.290	
78	280.00	20.490	16.120	
79	285.00	20.650	16.280	
80	290.00	20.540	16.170	
81	295.00	20.640	16.270	
82	300.00	20.850	16.480	
83	310.00	20.950	16.580	
84	320.00	21.040	16.670	
85	330.00	21.200	16.830	
86	340.00	21.230	16.860	
87	350.00	21.260	16.890	
88	360.00	21.320	16.950	
89	361.00	27.990	23.620	
90	362.00	28.130	23.760	
91	363.00	29.250	24.880	
92	364.00	29.580	25.210	
93	365.00	29.730	25.360	
94	366.00	30.000	25.630	
95	367.00	30.120	25.750	
96	368.00	30.370	26.000	
97	369.00	30.480	26.110	
98	370.00	30.470	26.100	
99	372.00	30.500	26.130	
100	374.00	30.660	26.290	

Waterloo Hydrogeologic 160 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 12.10.1998	A-3 Step Drawdown, Page 4
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-3 Step Drawdown	Test conducted on: 11.Oct.1998
A-3	A-3
Discharge 22.775 m³/h	Distance from the pumping well 0.124 m
Static water level: 4.370 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]
101	376.00	30.800	26.430
102	378.00	32.250	27.880
103	380.00	33.480	29.110
104	385.00	34.210	29.840
105	390.00	33.850	29.480
106	395.00	36.880	32.510
107	400.00	37.790	33.420
108	405.00	37.870	33.500
109	410.00	37.570	33.200
110	415.00	37.540	33.170
111	420.00	37.510	33.140
112	430.00	38.040	33.670
113	440.00	38.260	33.890
114	450.00	38.400	34.030
115	460.00	38.620	34.250
116	470.00	38.660	34.290
117	480.00	38.690	34.320
118	481.00	29.500	25.130
119	482.00	20.770	16.400
120	483.00	17.880	13.510
121	484.00	13.920	9.550
122	485.00	11.470	7.100
123	486.00	9.870	5.500
124	487.00	6.840	2.470
125	488.00	5.950	1.580
126	489.00	5.000	0.630
127	490.00	4.900	0.530
128	492.00	4.840	0.470
129	494.00	4.830	0.460
130	496.00	4.700	0.330
131	498.00	4.660	0.290
132	500.00	4.660	0.290
133	505.00	4.660	0.290
134	510.00	4.590	0.220
135	515.00	4.560	0.190
136	520.00	4.490	0.120
137	525.00	4.420	0.050
138	530.00	4.380	0.010

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 12.10.1998	A-3 Step Drawdown, Page 5
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-3 Step Drawdown	Test conducted on: 11.Oct.1998
A-3	A-3
Discharge 22.775 m³/h	

	Pumping test duration [min]	Discharge [m³/h]
1	120.00	9.100
2	240.00	18.000
3	360.00	27.300
4	480.00	36.700

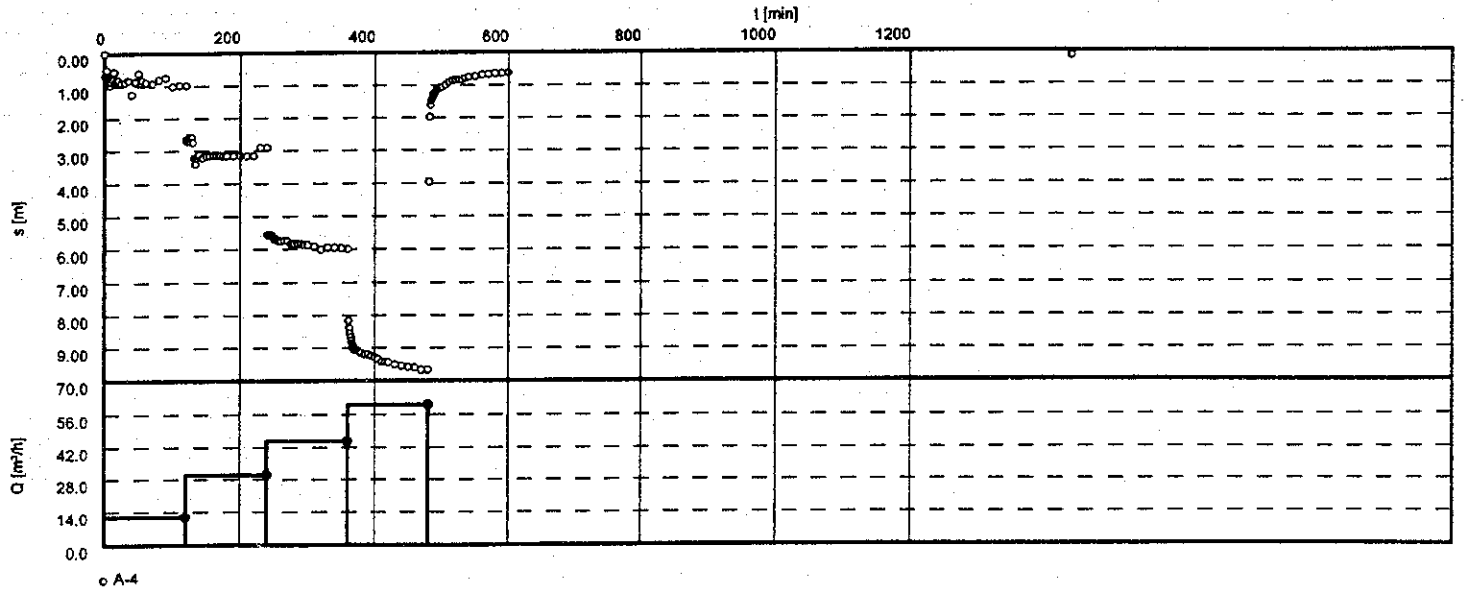
Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 12.10.1998	A-3 Step Drawdown, Page 6
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-3 Step Drawdown	Test conducted on: 11.Oct.1998
A-3	A-3
Discharge 22.775 m³/h	

	Discharge [m³/h]	Water level below datum [m]	Drawdown [m]
1	9.000	6.200	1.830
2	18.000	10.700	6.330
3	27.000	21.320	18.950
4	36.000	38.690	34.320

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 05.10.1998	A-4, Page 1
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-4 Step Drawdown	Test conducted on: 02.10.1998
A-4	
Discharge 36.689 m³/h	



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 05.10.1998	A-4, Page 2
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-4 Step Drawdown	Test conducted on: 02.10.1998
A-4	A-4
Discharge 36.689 m³/h	Distance from the pumping well 0.124 m
Static water level: 4.850 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]
1	0.00	4.850	0.000
2	1.00	5.540	0.690
3	2.00	5.550	0.700
4	3.00	5.340	0.490
5	4.00	5.520	0.670
6	5.00	5.520	0.670
7	6.00	5.590	0.740
8	7.00	5.520	0.670
9	8.00	5.820	0.970
10	9.00	5.720	0.870
11	10.00	5.530	0.680
12	12.00	5.640	0.790
13	14.00	5.400	0.550
14	16.00	5.720	0.870
15	18.00	5.700	0.850
16	20.00	5.650	0.800
17	25.00	5.750	0.900
18	30.00	5.730	0.880
19	35.00	5.670	0.820
20	40.00	6.110	1.260
21	45.00	5.710	0.860
22	50.00	5.440	0.590
23	55.00	5.670	0.820
24	60.00	5.730	0.880
25	70.00	5.770	0.920
26	80.00	5.650	0.800
27	90.00	5.590	0.740
28	100.00	5.860	1.010
29	110.00	5.830	0.980
30	120.00	5.830	0.980
31	121.00	7.500	2.650
32	122.00	7.560	2.710
33	123.00	7.520	2.670
34	124.00	7.460	2.610
35	125.00	7.420	2.570
36	126.00	7.510	2.660
37	127.00	7.520	2.670
38	128.00	7.510	2.660
39	129.00	7.450	2.600
40	130.00	7.580	2.730
41	132.00	8.070	3.220
42	134.00	8.240	3.390
43	136.00	8.050	3.200
44	138.00	7.970	3.120
45	140.00	7.960	3.110
46	145.00	8.050	3.200
47	150.00	8.010	3.160
48	155.00	7.990	3.140
49	160.00	7.980	3.130
50	165.00	7.970	3.120

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 05.10.1998	A-4, Page 3
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. A-4 Step Drawdown	Test conducted on: 02.10.1998
A-4	A-4
Discharge 36.689 m³/h	Distance from the pumping well 0.124 m
Static water level: 4.850 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
51	170.00	7.980	3.130	
52	175.00	8.000	3.150	
53	180.00	8.000	3.150	
54	190.00	8.000	3.150	
55	200.00	8.000	3.150	
56	210.00	8.000	3.150	
57	220.00	8.000	3.150	
58	230.00	7.750	2.900	
59	240.00	7.750	2.900	
60	241.00	10.400	5.550	
61	242.00	10.420	5.570	
62	243.00	10.400	5.550	
63	244.00	10.400	5.550	
64	245.00	10.400	5.550	
65	246.00	10.400	5.550	
66	247.00	10.420	5.570	
67	248.00	10.440	5.590	
68	249.00	10.470	5.620	
69	250.00	10.520	5.670	
70	252.00	10.560	5.710	
71	254.00	10.560	5.710	
72	256.00	10.570	5.720	
73	258.00	10.610	5.760	
74	260.00	10.610	5.760	
75	265.00	10.590	5.740	
76	270.00	10.600	5.750	
77	275.00	10.680	5.830	
78	280.00	10.690	5.840	
79	285.00	10.680	5.830	
80	290.00	10.690	5.840	
81	295.00	10.720	5.870	
82	300.00	10.720	5.870	
83	310.00	10.770	5.920	
84	320.00	10.860	6.010	
85	330.00	10.800	5.950	
86	340.00	10.800	5.950	
87	350.00	10.820	5.970	
88	360.00	10.840	5.990	
89	361.00	13.000	8.150	
90	362.00	13.230	8.380	
91	363.00	13.400	8.550	
92	364.00	13.520	8.670	
93	365.00	13.620	8.770	
94	366.00	13.730	8.880	
95	367.00	13.800	8.950	
96	368.00	13.860	9.010	
97	369.00	13.910	9.060	
98	370.00	13.900	9.050	
99	372.00	13.910	9.060	
100	374.00	13.910	9.060	

Waterloo Hydrogeologic
180 Columbia St. W.
Waterloo,Ontario,Canada
ph.(519)746-1798

Pumping test analysis
Time-Drawdown plot
with discharge

Project: JICA STUDY FOR ALTAI CITY

Evaluated by: PCI

Pumping Test No. A-4 Step Drawdown

Test conducted on: 02.10.1998

A-4

A-4

Discharge 36.689 m³/h

Distance from the pumping well 0.124 m

Static water level: 4.850 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]
101	376.00	13.950	9.100
102	378.00	13.980	9.130
103	380.00	14.000	9.150
104	385.00	14.050	9.200
105	390.00	14.050	9.200
106	395.00	14.100	9.250
107	400.00	14.140	9.290
108	405.00	14.200	9.350
109	410.00	14.280	9.430
110	415.00	14.290	9.440
111	420.00	14.300	9.450
112	430.00	14.370	9.520
113	440.00	14.410	9.560
114	450.00	14.440	9.590
115	460.00	14.460	9.610
116	470.00	14.530	9.680
117	480.00	14.530	9.680
118	481.00	8.800	3.950
119	482.00	6.840	1.990
120	483.00	6.460	1.610
121	484.00	6.330	1.480
122	485.00	6.280	1.430
123	486.00	6.230	1.380
124	487.00	6.150	1.300
125	488.00	6.130	1.280
126	489.00	6.100	1.250
127	490.00	6.050	1.200
128	492.00	6.000	1.150
129	494.00	5.950	1.100
130	496.00	5.940	1.090
131	498.00	5.920	1.070
132	500.00	5.900	1.050
133	505.00	5.840	0.990
134	510.00	5.760	0.910
135	515.00	5.710	0.860
136	520.00	5.690	0.840
137	525.00	5.680	0.830
138	530.00	5.670	0.820
139	535.00	5.630	0.780
140	540.00	5.600	0.750
141	550.00	5.580	0.730
142	560.00	5.530	0.680
143	570.00	5.510	0.660
144	580.00	5.490	0.640
145	590.00	5.480	0.630
146	600.00	5.470	0.620
147	1440.00	5.000	0.150

Waterloo Hydrogeologic
180 Columbia St. W.
Waterloo,Ontario,Canada
ph.(519)746-1798

Pumping test analysis
Time-Drawdown plot
with discharge

Date: 05.10.1998 | A-4, Page 5

Project: JICA STUDY FOR ALTAI CITY

Evaluated by: PCI

Pumping Test No. A-4 Step Drawdown

Test conducted on: 02.10.1998

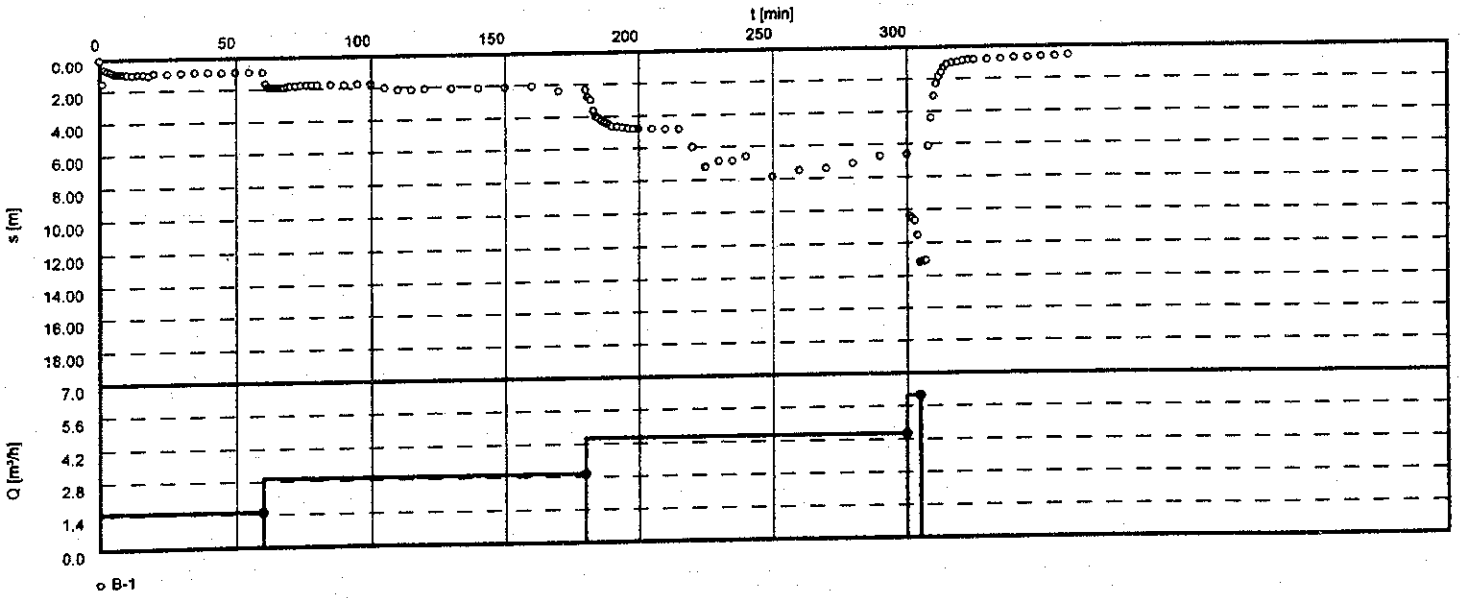
A-4

A-4

Discharge 36.689 m³/h

	Pumping test duration [min]	Discharge [m³/h]
1	120.00	11.910
2	240.00	30.126
3	360.00	44.658
4	480.00	60.060

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 18.09.1998	B-1 Step Drawdown, Page 1
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	
Pumping Test No. B-1		Test conducted on: 16.Sep.1998	
B-1			
Discharge 3.288 m³/h			



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 18.09.1998	B-1 Step Drawdown, Page 2
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. B-1	Test conducted on: 16.Sep.1998
B-1	B-1
Discharge 3.298 m³/h	

	Pumping test duration [min]	Discharge [m³/h]
1	60.00	1.500
2	180.00	2.940
3	300.00	4.440
4	305.00	6.060

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 18.09.1998	B-1 Step Drawdown, Page 3
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. B-1	Test conducted on: 16.Sep.1998
B-1	B-1
Discharge 3.298 m³/h	Distance from the pumping well 0.077 m

Static water level: 20.700 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]
1	0.00	20.740	0.040
2	1.00	22.220	1.520
3	2.00	21.360	0.660
4	3.00	21.450	0.750
5	4.00	21.500	0.800
6	5.00	21.600	0.900
7	6.00	21.670	0.970
8	7.00	21.680	0.980
9	8.00	21.670	0.970
10	9.00	21.680	0.980
11	10.00	21.700	1.000
12	12.00	21.730	1.030
13	14.00	21.700	1.000
14	16.00	21.700	1.000
15	18.00	21.770	1.070
16	20.00	21.630	0.930
17	25.00	21.660	0.960
18	30.00	21.630	0.930
19	35.00	21.600	0.900
20	40.00	21.600	0.900
21	45.00	21.630	0.930
22	50.00	21.610	0.910
23	55.00	21.610	0.910
24	60.00	21.630	0.930
25	61.00	22.370	1.670
26	62.00	22.590	1.890
27	63.00	22.600	1.900
28	64.00	22.610	1.910
29	65.00	22.610	1.910
30	66.00	22.610	1.910
31	67.00	22.610	1.910
32	68.00	22.610	1.910
33	69.00	22.570	1.870
34	70.00	22.530	1.830
35	72.00	22.510	1.810
36	74.00	22.490	1.790
37	76.00	22.470	1.770
38	78.00	22.460	1.760
39	80.00	22.460	1.760
40	85.00	22.470	1.770
41	90.00	22.490	1.790
42	95.00	22.450	1.750
43	100.00	22.460	1.760
44	105.00	22.700	2.000
45	110.00	22.840	2.140
46	115.00	22.860	2.160
47	120.00	22.800	2.100
48	130.00	22.800	2.100
49	140.00	22.820	2.120
50	150.00	22.800	2.100

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 18.09.1998	B-1 Step Drawdown, Page 4
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. B-1	Test conducted on: 16.Sep.1998
B-1	B-1
Discharge 3.298 m³/h	Distance from the pumping well 0.077 m

Static water level: 20.700 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
51	160.00	22.770	2.070	
52	170.00	23.090	2.390	
53	180.00	23.020	2.320	
54	181.00	23.480	2.780	
55	182.00	23.670	2.970	
56	183.00	24.330	3.630	
57	184.00	24.690	3.990	
58	185.00	24.770	4.070	
59	186.00	24.920	4.220	
60	187.00	25.040	4.340	
61	188.00	25.100	4.400	
62	189.00	25.200	4.500	
63	190.00	25.320	4.620	
64	192.00	25.340	4.640	
65	194.00	25.410	4.710	
66	196.00	25.450	4.750	
67	198.00	25.480	4.780	
68	200.00	25.480	4.780	
69	205.00	25.510	4.810	
70	210.00	25.540	4.840	
71	215.00	25.560	4.860	
72	220.00	26.670	5.970	
73	225.00	27.900	7.200	
74	230.00	27.540	6.840	
75	235.00	27.540	6.840	
76	240.00	27.290	6.590	
77	250.00	28.550	7.850	
78	260.00	28.190	7.490	
79	270.00	28.080	7.380	
80	280.00	27.820	7.120	
81	290.00	27.390	6.690	
82	300.00	27.300	6.600	
83	301.00	31.080	10.380	
84	302.00	31.210	10.510	
85	303.00	31.370	10.670	
86	304.00	32.230	11.530	
87	305.00	33.840	13.140	
88	306.00	33.790	13.090	
89	307.00	33.740	13.040	
90	308.00	26.830	6.130	
91	309.00	25.090	4.390	
92	310.00	23.750	3.050	
93	311.00	23.000	2.300	
94	312.00	22.570	1.870	
95	313.00	22.300	1.600	
96	314.00	21.980	1.280	
97	315.00	21.780	1.080	
98	317.00	21.700	1.000	
99	319.00	21.650	0.950	
100	321.00	21.560	0.860	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 18.09.1998	B-1 Step Drawdown, Page 5
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

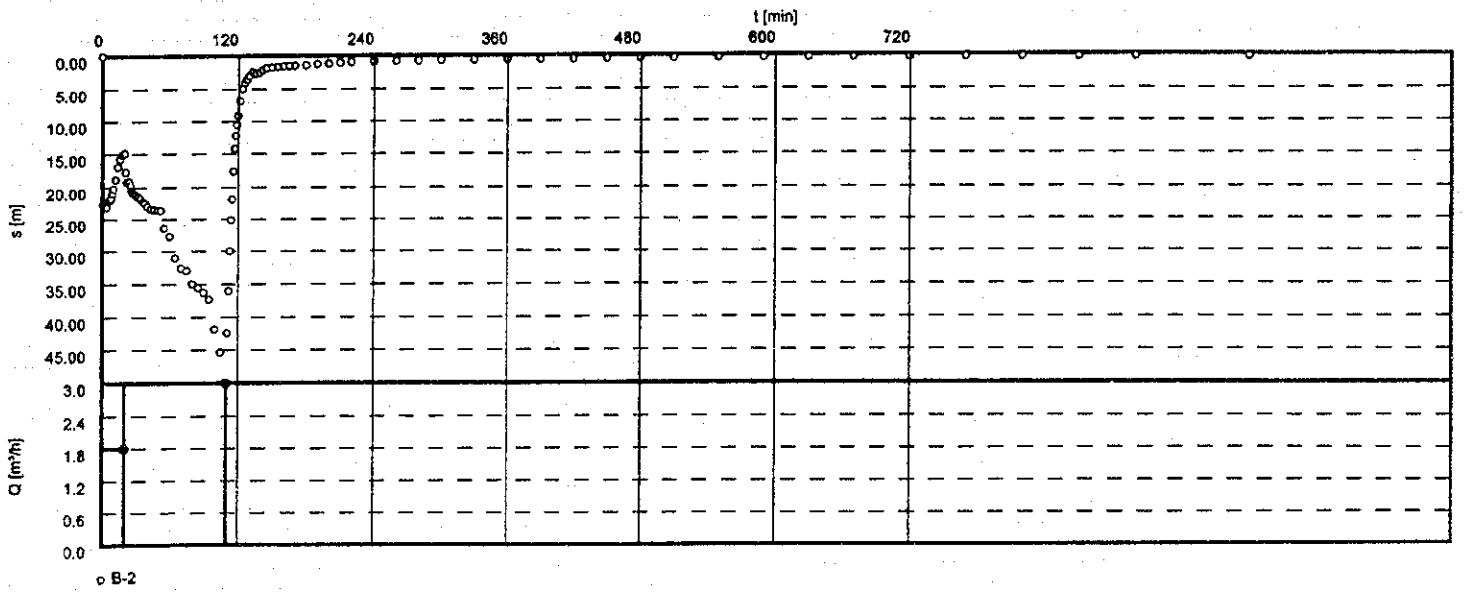
Pumping Test No. B-1	Test conducted on: 16.Sep.1998
B-1	B-1
Discharge 3.298 m³/h	Distance from the pumping well 0.077 m

Static water level: 20.700 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
101	323.00	21.520	0.820	
102	325.00	21.510	0.810	
103	330.00	21.500	0.800	
104	335.00	21.460	0.760	
105	340.00	21.400	0.700	
106	345.00	21.380	0.680	
107	350.00	21.350	0.650	
108	355.00	21.320	0.620	
109	360.00	21.260	0.560	

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	B-2 Step Drawdown, Page 1
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. B-2 Step Drawdown	Test conducted on: 13 Aug. 1998
B-2	
Discharge 2.782 m³/h	



Waterloo Hydrogeologic 160 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	B-2 Step Drawdown, Page 2
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. B-2 Step Drawdown	Test conducted on: 13 Aug. 1998
B-2	B-2
Discharge 2.782 m³/h	

	Pumping test duration [min]	Discharge [m³/h]		
1	20.00	1.800		
2	110.00	3.000		

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 27.08.1998	B-2 Step Drawdown, Page 3
		Project: JICA STUDY FOR ALTAI CITY	
		Evaluated by: PCI	

Pumping Test No. B-2 Step Drawdown	Test conducted on: 13 Aug. 1998
B-2	B-2
Discharge 2.782 m³/h	Distance from the pumping well 0.077 m
Static water level: 12.030 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]
1	0.00	12.030	0.000
2	1.00	34.840	22.810
3	2.00	34.790	22.760
4	3.00	34.960	22.930
5	4.00	35.120	23.090
6	5.00	34.220	22.190
7	6.00	34.070	22.040
8	7.00	34.000	21.970
9	8.00	33.680	21.650
10	9.00	32.960	20.930
11	10.00	32.200	20.170
12	12.00	30.800	18.770
13	14.00	28.940	16.910
14	16.00	27.790	15.760
15	18.00	27.100	15.070
16	20.00	26.880	14.850
17	21.00	29.670	17.640
18	22.00	31.160	19.130
19	23.00	31.160	19.130
20	24.00	31.150	19.120
21	25.00	31.640	19.610
22	26.00	32.550	20.520
23	27.00	32.860	20.830
24	28.00	32.980	20.950
25	29.00	33.090	21.060
26	30.00	33.270	21.240
27	32.00	33.550	21.520
28	34.00	33.840	21.810
29	36.00	34.280	22.250
30	38.00	34.510	22.480
31	40.00	35.000	22.970
32	43.00	35.420	23.390
33	46.00	35.530	23.500
34	49.00	35.580	23.550
35	52.00	35.630	23.600
36	55.00	38.400	26.370
37	60.00	39.720	27.690
38	65.00	43.080	31.050
39	70.00	44.680	32.650
40	75.00	45.010	32.980
41	80.00	46.990	34.960
42	85.00	47.600	35.570
43	90.00	48.340	36.310
44	95.00	49.350	37.320
45	100.00	53.820	41.790
46	105.00	57.380	45.350
47	110.00	61.860	49.830
48	111.00	54.400	42.370
49	112.00	48.070	36.040
50	113.00	42.040	30.010