ORKUSTOFNUN

NATIONAL ENERGY AUTHORITY

PRELIMINARY REPORT

SELECTION OF SITES FOR GROUND-WATER EXPLOITATION IN SOUTHWESTERN ICELAND

Guttormur Sigbjarnarson

OS82039/VOD23 B

April 1982

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NATIONAL ENERGY AUTHORITY
GRENSÁSVEGUR 9,
108 REYKJAVÍK ICELAND

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CONTENT

INTRODUCTION

This preliminary report was prepared by the National Energy Authority of Iceland (Orkustofnun) for Rolf Johansen & Company at the request of Mr. Ágúst Ágústsson consulting engineer. The Autority was requested to select possible sites in the southwestern corner of Iceland for ground-water exploitation, for a fresh-water plant with a capacity of at least 10-100 l/s.

For this purpose 13 places believed to be most promising were chosen. Of course, there are other localities where there are possibilities for exploiting ground water of the above quantity, but were excluded for some reason. Some of the localities selected may be excluded for some reasons yet unknown.

Only a few chemical analyses of ground water from the chosen localities have been made, as can be seen in tables I and II. Sampling of water for comparison of the different places is therefore recommended.

In most cases drilling is needed for ground-water exploitation, but in a few cases well construction could be possible at the spring site.

Following is a brief description of each of the chosen localities, where we have tried to collect our present knowledge of the most important aspects at each place on a standardized form, but there are many gaps. At the end of descriptions there are two tables, I and II, which present all the chemical analyses made in our own laboratory, but in a few cases a few other chemical analyses are available. The tables are followed by a map showing a rough location of the 13 places, marked with the same number as on the description sheet for each of them.

NAME OF THE LOCALITY | NO ON THE MAP

Heidmörk | 1

TYPE OF AQUIFER AND GEOLOGICAL SETTING

The main springs at Gvendarbrunnar, Silungapollur and Jadar are located on the contact between two postglacial lavas, whereof the lower one, along Hólmsá, is almost saturated with ground water. SW-NE running fault zone is also present at the main springs. The sublayers of the higher ones of the lavas in Heidmörk area are in interglacial gray basalts of shield volcanoes and palagonite ridges with some fluvial sediment layers. The westernmost springs at Myllulækur issue from the tectonic zone in the grey basalt lava layers.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

The average discharge of Elliðaá basin is 5,39 m^3/s whereof 1,5-2,5 m^3/s can be estimated to come from Heidmörk area.

EXPECTED TYPE OF WELLS

Drill holes

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

Reykjavík municipal water works exploit to-day on the average 800-900 l/s for its present use. Heidmörk is now a recreation area except a narrow protected area around the wells. No changes are expected.

ADMINESTRATIVE AND LEGAL ASPECTS

Reykjavík municipality is the owner of the whole area in question.

CHEMICAL ANALYSIS

See no 73-007 in Table I. Some more chemical analyses will be avialable from Reykjavík municipial water works.

PROPOSED WATER SAMPLING FOR COMPARISON

Sampling must be made in collaboration with Reykjavík municipial water works.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

See below.
Serial water sampling.

OTHER REMARKS

An extensive research work of the Elliðaá basin is now in progress under the leadership of Reykjavík water works commitee. Preliminary report issued in Desember 1981.

NAME OF THE LOCALITY | NO ON THE MAP

Lækjabotnar and Nátthagavatn | 2

TYPE OF AQUIFER AND GEOLOGICAL SETTING

Spring at the edge of an interglacial shield volcanoe lava field rasting on some older palagonite and sedimentary leyers, which make an escarpment in the landscape. Usually the springs form a horizon downslope of the escarpment but during high groundwater conditions there is some overland-flow above the escarpment. Therefore the springs are unusually unstable in discharge in comparision with other springs. Located in tectonic zone with little or no resent activity.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

50-400 l/s.

EXPECTED TYPE OF WELLS

Wells or drill holes at the base of the escarpment.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

The main road from Reykjavík to Southern Iceland is located close to the southernmost springs. The present use of this area is some farming activity with a few summer houses and recreation. As far as we know no other activities are planned there in the near future.

ADMINESTRATIVE AND LEGAL ASPECTS

Mosfellshreppur in Gullbringu- og Kjósarsýsla.
Most likely private properties.

CHEMICAL ANALYSIS

Table II shows series of chemical ananyses from the very same spring at Lögberg. See other remarks.

PROPOSED WATER SAMPLING FOR COMPARISON

1 or 3 samples from lower located springs for chemical analysis.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

If this place should be selected it would be necessary to perform 3-5 days field studies of the area for selecting springs for sampling for serial analyses.

OTHER REMARKS

The location of the spring for chemical analysis reflects more the change of the chemical components in the uppermost leyer of the aquifer than in it as whole. This spring can therefore not be quite representative for the aquifer as a whole.

NAME OF THE LOCALITY
Kaldársel

NO ON THE MAP
3

TYPE OF AQUIFER AND GEOLOGICAL SETTING
The main springs are located at tectonic fissures crossing low hills of pillow-lava breccia in the palagonite formation. The hills are surrounded by postglacial lavas, but the pillow-lava breccia with the tectonic fissures is most likely the main aquifer.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN
The surface outflow is highly dependent on the ground water conditions and it is disturbed by present dam of Hafnarfjördur water work. It has been measured 1,26 m^3/s.

EXPECTED TYPE OF WELLS
Drill holes or wells.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT
Hafnarfjördur municipal water works operate its plant with 100-200 l/s. The Kaldársel area is protected for water supply, but is also a recreation area.

ADMINESTRATIVE AND LEGAL ASPECTS
Hafnarfjördur town is the owner of the water right and most likely of the area itself.

CHEMICAL ANALYSIS
See table I Kaldársel spring. The Kaldársel drill hole in table I is of no interest.

PROPOSED WATER SAMPLING FOR COMPARISON
Hafnarfjördur city has likely more chemical analysis of the water in the springs. Otherwise 1-2 sample should be enougt for comparison.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

No special field studies but serial water sampling in collaboration with Hafnarfjördur municipial water works.

OTHER REMARKS

NAME OF THE LOCALITY
Straumur

NO ON THE MAP
4

TYPE OF AQUIFER AND GEOLOGICAL SETTING

The area is covered with postglacial lavas reaching below the present sea level. The underlying sublayers are assuminqly of the palagonite formation but possibly gray basalt of shield volcano type.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

About 5 m^3/s.

EXPECTED TYPE OF WELLS

Drill holes

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

The aluminium plant of Straumsvík is in the neighbourhood, and the lava fields south of the main road to Keflavík are planned to be an industrial area such as iron smelting plant.

ADMINESTRATIVE AND LEGAL ASPECTS

Hafnarfjördur. The ownership of the area is complicated. It is partly private property , but other parts are owned by Hafnarfjördur town and Icelandic soil conservation service.

CHEMICAL ANALYSIS

Sample 78-0001 and 77-103 in table I. Some more chemical analysis are avialable at Orkustofnun.

PROPOSED WATER SAMPLING FOR COMPARISON

Satisfactory.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

More studies are needed especially conserning the flow direction of the ground water stream. Serial sampling for analysis.

OTHER REMARKS

A preliminery study of the drainage area was done 1975, including the outlet zone at Straumur.

NAME OF THE LOCALITY
Vatnsleysuvík

NO ON THE MAP
5

TYPE OF AQUIFER AND GEOLOGICAL SETTING

A boarder of two postglacial lavas at the coast with an active tectonic fissure swarm in the older one. The springs are almost only at the shoreline.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

Can be estimated more than 1/2 m^3/s.

EXPECTED TYPE OF WELLS

Drill holes

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

At the present time only the coastal strip is used for summer houses. No further uses are planned as far as we know.

ADMINESTRATIVE AND LEGAL ASPECTS

Vatnsleysustrandarhreppur, Gullbringu- og Kjósarsýsla.
Most likely private properties.

CHEMICAL ANALYSIS

None

PROPOSED WATER SAMPLING FOR COMPARISON

One day field work of hydrogeological studies for selecting a few localities for sampling.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

A few days field work with some geoelectricial sounding and ground water tracing to select the place for drilling and serial sampling.

OTHER REMARKS

No information available on this part.

NAME OF THE LOCALITY
Vogavík

NO ON THE MAP
6

TYPE OF AQUIFER AND GEOLOGICAL SETTING

The springs are only at the shøreline in a postglacial lava field of a shield volcano Vogastapi. Very active tectonic fissure swarm cuts both the older lava and the younger one.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

At least 1 m^3/s.

EXPECTED TYPE OF WELLS

Drill holes.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

The main road between Keflavík and Reykjavík crosses the area. A fish hatcing company has got a permission for constructing a large hatchery there, which is now in a reserch and design stage. Other planned activety not known.

ADMINESTRATIVE AND LEGAL ASPECTS

Vantsleysustrandarhreppur. Gullbringu- og Kjósarsýsla.
Most likely owned by the parish (country).

CHEMICAL ANALYSIS

77-0240 and other chemical analyses marked Snorrastaðatjarnir spring in Table I represent possibly the main aquifer.

PROPOSED WATER SAMPLING FOR COMPARISON

Samples from the new research drill holes.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

A few days field work with some geoelectrical sounding may be necessary before serial sampling (if not performed by other agency working there now).

OTHER REMARKS

The chemical analysis 78-0149 and 78-0024 in Table I are not representative for the main aquifer but for another one. The sample 73-0025 Vogar drill-hole is clearly contaminated by intrusion of oceanic water.

NAME OF THE LOCALITY
Hlídarvatn, Selvogur

NO ON THE MAP
7

TYPE OF AQUIFER AND GEOLOGICAL SETTING

Very little is known of the geology of th Selvogur area. The bedrock around Hlídarvatn consists of postglacial avas and palagonite formation with some grey basalts. Tectonic fissure swarm is most likely present in this area.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN
1-2 m^3/s.

EXPECTED TYPE OF WELLS
Wells or drill holes.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT
Unihabited area only with minor domestic grazing.

ADMINESTRATIVE AND LEGAL ASPECTS

Selvogshreppur, Árnessýsla.
Ownership unknown.

CHEMICAL ANALYSIS
None

PROPOSED WATER SAMPLING FOR COMPARISON

One day field work for selecting 2-3 springs for sampling.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

Several days field work in geological reconnaissance and for geohydrological studies.

OTHER REMARKS

NAME OF THE LOCALITY	NO ON THE MAP
Thorlákshöfn	8

TYPE OF AQUIFER AND GEOLOGICAL SETTING

Thorlákshöfn municipial water work is located on a postglacial lava to the west of the town. A lava pile of shield volcano origin reaches below the present sea level. Most likely there are similar conditions for a long distance in the direction of Selvogur.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

A drill hole at Thorlákshöfn water work has been tested to give 500 l/s with 0,9 m drowdown. At least some hundred liters per second are flowing through the lava.

EXPECTED TYPE OF WELLS

Drill holes.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

No activities are on the lavas but the Thorlákshöfn town is growing westwards. The main planning of the district must therefore be taken in account.

ADMINESTRATIVE AND LEGAL ASPECTS

Ölfushreppur, Árnessýsla.
Most likely owned by the commune.

CHEMICAL ANALYSIS

Sample no 75-0048 and 75-0044 in Table I.

PROPOSED WATER SAMPLING FOR COMPARISON

From the drill hole if it is needed.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

A few days field work. Geoelectrical sounding would be preferable for the site of a new drillhole. Serial sampling for analysis.

OTHER REMARKS

NAME OF THE LOCALITY
Hraun, Ölfus

NO ON THE MAP
9

TYPE OF AQUIFER AND GEOLOGICAL SETTING

Springs at lava edge resting on much older bedrock of palagonite formation and gray basalts and some unconsolidated sediment layers of sand and silt. Very little is known about the geological conditions.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

About 30-80 l/s.

EXPECTED TYPE OF WELLS

Wells or drill holes.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

Farming area and it is expected to be so.

ADMINESTRATIVE AND LEGAL ASPECTS

Ölfushreppur, Árnessýsla
Private property.

CHEMICAL ANALYSIS

None

PROPOSED WATER SAMPLING FOR COMPARISON

One day field work for selecting springs for sampling and discharge measurements.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

A few days for reconnaisance and hydrological field studies for selecting a site for serial sampling and discharge measurements.

OTHER REMARKS

NAME OF THE LOCALITY | NO ON THE MAP

Hjalli, Ölfus | 10

TYPE OF AQUIFER AND GEOLOGICAL SETTING

The springs issue from stratifeild gray basalts with some sedimentary fied layers. Very little is known about the local geological conditions.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

30-60 l/s.

EXPECTED TYPE OF WELLS

Wells or drill holes.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

Farming area and it is expected to be so.

ADMINESTRATIVE AND LEGAL ASPECTS

Ölfushreppur, Árnessýsla.
Most likely private property.

CHEMICAL ANALYSIS

None

PROPOSED WATER SAMPLING FOR COMPARISON

One day field work for selecting springs for sampling.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

A few days for hydrogeological field studies and selecting a site for serial sampling and discharge measurements.

OTHER REMARKS

NAME OF THE LOCALITY | NO ON THE MAP

Fjallstún, Ingólfsfjall | 11

TYPE OF AQUIFER AND GEOLOGICAL SETTING

Palagonite formation consisting of pillow lava and breccia.
The springs are in connection with faulting.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

More than 30-50 l/s..

EXPECTED TYPE OF WELLS

Wells

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

Fish-hatchery at the springs. Otherwise only domestic grazing.

ADMINESTRATIVE AND LEGAL ASPECTS

Ölfushreppur, Árnessýsla.
Private property.

CHEMICAL ANALYSIS

Comparable with Selfoss.

PROPOSED WATER SAMPLING FOR COMPARISON

A sample from the main spring.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

Discharge measurements and serial sampling.

OTHER REMARKS

NAME OF THE LOCALITY
Miðmundahóll, Ingólfsfjall

NO ON THE MAP
12

TYPE OF AQUIFER AND GEOLOGICAL SETTING

Palagonite formation consisting of pillow lava and breccia.
The springs are most likely in connection with faulting.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

About 50 l/s.

EXPECTED TYPE OF WELLS
Wells

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

Only domestic grazing.

ADMINESTRATIVE AND LEGAL ASPECTS

Ölfushreppur, Árnessýsla.
Owned by Árnessýsla and "Landvernd" society.

CHEMICAL ANALYSIS
None

PROPOSED WATER SAMPLING FOR COMPARISON

A sample from the main spring.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

Field reconnaisance, discharge measurement and serial sampling.

OTHER REMARKS

NAME OF THE LOCALITY
Thingvallavatn area

NO ON THE MAP
13

TYPE OF AQUIFER AND GEOLOGICAL SETTING

The postglacial lava fields on the east and the north coast of Lake Thingvallavatn issue an enormous amount of ground-water to the lake, especially along the recent fault zone. At the SE corner of the Lake there are very large springs in the former channel of river Sog. At Kaldárhöfði is also some springs issuing from faults in grey basalts and palagonite formation.

ROUGH ESTIMATE OF THE OUTFLOW OF THE WATER BASIN

The groundwater inflow in Lake Thingvallavatn amounts 70-80 m^3/s.

EXPECTED TYPE OF WELLS

Wells or drill holes.

PRESENT USE AND EXPECTED INDUSTRIAL DEVELOPMENT

The present use is mostly recreation activities, and summer houses and some domestic grazing.

ADMINESTRATIVE AND LEGAL ASPECTS

Thingvallahreppur, Árnessýsla.
Many owners, both private and official.

CHEMICAL ANALYSIS
None

PROPOSED WATER SAMPLING FOR COMPARISON

One day for selecting places for sampling.

PROPOSED WATER SAMPLING AND FIELD STUDIES IF PLACE IS SELECTED

A few days field work for selecting localities for serial sampling.

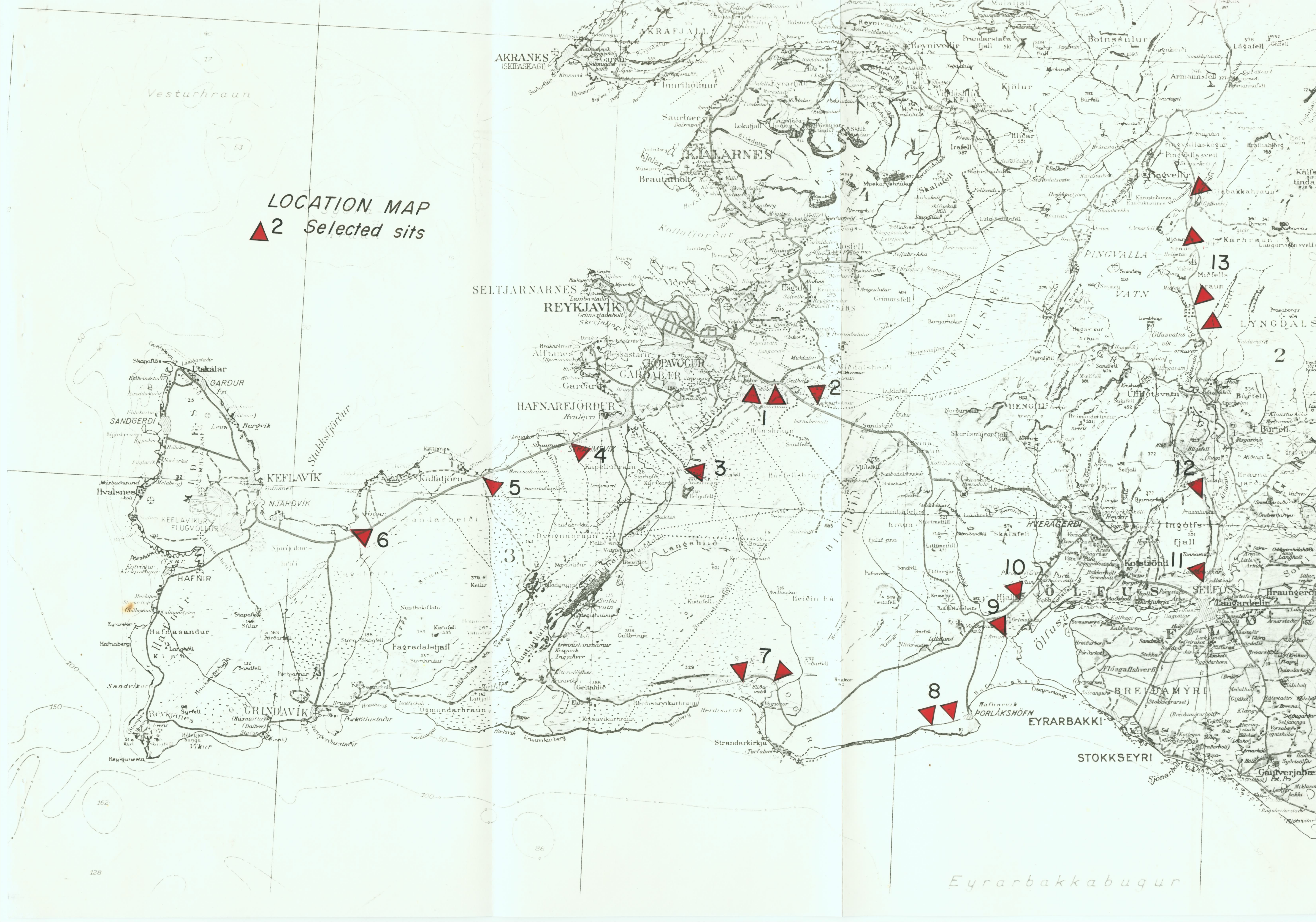
OTHER REMARKS

TABLE I Some chemical analyses from the selected localities or their neighbourhoud.

	Name of locality	pH	CO_2	SiO_2	Resistiv.	SO_4	Cl	Na	K	Ca	Mg	F	Diss.sol.	°C	date
78-0149	Vogastapi drillhole	7.4/20	56.8							13.8					
78-0024	- " - - " -	7.2/22		19.4	47.4/25		39.4	20.6		7.0					14/3'78
78-0025	Vogar drillhole	7.27/25	20.2	16.2	14.1/?	29.6	210	94.4	3.8	23.0	18.7	0.05	454.5	5.4	/9'73
78-0001	Gvendarbr.Straumi spring	8.68/23			102/25									4.1	3/1'78
77-0103	- " - - " -	8.6/?	27.9	15	127/?	4.1	11.0	9.8	0.78	5.1	2.3				/6'77
78-0007	Gvendarbrunnar spr.	8.42/21	26	22	112/?	6.6	7.4	11.5	0.4	4.6	1.0	<0.1	67.1		10/7'73
77-0240	Snorrastaðatjarnir spring	7.25/20	6.7	8.3	43.1/25	9.4	52.7	26.6	1.32	5.3	4.8			7.2	20/10'77
77-0238	- " - - " -				44.8/25		52.8		1.3	3.1					7/10'77
77-0023	- " - - " -			6.6	68/?										10/3'77
77-0008	- " - - " -	6.69/22	38.7	11.0	30/?		94								5/2'77
75-0014	- " - - " -	6.8/20	17	6.7	55.6/?			21.5	1.2	5.1	4.1		105.7	0.1	15/2'75
76-0109	Selfoss spring	7.44/?		8.1	111/?	4.3	9.3	10.1	0.32	5.2	0.7			3.8	16/8'76
75-0048	Þorláksh. drillhole						13							5.6	2/7'75
75-0044	- " - - " -	8.59/22	18.9	17.9	100/?			10.1	0.7	4.5	2.6	0.222	79	5.6	1/7'75
	Kaldársel drillh. 3	8.1/?		12	84.5/?	5.2	9.3			3.6	1.5	0.1	54	3.5	/10
	- " - spring	8.29/20	24.2	10.8	11.8/?	10.8	8.9	8.4	0.6	6.2	2.6	0.05	60	3.0	6/11'73

TABLE II Chemical analyses of Lækjarbotnar spring.

	Name of locality	pH	CO_2	SiO_2	Resistiv.	SO_4	Cl	Na	K	Ca	Mg	F	Diss.sol.	°C	date
81-0019	Lækjabotnar spring			12.7	125/22.5	2.91	6.9	7.89	0.51	4.26	1.22	0.037	52.4	3.7	6/8'81
81-0018	- " - -"-	7.62/24	13	12.3	127/23		9.25	15.3	0.48	0.15	1.41	0.022	88.5	3.6	7/7'81
81-0013	- " - -"-	7.68/24	10.2	12.1	128/22.9	2.6	14.5	8.4	0.49	4.4	1.41	0.022	77.1	3.5	2/6'81
81-0010	- " - -"-	7.50/23	14.1	11.8	128/23	2.7	14.5	7.2	0.49	4.2	1.40	0.023	88.7	3.6	5/5'81
81-0006	- " - -"-	7.40/23	12.3	11.8	122/23	2.6	15.4	8.6	0.49	4.4	1.40	0.023	87.9	3.6	3/5'81
81-0003	- " - -"-	7.35/18	14	11.7	127/23	2.4	12.0	8.7	0.49	4.2	1.31	0.023	85.4	3.4	6/2'81
81-0001	- " - -"-	7.50/23	12	11.8	132/23	2.3	11.4	8.7	0.49	4.1	1.31	0.024		3.4	6/1'81
80-0040	- " - -"-	7.60/22	11.4	12.3	127/22.9		11.4	8.6	0.53	3.3	1.19	0.030	51.2	3.6	3/12'80
80-0037	- " - -"-	7.6/22	13.2	11.8	132/23	2.3	11.4	8.2	0.50	3.3	1.24	0.030	34.6	3.6	1/10'80
80-0032	- " - -"-	7.6/23	12	10.6	133/22.6	2.4	11.4	7.7	0.47	3.5	1.21	0.025	20.7	3.6	1/8'80
80-0025	- " - -"-	7.8/19.5	15	10.7	117/21	2.6	9.2	7.2	0.47	4.2	1.28	0.037	59.0	3.8	3/7'80
80-0022	- " - -"-	7.9/22	15.4	11.0	142/21	2.8	7.4	7.2	0.48	4.5	1.31	0.037	56.7	3.6	4/6'80
80-0014	- " - -"-	7.73/25	15.4	11.8	166/21	2.7	9.7	7.0	0.46	4.7	1.35	0.037	51.0	3.6	6/5'80
80-0011	- " - -"-	7.80/23	15.4	12	125/22.5	2.8	7.8	7.8	0.47	4.2	1.20	0.040	52.6	3.7	1/4'80
80-0008	- " - -"-	7.85/24	17.1	12.6	125/22.5	2.8	11.8	7.9	0.52	4.0	1.26	0.037	64	3.7	5/3'80
80-0005	- " - -"-	7.45/22	12	12.1	133/22.5	2.76	7.9	8.0	0.43	4.2	1.17	0.040	75	3.5	8/2'80
80-0001	- " - -"-	7.48/18	9.7	12.5	117/22.5	3.0	8.4	8.1	0.45	4.0	1.27	0.040	46.2	3.6	3/1'80
79-0076	- " - -"-	7.6/18	21.6											3.6	2/11'79
79-0073	- " - -"-	7.8/21	14.1											3.7	28/9'79
79-0047	- " - -"-	7.52/20	12.8											3.7	1/8'79
79-0046	- " - -"-	7.7/23	14.5											3.6	8/5'79
79-0014	- " - -"-	7.6/20	11.9											3.6	2/3'79
79-0001	- " - -"-	7.2/20	12.3											3.6	8/1'79
78-0178	- " - -"-	7.12/17	11												3/10'78
78-0150	- " - -"-	7.76/24	11.5											3.8	4/12'78
78-0137	- " - -"-	7.25/20	10.1											3.6	3/11'78
78-0092	- " - -"-	7.58/24	10.3											3.7	3/8'78
78-0070	- " - -"-	7.54/20	8.14		129/									3.7	2/6'78
78-0058	- " - -"-	7.70/22			131/									3.8	3/5'78
78-0016	- " - -"-	6.53/24	12		133/25									3.6	7/3'78



LOCATION MAP
2 Selected sits
1
2
3
4
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6
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8
9
10
11
12
13
AKRANES
KJALARNES
SELTJARNARNES
REYKJAVÍK
KÓPAVOGUR
GARÐABÆR
HAFNARFJÖRÐUR
KEFLAVÍK
NJARÐVÍK
SANDGERÐI
GARÐUR
HAFNIR
GRINDAVÍK
HVERAGERÐI
SELFOSS
EYRARBAKKI
STOKKSEYRI
ÞORLÁKSHÖFN
Vesturhraun
Eyrarbakkabugur