~~SECRET~~ Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5
Copy No. 27

GEOGRAPHIC INTELLIGENCE MEMORANDUM

SPECIFIC GEOGRAPHIC DATA FOR THE NOVOSIBIRSK AREA

CIA/RR-G/I-238
November 1957

CENTRAL INTELLIGENCE AGENCY
OFFICE OF RESEARCH AND REPORTS

~~SECRET~~
Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

[redacted]

GEOGRAPHIC INTELLIGENCE MEMORANDUM

SPECIFIC GEOGRAPHIC DATA FOR THE NOVOSIBIRSK AREA

CIA/RR-G/I-238

November 1957

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

[redacted]

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Specific Geographic Data for the Novosibirsk Area

This report presents specific geographic data focused on a selected location in the Novosibirsk area about 10 kilometers (6 miles) north-northeast of the western railroad bridge across the Ob' River.

Administratively, this location is within the city limits of Novosibirsk. It lies about 175 meters (575 feet) above sea level on a gentle south slope at the head of a small valley. The stream, Pervaya Yel'tsovka, that drains this valley flows southwestward through the northern part of Novosibirsk and joins the Ob' 9 kilometers (5.6 miles) to the southwest. Paralleling this stream about 2 kilometers (1.2 miles) to the northwest is the Vtoraya Yel'tsovka. A second and larger stream, the Kamenka, parallels the Pervaya Yel'tsovka about 3 kilometers (1.9 miles) to the southeast.

Forests in the Novosibirsk area are predominantly pine and birch, with an intermixture of aspen in some places. The tree cover in the immediate vicinity of the selected location is probably sparse, becoming denser to both the east and the west.

Granitic bedrock extends northward from Novosibirsk for a distance of at least 20 kilometers (12.5 miles) in the sector between the Ob' River and the railroad line to Tayga. The granitic bedrock, however, may be interrupted by local deposits of Paleozoic shale and sandstone. On the Ob' flood plain immediately adjacent to the river, the bedrock may be overlain by as much as 100 meters (330 feet) of unconsolidated Quaternary deposits. Similar deposits may also be fairly thick on the valley floors of the tributaries of the Ob', but on the interfluves the sedimentary deposits probably cover the bedrock to a depth of only 1 to 5 meters (3 to 16 feet). In a few places the granite outcrops. (See map following.)

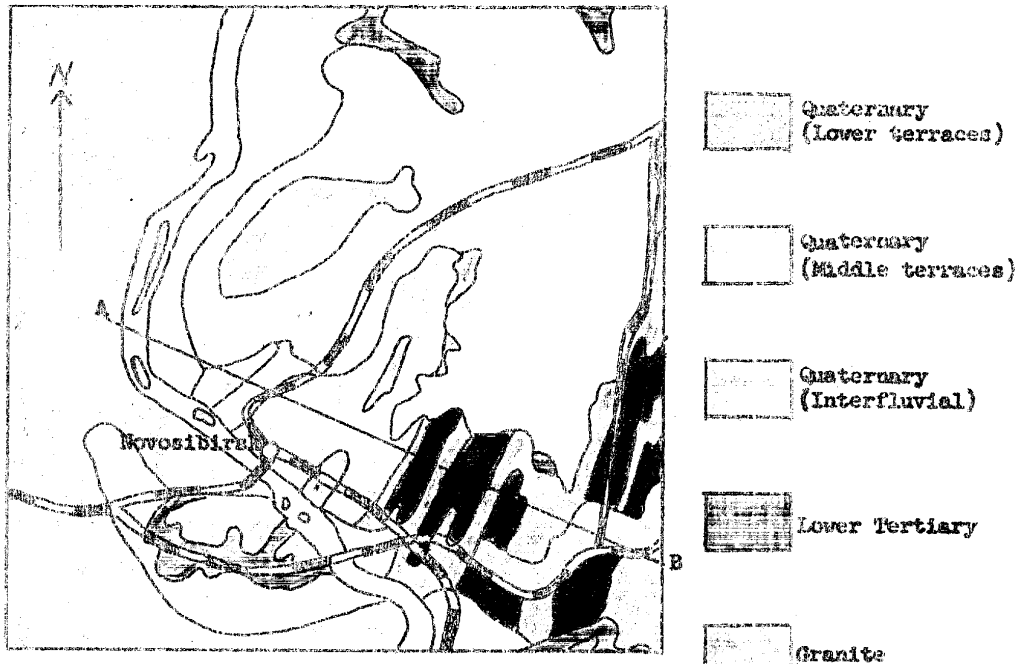
Where the Quaternary deposits are thick enough to be subdivided, gravelly deposits normally lie immediately on top of the granite and fill the depressions. Lying above the gravel are deposits of clay that becomes sandy clay near the top. The uppermost layer consists of about 1 meter of brown, sandy clay, and loess-like silt.

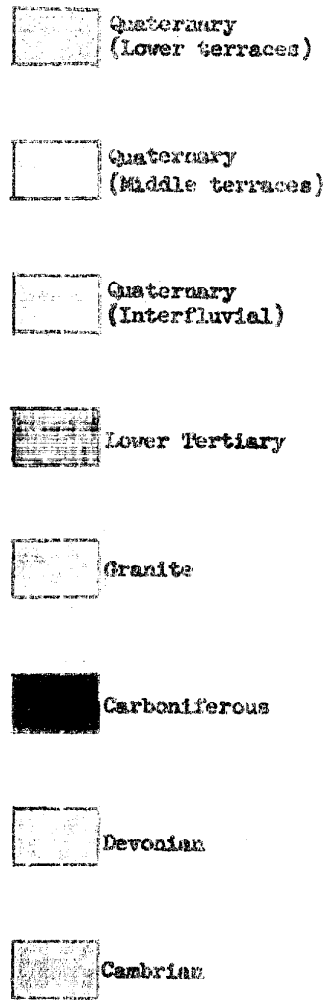
Throughout much of the spring, summer, and early autumn the soil in the Novosibirsk area is either ooze or sticky or in a state of plasticity. Thawing begins at the surface soon after the disappearance of the snow cover. The thaw may begin as early as the end of March but usually occurs

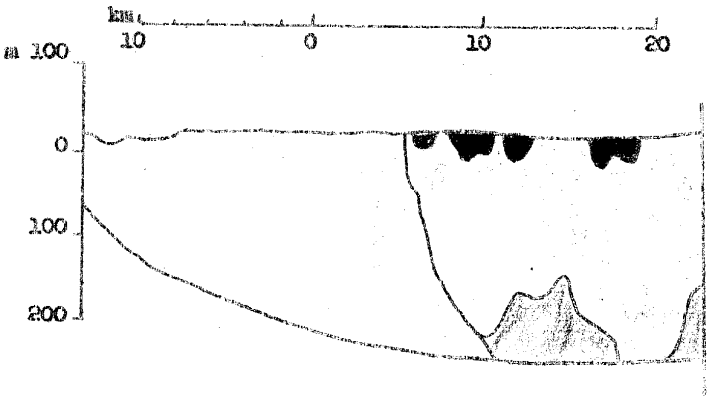
Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

GEOLOGY OF THE NOVOSIBIRSK AREA







Cross Section Along the Line A-B

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

between 10 and 20 April. In most years the deeper frozen levels do not thaw until June. About 2 weeks after the end of the spring thaw, the oozy or sticky soil dries out enough to develope a soft plastic consistency. The following tabulation shows the progressive changes in soil condition from May through September and gives the number of days per month on which soil conditions of a specific type can be expected.

Soil Condition	Duration by Days				
	May	Jun	Jul	Aug	Sep
Firm (dry)	0	3	6	6	1
Firm plastic	0	6	7	6	0
Soft plastic	22	19	15	15	26
Oozy or sticky	9	2	3	4	3

Freezing may begin as early as late October or as late as 20 November. It progresses gradually downward but does not reach its maximum depth, an average of about 150 centimeters (5 feet), until February or March. In particularly severe winters, freezing may reach a depth of nearly 2 meters (6.6 feet); in mild winters, it may extend no more than 125 centimeters (4.1 feet) into the soil.

The climate of the Novosibirsk area is extremely continental, characterized by long, severe winters and short, cool summers. Average monthly temperatures range from -19.3°C (-2.8°F) in January to 18.3°C (65°F) in July. The range between the temperature extremes is much greater, the lowest and highest recorded temperatures being -51°C (-59.8°F) and 35°C (95°F).

The average annual precipitation is low -- only 495 millimeters (about 16 inches). The amount of precipitation is greatest during summer, being heaviest in July and lightest during the winter and early spring, from January through April. Snow cover lasts for about 170 days, from mid-October to mid-April. The depth of the cover is greatest during the first half of March, when the average is 37 centimeters (1.2 feet).

Winds are generally light and may blow from any direction in summer. During the other seasons, however, winds are usually more severe and are prevailingly from the southeast, south, or southwest. Winds of gale force (in excess of 33 m.p.h.) are most common in December, which has an average of 4 days with gale.

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Detailed climatic data are presented in Table 1 (following p. 4) for three points in the vicinity of the selected location. The nearest point is the Novosibirsk Experimental Station (55°03'N-83°02'E), located 6 to 7 kilometers (4 miles) to the southeast. Climatic data are also available for the Novosibirsk Railroad Station (55°02'N-82°55'E) and at the suburb of Bugry (54°58'N-82°57'E), which are located about 8 kilometers (5 miles) southwest and 13 kilometers (8 miles) south-southwest, respectively. For most of the climatic factors the records used were 40 to 50 years in length. The record for wind velocity is shortest, only 15 years. Information on the occurrence of frost and freezing at the Novosibirsk Railroad Station and on the period of snow cover is summarized in the following tabulation.

Duration of Climatic Periods

Periods	Beginning			End		
	Average	Earliest	Latest	Average	Earliest	Latest
Frost	22 Sep	3 Sep	11 Oct	21 May	24 Apr	13 Jun
Continual Freezing	9 Nov	-	-	26 Mar	-	-
Snow Cover	18 Oct	18 Sep	8 Nov	21 Apr	27 Mar	18 May
Continuous Snow Cover	2 Nov	19 Oct	17 Nov	15 Apr	27 Mar	30 Apr

Water supplies adequate for all industrial requirements of the location can be drawn from the Ob' River. Hydrological data for the Ob' River at Novosibirsk are included in Table 1. The river discharge data are given in average, maximum, and minimum values, and cover a 57-year period from 1894 to 1950. In addition, a limited amount of supplementary water can be obtained from the Vtoraya Yel'tsovka, Pervaya Yel'tsovka, and Kamenka; but these three streams may run dry during the summer or freeze solid during the winter.

The discharge of the Ob' River is characterized by a high-water period in middle and late spring and a low-water period from winter through early spring. The spring high-water period usually occurs from 7 to 15 April, though it may begin as early as the latter part of March or as late as early May. It is accompanied by severe ice jams and considerable flooding in the vicinity of Novosibirsk. The water level rises rapidly in the course of several hours. About 45 percent of the yearly discharge occurs during the spring high-water period in May and June. Thereafter, the water level recedes gradually and reaches its minimum just before the break-up of ice in late March. This situation will be altered somewhat with the completion of the Novosibirsk dam and hydroelectric plant. Ice jams and flooding will be reduced, and the water level will be

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

regulated, thus reducing the sharp fluctuations that occur at the beginning of the spring high-water period.

The geographic conditions peculiar to the Novosibirsk area impose certain definite limitations on economic activities.

Because the soil becomes miry during the spring thaw, after summer rains, and again in the autumn, pavement must be laid wherever vehicular movement must continue throughout the year. Ores, also, must be stockpiled on a hard surface because of soil conditions.

The amount of snowfall in the Novosibirsk area is not in itself great enough to hamper industrial operations to any great extent, but drifting can create serious problems. While the average maximum depth is only 37 centimeters (1.2 feet), snow may blow into drifts several times this depth around buildings, storage tanks, and stockpiles of ore. When the snow melts during the spring period of alternate freezing and thawing, the water penetrates into the stockpiles and then refreezes within them unless they are covered.

The frequent high winds in the area may make it advisable to cover stockpiles of fine-grained ores during the entire year.

Water pipelines must be laid at a depth greater than 2 meters (6.6 feet) to protect them from freezing during the most severe winters. Where the bedrock lies less than 2 meters below the surface, however, the digging of trenches to such a depth would be very expensive; and heated and insulated above-ground lines may be used instead of trenches.

No unusual difficulties are to be expected in the construction and maintenance of electric transmission lines.

Some common acids, for example $H_2SO_4 \cdot H_2O$, have freezing points well above that of water and must, therefore, be stored and transported at relatively warm temperatures. Other common acids, on the other hand, either decompose or boil at low temperatures, and must be protected from the occasional, high summer temperatures encountered in the Novosibirsk area. Critical temperatures for various acids are given in Table 2.

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Table 1

Climatic and Hydrologic Data for Novosibirsk

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Yearly
Air Temperature (°C)													
Average[a]	-19.3	-16.9	-11.2	-0.7	9.1	15.5	18.3	15.7	9.7	1.2	-10.0	-16.8	-0.5
Average Minimum[a]	-23.5	-20.6	-16.0	-5.1	3.5	10.7	13.3	10.7	5.1	-2.4	-13.2	-21.4	-4.9
Absolute Minimum[b]	-51	-44	-40	-31	-16	-2	4	1	-6	-26	-43	-48	-51
Absolute Maximum[a]	3	4	9	26	33	35	35	33	28	22	9	2	35
Precipitation													
Average (mm)[c]	24	16	18	21	38	68	89	69	50	32	42	28	495
Minimum (mm)[c]	-	-	-	2	17	33	39	17	20	11	-	-	-
Maximum (mm)[c]	-	-	-	50	57	180	164	138	92	80	-	-	-
Average No. of Days with Precipitation[b]	14.2	13.4	11.0	7.6	4.8	3.7	3.8	4.5	6.5	8.3	12.5	13.6	-
Average No. of Hours of Precipitation[b]	227	147	143	76	58	52	53	68	84	108	224	245	-
Average Snowdepth by 10-day Periods (cm)[c]													39[e] 73[f]
(1 - 10)	24	32	36	20	d	0	0	0	0	d	5	16	
(11 - 20)	26	34	37	7	d	0	0	0	0	d	9	19	
(21 - 30)	28	35	33	d	0	0	0	0	0	1	13	22	
Discharge of Ob' River (M^3/sec)													
Average	392	334	315	1880	5170	4260	3030	2020	1440	1160	698	483	1760
Minimum	224	220	213	349	1920	1670	1270	1070	653	541	304	228	884
Maximum	980	785	670	5100	9480	6920	5480	3410	3000	2660	1500	1250	2550

a Novosibirsk Experiment Station
b Novosibirsk Railroad Station
c Bugry
d Snow observed in less than 50 percent of years
e Average maximum field snowdepth
f Average maximum forest snowdepth

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Table 1 (Continued)

Climatic and Hydrologic Data for Novosibirsk

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly
Wind													
Direction (%)[b]													
North	4	5	6	9	12	13	18	11	9	5	4	4	9
Northeast	4	7	9	13	11	14	16	14	11	5	5	5	9
East	7	10	7	7	7	7	8	9	8	6	5	7	7
Southeast	22	24	18	11	10	13	13	14	14	18	18	23	16
South	26	21	18	13	10	10	9	10	14	21	25	25	17
Southwest	29	25	29	26	21	16	14	17	23	28	29	26	24
West	6	6	10	15	18	15	12	14	14	11	11	7	12
Northwest	2	2	3	6	11	12	10	11	7	6	3	3	6
Speed (frequency in %)[b]													
0 - 1 m/sec	21.9	28.2	21.9	23.2	20.4	24.3	29.3	27.8	25.1	18.2	15.0	21.0	
2 - 5 m/sec	50.8	53.2	49.2	50.6	52.7	59.5	60.0	58.1	56.1	55.3	54.8	51.7	
6 - 10 m/sec	23.4	16.9	25.2	24.1	25.4	15.5	10.3	13.3	17.8	23.7	27.7	24.3	
11 - 15 m/sec	2.6	1.3	2.7	1.8	1.4	0.5	0.3	0.7	0.8	1.9	2.0	2.0	
>15	1.3	0.4	1.0	0.3	0.1	0.2	0.1	0.1	0.2	0.9	0.5	1.0	
Calms (number)[b]	6	9	4	6	5	8	11	12	9	5	4	6	85

b Novosibirsk Railroad Station

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Table 2

Critical Temperatures for Selected Acids and Their Commercial Concentrations

Acid	Formula	Melting Point in °C	Boiling Point in °C
Hydrofluoric	HF	-92.3	19.4
	$HF(35.35\%)+H_2O$	-35.0	120.0
Hydrochloric	HCl	-112.0	-83.7
	$HCl(42.2\%)+H_2O$	-15.4	Unknown
	$HCl \cdot 2H_2O$	-17.7	Decomposes
	$HCl \cdot 3H_2O$	-24.4	Decomposes
Nitric	HNO_3	-42.0	86.0
	$HNO_3 \cdot H_2O$	-38.0	Unknown
	$HNO_3 \cdot 3H_2O$	-18.5	Unknown
Sulfuric	H_2SO_4	10.5	330.0 (98.3% decomposed)
	$H_2SO_4 \cdot H_2O$	8.6	290.0
	$H_2SO_4 \cdot 2H_2O$	-38.9	167.0

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5

SECRET

SECRET

Approved For Release 2000/05/22 : CIA-RDP60-00346R000200040029-5