

*BEST COPY*

*AVAILABLE*

PRODUCTION OF

IN

THE

Project 24.14

Central Intelligence Agency

Office of Research and Reports

1 June 1953

68-5-302

B-1

PRODUCTION OF GOLD IN THE USSR

Outline

- I. Introduction
- II. History and Significance of the Industry
  - A. History and Significance of the Industry
  - B. Data
- III. Production and Reserves
  - A. Production
  - B. Processing
  - C. Reserves
- IV. Capabilities, Limitations and Vulnerabilities
  - A. Capabilities
    - 1. Possibilities of Expansion
    - 2. Convertibility of Machinery
  - B. Limitations
  - C. Vulnerabilities
- V. Methods of Investigation
- VI. Methodology
- VII. Sources and Evaluation of Sources

**THE GOLD RESERVE OF THE USSR**

**Summary**

Gold has long been an essential metal to the economy of many countries of the world including the USSR. Requirements for this metal in the USSR increased greatly with the beginning of the Five Year Plans. Gold is foreign exchange and thus is an important factor in the international financial position of the Soviet Union, as it is required to provide the purchasing power abroad for commodities necessary for the security and independence of the USSR. 1/

Officially the USSR has not set on a ruble basis, since the ruble is a domestic currency only and foreign exchange is thus based on dollars, sterling or other currencies which through various agencies are often purchased with gold.

**Production**  
The production of gold in the USSR in 1927 was 100 tons and was moved to the East in Siberia. Complete marketing statistics on gold in the USSR are not available after 1927 and therefore, the reported figures released or compiled since that date are estimates and calculated figures based on the relation of gold to other metal recovery to that of production.

**Deposits**  
The production rate of gold in the USSR are very large and the reserves are very large. The production rate of gold in the USSR are very large and the reserves are very large. The production rate of gold in the USSR are very large and the reserves are very large.

The production of the gold mining industry will be limited primarily by the availability of equipment and replacement parts made available. The production of the gold mining industry will be limited primarily by the availability of equipment and replacement parts made available.

The production in the USSR comes from placer operations which require a minimum of mechanical equipment. The production in the USSR comes from placer operations which require a minimum of mechanical equipment.

## A. General

Gold is one of the few metals known to prehistoric man and shares with copper the distinction among pure metals of being colored. It is obtained from several types of ore deposits including placers, gold quartz veins, replacement bodies in metamorphic and other rocks, and as a by-product of the mining of base metals, principally copper, lead and zinc.

The gold recovered in the USSR for the most part is obtained in Siberia. Large quantities of the gold mined is alluvial gold recovered from present or ancient stream beds. Some of the older mines, however, were opened on gold quartz veins or veins of gold in near surface or oxidized zones of mines which developed as lead-zinc mines.

## B. History and Significance of the Industry

Gold production began in the USSR in the Berezovsky gold mines in the Ural Mountains in 1742 where it occurs in granite-like dikes which have filled fault fissures. <sup>1/</sup> Placer gold in river beds was discovered in 1771 in the Sosnovi River in the Urals, and later was found to occur in many other rivers in the Ural Mountain region. Other fields were opened in Western Siberia in the Prudnyy of Tyumen, and the Altai Mountain system where both vein or lode gold, and placers began operation in about 1830. The Yenisei and Angar River systems had placer mining operations in production by 1832. In 1846 production began in the Lena River basin and this area is still one of the largest producing areas in the USSR. In 1849 production began in the Barguzinsk district of the Trans-Baikal region which includes also the Amur and Argun River fields.

SECURITY INFORMATION

The industry was given an upward lift in 1870 when an Imperial Law was released which gave all Russian citizens and foreigners as well the authority to prospect for and mine gold in all parts of Russia except certain Crown lands. Production increased accordingly and by 1880 exceeded one million ounces annually. Output continued to increase as foreign capital and technical assistance was accepted, but did not exceed two million ounces until 1930.

The industry lagged badly between 1914 and 1922 as the result of World War I and the Revolution in 1917. The Communist faction after the Revolution held the opinion that gold was of little value under a collectivist system. In 1923 the Aldan River field was discovered and production again began an upward trend which has continued almost unabated. The Kolyma-Indigirka fields, perhaps the richest fields in the Soviet Union and are now believed to produce 95 to 40 percent of the total annual output, were discovered in 1926 and began operating in the following year. Before the discovery of the Kolyma fields the Lena River fields were considered the largest in the USSR.

Although the production of gold began in 1742 in the USSR, its significance in industry was relatively small until sometime after the 1917 revolution. However, when Stalin began to industrialize the country it became important to have large quantities of gold available to purchase materials not available within the borders of the USSR. The shortage of gold was so great during the first Five Year Plan that the USSR sought treasures to pay for American and European machinery and equipment. The industry was discovered in 1927 and became a direct project of Stalin.

The industry was responsible only to Stalin in Moscow and made almost daily reports.

This increasing demand and importance of gold in the USSR was

stated again at the beginning of the third Five Year Plan. The USSR requires more of its raw materials for manufactured products. Thus in reducing the export of raw materials the production of gold must be increased to purchase abroad everything necessary for the security greatness and invincibility of the USSR. (1)  
the immediate demands for gold to purchase equipment and materials were met during World War II by Lend Lease Agreements production continued to expand in the industry. Gold miners were frozen in their jobs during this period. Thus as long as industry continues to expand in the Soviet Union and materials, equipment, and replacement parts must be purchased from the outside, gold and the gold production industry will be of vital importance to the USSR.

#### C. Uses

Monetary use accounts by far for the largest quantity of gold produced. Other uses are the arts where gold is used in the manufacture of jewelry, watches and many luxury items. Industrial uses include gold used in paints, dental alloys, and gold-sealed base metal or gold-filled and rolled gold plate products. The preponderance of the use of gold in the production of money has brought forth the opinion from several sources that gold is not a commodity but should be reported as the conventional monetary metal. This monetary use often takes the form of stockpiles of gold held by governments or private hoards that can be made available to industry and the arts without smelter or refinery preparation.

The use of gold for personal and industrial needs is believed to be comparatively low in the USSR. The major uses for gold thus are to acquire international negotiable currencies, and to finance trade deficits with the US and other non-Communist countries. This was particularly true when the Five Year Plans began. During

provided most of the necessary equipment and materials. Since the war, however, the increased industrial expansion of the country has again increased demand for the services of gold.

## II. Production and Reserves

A. Production of gold in the USSR comes from mines in which the gold occurs in veins and is the only mineral mined, and in mines in which the gold is recovered as a by product of mining copper, lead and zinc. It is also recovered by placer mining in present or ancient stream beds. Placer mining of free or native gold accounts for the largest percentage of the gold recovered. In addition to vein and placer mining in the USSR, gold is also recovered as a by product of the refining of copper, lead and zinc.

Production in many of the gold fields is still confined only to placer operations and the vein or vein from which many of the placers originate have not been developed. Placer gold mining was performed largely by hand methods. It has been reported that up to 1913 only 20 percent of the gold mined was recovered by mechanical means. Mechanical recovery had increased to 25 percent and in 1930 to 30 percent.

The following mechanical equipment was reported to be in operation in the gold fields in 1933, including the Kolyma region:

- Electric dredging machines 15
- Hand operated dredges 47
- Electric installations 100



Production of gold from complex ores.

These varied methods of mining and the vast reaches of the country, which make it difficult to get accurate coverage of production figures from the many producing areas, tend to impair the reliability of the annual output reported. However, up to 1927 production figures given are official totals reported by the USSR. From 1927 to the present the totals represent estimates based on various USSR reports of actual production, or percentages of increase in output over the previous years production.

TABLE I  
Production of Gold in the USSR 1913-1952

<u>in thousands of troy ounces</u>	
1913	1,359
1914	1,727
1915	1,382
1916	1,090
1917	1,177
1918	555
1919	174
1920	74
1921	65
1922	192
1923	305
1924	610
1925	794
1926	855
1927	801
1928	887
1929	1,074
1930	1,434
1931	1,702
1932	1,878
1933	2,497
1934	3,504
1935	4,993
1936	6,300
1937	7,847
1938	7,106
1939	9,158
1940	9,687
1941	10,700
1942	9,101
1943	7,088
1944	5,342
1945	8,086
1946	8,150
1947	9,958
1948	11,574
1949	13,540
1950	14,253
1951	14,771
1952	14,878

The 1913 figure represents a peak year for gold production in the USSR which was broken in the following year. The decline during the 1918-1922 period reflects the Communist revolution and the immediate effects of the Communist war, that gold would have little value in a Collectivist State. The sharp increase in the 1929 output over 1928 and the continued rise through 1935 is attributed largely to the effects of the first and second Five Year Plans which were in progress during those years. Output in 1936 exceeded six million ounces for the first time in the history of gold mining in the USSR. This is also the first year in which the output of the Kolyva fields exceeded one million ounces (see Table II). The continued increase to a peak of 10,700,000 ounces in 1941 is attributed partly to the relatively large increase in output from the Kolyva fields. The Kolyva output comes mostly from placer operations the production curve of this type of operation rises to a relatively early peak 1941, (see Table II), drops off and then increases at a more gradual rate. The drive to meet the 1946-1950 plan goal for the gold industry plus the increased output from Kolyva is believed to account for the large annual output in the 1946-1952 period. The margin of error in the totals reported in this table is estimated at -15/5 percent.

Various estimates of gold production in the USSR have been presented in recent years. A total of seventeen complete or partial sets of estimates have been considered in the preparation of this report. They include figures reported by the

- 1/ Annual report of the Director of the US Mint
- 2/ Federal Reserve Review of Foreign Developments
- 3/ Metal Bulletin of London England
- 4/ Engineering and Mining Journal articles in 1913 and 1937

25X1X7

25X1X7

... report.

A report by H. G. Chillova entitled "More About Russian Gold" in the Engineering and Mining Journal in 1937 contained a table on gold production in the USSR for the 1930-1936 period broken down to show the output from the gold trust, base metal mines, and the Kolyva region. The source of the 1930-1936 figures is an article in a Russian publication, Sovetskaya Zolotopromyshlennost 1933. The gold recovered as a by product of the recovery of copper, lead and zinc accounted for about 6 percent of the total gold produced annually during that period. The gold recovered from these base metals was calculated on the basis of 61 grams of gold per ton of copper recovered and 60 grams of gold each per ton of lead and zinc. A review of material on the recovery of copper, lead and zinc in the USSR substantiated the respective totals of 61 and 60 grams of gold recovered or available in the ores of these metals.

The next step was to check the estimates of the production of copper, lead and zinc in the USSR reported in NIK 65 for the 1937-1952 period and using the above factors calculate the quantity of gold recovered in the base metal production.

This gold production then represents 6 percent of the total gold recovered in the USSR (see Table II). These figures divided by 6 and multiplied by 100 then give the total gold output in the USSR. The major assumption in these calculations is that the quantity of gold in the base metal ores will remain constant. It is

estimated that the percentage of gold in these ores may vary from 5 to 7 percent

and the average figure of 6 percent was used. A large new copper deposit has been reported in Soviet Central Asia which is believed not to have gold in its ore.

This was also taken into account in arriving at the gold from base metal mines.

TABLE II

Assets of the Gold Trust, Base Metal Block, and Alloy Block

1961-1962

1961-1962

Year	Base Metal Block	Alloy Block	Total
1961	192,000	192,000	384,000
1962	27,000	27,000	54,000
1963	31,000	31,000	62,000
1964	102,000	102,000	204,000
1965	192,000	192,000	384,000
1966	280,750	280,750	561,500
1967	305,170	305,170	610,340
1968	470,627	470,627	941,254
1969	449,716	449,716	899,432
1970	567,479	567,479	1,134,958
1971	581,214	581,214	1,162,428
1972	612,035	612,035	1,224,070
1973	569,473	569,473	1,138,946
1974	625,312	625,312	1,250,624
1975	500,511	500,511	1,001,022
1976	485,243	485,243	970,486
1977	525,986	525,986	1,051,972
1978	597,466	597,466	1,194,932
1979	694,485	694,485	1,388,970
1980	612,401	612,401	1,224,802
1981	855,190	855,190	1,710,380
1982	884,265	884,265	1,768,530
1983	692,700	692,700	1,385,400

An estimate of gold production in the Kolyma area is also shown in Table II. Production estimates on the annual output of gold from this region have covered a wide range. Presentations they range from 50 to 75 percent of the total output in the 1941-1945 period to several current CIA estimates of 30 to 40 percent of the total output. In any case they range from an average of about 4 million grams annually for the 1941-1945 period as shown in Table II of this paper, to an average of about 3.5 million for the 1935-1945 period by Sylvester 10/.

The CIA estimate of gold production is based on the belief that most of the gold reported on gold production to the USSR do not include the output from the Kolyma fields. Thus the total gold production reported for the USSR by the US Bureau of Mines is subtracted from the total reported in this paper to obtain the production figures for the Kolyma region.

The output reported for the gold produced by the mines controlled by the gold business, is the remainder after the quantity recovered at the base metal mines in the Kolyma fields has been accounted for. Mines controlled by the gold business include all the gold mines except those in the Kolyma-Indigirka fields.

The processing of a large part of the gold ore in the USSR is made up of placer mining. The gold is recovered from stream gravels in what is called placer mining. The gold particles are recovered by panning in stream beds by individual miners, by operations which flush the gravels through sluices containing riffles or screens which retain the gold, and dredges which operate on much the same principle but on a still larger scale. The lode or vein mines which are all

in hard rock and must be blasted down, removed to a mill and then  
 processed by cyanidation, amalgamation or other methods to extract the  
 metal. The remaining quantity of gold recovered is then refined and  
 of the smelting of copper, lead and zinc ores.

C. Reserves

Soviet gold reserves have been reported to be the largest in the world,  
 but like production figures must be estimated. In 1926 reserves of  
 black sands measured inferred and possible as shown below were reported as  
 4,943,630 kilograms.

Reserves of gold ore in the USSR in 1926 in kilograms:

Ore	Measured and Inferred	Possible
Gold Ore	121,820	130,000
Black Sands*	173,810	4,117,800
Total	295,630	4,607,800

Reported to 1926 ounces at 12.15 troy ounces per kilogram the totals are

of possible and inferred and 149,413,910 ounces of possible

total of 158,918,414 troy ounces. 17/

ores reported in 1926 do not include the large Aldan field which  
 was discovered in 1923 18/ and from which only limited information was available,  
 at the Kolyma-Indigirka, Kasehatka, and Chukotski regions. The Aldan, Lena and Kolyma  
 are perhaps the largest fields and have the greatest reserves.

In 1925 it was reported that new ore bodies had been found in the Lena river

which increased the reserves of this area. Production from 1843 to 1915

field alone was 23,712,500 ounces and reserves are nearly that much still.

silver and placer deposits 19/

6 (Continued to Page 11)

as reported by G. B. Tigranov and P. V. Ol in Dragotsannye Metally

(Metals) 1925 represent the material which is recovered from gold

ores and contain in addition to gold some of the dark minerals such as

pyrite, arsenite and rutile.

7.

The gold reserves of the USSR at 2.5 billion dollars, or 2.5 billion ounces, would be 71,428,571 ounces.

Because of the widespread occurrence of gold, the relatively primitive mining and recovery methods in many fields and the lack of adequate geologic coverage of reserves any estimate of gold reserves in the USSR must be classed as a rough estimate. It is believed, however, that gold reserves of the USSR are the second largest in the world and are exceeded only by South Africa.

### III. Capabilities, Limitations and Vulnerabilities

#### A. Capabilities

The possibilities of expansion of the gold mining industry is controlled largely by the number of men and quantity of equipment allocated to the industry. These reserves are adequate for large scale expansion in current output by increasing the efficiency of present mining and processing practices. Because a large part of the gold production comes from placer operations which have relatively simple equipment, it is believed that the quantity of equipment available for use in any one country will be small.

#### B. Limitations

The number of men available for the gold mining industry and the quantity and replacement parts that can be allocated to this industry are the limiting factors. The only other major limitation is the lack of complete and coverage of the total gold resources in the USSR.



INFORMATION

### C. Vulnerabilities

Because of the many mining operations scattered over such a large part of Siberia and the relatively simple equipment in most of the mines, it does not seem probable that the gold mining industry is directly vulnerable to war damage effects. However, as most of the gold produced is recovered from mines located in Far East Siberia, the transportation facilities carrying the gold to refineries or stockpiles in Moscow or Soviet Central Asia would be the most vulnerable factors in the mining and refining of gold in the USSR.

Gaps in Intelligence

Reasonably accurate information is available on sources, production and reserves of gold in the USSR up to 1926. After that period, however, very little accurate material is available on this industry. The largest gaps, therefore, are information for the 1927-1952 period on production statistics, reserves, consumption, trade and stocks of gold in the USSR.

~~SECRET~~  
SECURITY INFORMATION

APPENDIX B

Methodology

The estimate of availability of gold ore and production in the USSR for 1955 is based on published geologic reports on gold and are believed to be fairly reliable. Estimates of production and reserves for the 1927-1952 period are based on the collection of production estimates from as many sources as were available. These estimates were then checked as to source and evaluated for the accuracy and the reliability of the source. The estimates used in this report were based on the following assumptions. First, that the quantity of gold in the copper, lead and zinc ores in the USSR remains essentially constant at 61 and 60 grams per ton, second, that most of the estimates of gold production in the USSR do not include production from the Kolyma fields.

SECURITY INFORMATION

APPENDIX C

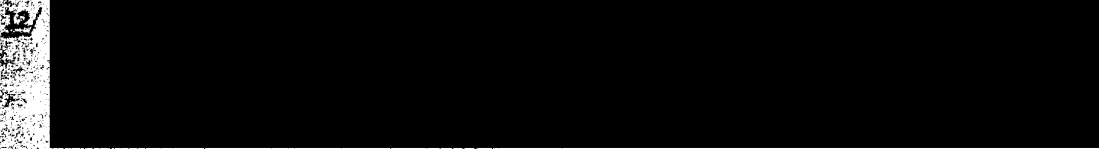
Sources and Evaluation of Sources

Evaluation of Sources

Sources 1, 5, 13, 17 and 20 are considered the most valuable as they contain information on mining and recovery of gold before restrictions were placed on releasing material on mineral production; were prepared by mining engineers who had spent some time in the Soviet Union; or represent source material prepared by Soviet mining engineers and geologists. Sources 7, 8, 9, 10, 11, 12, 14, 15 and 16 are concerned with estimates of gold production in the USSR. Several of these estimates have used the same source or estimate as a base and others contain statistics for only a few years. There is little agreement as to the annual output among these sources. Sources 2, 3, 4, 18, 19, 21 and 22 contain general information on gold in the USSR with particular reference to the Far East fields of the Kolyva region.

Source

- 1/ Kaganovich, L. M. Industriya, Moscow, 19 April 1938, RR 3
- 2/ CO-M-8171 The Peresovskiy Oks Field, RR 3
- 3/ Edwards B., Mineral Deposits of the USSR, The Far Eastern Series, 1947, RR 3
- 4/ Pallin D. A. & Nicolavsky B. I. Forced Labor in Soviet Russia, 1947, RR 3
- 5/ Kaganovich, L. M. Industriya, Moscow, 19 April 1938
- 6/ Pravda, 29 January 1934, RR 3
- 7/ US Bureau of Mines Minerals Yearbook
- 8/ Annual Reports of the Director of the United States Mint
- 9/ Notes on Soviet Gold Output, Federal Reserves Review of Economic and Statistics, July 1946, ORR 1
- 10/ Metal outputs in the Communist World, Metal Bulletin, No. 1760, 16 January 1953, RR 3
- 11/ MIS-26, Chapter 6, Section 63, 1949, RR 2 25X1X7



- 13/ Russian Gold, Engineering and Mining Journal, Vol. 136, No. 4, January 1953, RR 3
- 14/ More About Russian Gold, Engineering and Mining Journal, Vol. 136, No. 4, January 1953, RR 3
- 15/ CIA/RS IP-242, RR 3



- 17/ ... (Lazarev Lazarev) Kolyma-Gold and Forced Labor in ...  
Foundation for Foreign Affairs, Washington, D. C. 1947, RR 3
- 18/ ... Mineral Resources of the USSR, Part 13, Gold, Leningrad 1941, RR 3

The Value of the U.S. Gold Fields, Russian Economic Review, US Department of  
Commerce, November 1934

Pravda, 17 April 1935

American Russian Chamber of Commerce Bulletin 319, April 1935 and Bulletin 145,

June 1932

25X1A2g

