2007 Minerals Yearbook

TURKMENISTAN

U.S. Department of the Interior
U.S. Geological Survey

July 2010

The Mineral Industry of Turkmenistan

By Richard M. Levine and Glenn J. Wallace

Although Turkmenistan produces a wide range of industrial minerals, its major mineral resources are its oil and gas reserves, and the country is a leading regional natural gas producer. Turkmenistan has several of the world's largest gasfields, which include the Dauletabad, which was brought into production in 1982, and the Shatlyk, which was brought into production in the early 1970s. Turkmenistan had two oil refineries—the Turkmenbashi complex and the Seydi refinery.

The country's leading nonfuel mineral enterprises were the Arpaklenskiy barite-witherite enterprise, the Cheleken ozokerite enterprises, the Gaurdak sulfur plant, the Karabogazsulfate Association, the Kara-Kum sulfur plant, and the Oglanly bentonite mining enterprise. One of the leading enterprises that extracted chemical raw materials was the Karabogazsulfate Association, which recovered salts from the Kara-Bogaz Gol lagoon off the Caspian Sea. The association produced bischofite, Caspian Sea salt, epsomite, Glauber's salt, and sodium sulfate. In the western part of the country at the Boyadagskoye, the Cheleken, and the Nebitdag deposits, iodine-bromine brines were being extracted, then processed at the Cheleken and the Nebitdag iodine-bromine plants.

The country had discovered 149 gas and gas condensate deposits with total reported reserves of 5 trillion cubic meters of natural gas. Of these deposits, 139 were located onshore and had reported reserves of 4.6 trillion cubic meters and 10 were located on the Caspian Shelf and had reported reserves of 400 billion cubic meters. Fifty-four deposits with reported reserves of 2.6 trillion cubic meters and 11 deposits with reported reserves of 260 billion cubic meters were being prepared for development. Seventy-three deposits with reported reserves of 2 trillion cubic meters were under exploration, and 11 deposits with reported reserves of 140 billion cubic meters had been placed on hold. The majority of the country's reported natural gas reserves were located in the Dauletabad and the Shatlyk basins (Eder, 2007).

By the beginning of 2006, 34 oil deposits and 82 gas condensate deposits had been discovered in Turkmenistan, of which 20 oil deposits and 38 gas condensate deposits were under development. Four gas condensate deposits were being prepared for development, and exploration work was being conducted at 14 oil and 39 gas condensate deposits. The majority of oil reserves are located in the Southern Caspian oil and gas basin in the western part of the country (Eder, 2007).

Owing to a lack of adequate information about the country's oil and gas reserves and the lack of a complete international audit of reserves, the reserves numbers that have been published by a number of organizations can only be considered estimates. Furthermore, a large portion of the country still had not undergone intensive exploration (Eder, 2007).

Future development of the country's oil and gas sector will depend primarily on the development of offshore oil and gas resources in the Caspian Sea. According to Turkmenistan's Ministry of the Oil and Gas Industries and Mineral Resources, Turkmenistan has resources of 12 billion metric tons of oil and 6.2 trillion cubic meters of natural gas in the Caspian Sea at depths of between 2,000 to 7,000 meters (Eder, 2007).

Production

Data on mineral production are in table 1. In 2007, Turkmenistan increased production of its two major mineral products, natural gas and oil, by 9% each compared with production in 2006. Production data and other information regarding mineral production for most other mineral commodities have not been available for a number of years and production estimates in table 1 generally reflect past levels of production.

Structure of the Mineral Industry

All mineral production enterprises were state owned and all deposits were being developed by enterprises subordinate to the state and its ministries. Based on a law passed in 1992, foreign firms were permitted to establish joint ventures only with state-owned companies. This law was changed in late 2007 to allow foreign investors the right to fully or partially own enterprises, as well as to own movable property and real estate. Ownership rights can be purchased from individuals as well as from legal entities registered in Turkmenistan (Interfax Russia & CIS Metals and Mining Weekly, 2007).

The role of foreign firms in the country's oil and gas production was less than 10%, although attracting foreign investment and the participation of foreign firms would likely be a major factor in the country increasing production on the Caspian Shelf (Eder, 2007). Table 2 is a list of major mineral industry facilities in Turkmenistan.

Mineral Trade

Turkmenistan planned to increase gas exports in 2007 to 58 billion cubic meters in accord with intergovernmental agreements. Revenues from exports of natural gas and oil and oil products accounted for about 80% of Turkmenistan's merchandise exports as the country experienced a large inflow of revenue because of the high world market prices for oil. In 2006, Turkmenistan negotiated improved payment terms for its natural gas exports with Russia and Ukraine, which included eliminating barter settlements as well as an almost 50% increase in the export price. A 25-year gas export agreement signed with Russia in 2003 and a 30-year agreement signed with China in the spring of 2006 would likely enable Turkmenistan to maintain a steady stream of foreign exchange inflows (World Bank, The, 2007).

In 2006, Turkmenistan had two gas-export pipelines. One was a major pipeline route built in the Soviet era that connected to the pipeline network in Russia and through which the majority

of Turkmenistan's gas was exported. The other was a much smaller pipeline built in the post-Soviet period that linked to the pipeline network in Iran through which Turkmenistan exported about 8 billion cubic meters of gas annually to Iran. In 2007, Turkmenistan was to export 50 billion cubic meters of gas to Russia. Turkmenistan's gas flowed directly only to these countries (Pannier, 2008).

On May 12, Kazakhstan, Russia, and Turkmenistan signed an agreement to construct a pipeline from Turkmenistan's Caspian shore to Russia through Kazakhstan. It would initially entail the reconstruction of the existing western branch of the Soviet-era Central Asia-Centre (CAC) pipeline, which would extend along the shore of the Caspian Sea and would transport Turkmenistan's gas to Russia by way of Kazakhstan. The reconstructed pipeline would have the capacity to transport 10 billion cubic meters per year. A new parallel pipeline would then be laid alongside it to boost the overall capacity.

On May 14, the U.S. Secretary of Energy said that this pipeline deal was not good for Europe, which needs to diversify its sources of energy. A week before the trilateral agreement on the pipeline was signed, the head of the state-owned Turkmengas company said the country was interested in diversifying its export routes and cited the possibility of constructing the Trans-Caspian Gas Pipeline (TCGP), which would be an extension of the South Caucasus Pipeline. At a press conference held after the trilateral summit, the President of Turkmenistan said that the TCGP was still on the agenda and that diversification of gas distribution could still be examined (Abdurasulov, 2007).

Commodity Review

Mineral Fuels

Natural Gas.—In 2007, natural gas production in Turkmenistan increased to 72.3 billion cubic meters, or by 9% compared with production in 2006. The state company Turkmengaz accounted for more than 80% of the country's natural gas production and also produced oil and gas condensate (Eder, 2007; Interfax Russia & CIS Oil and Gas Weekly, 2008). Natural gas production had fallen from a high of about 80 billion cubic meters per year in the 1980s to only 12 billion cubic meters in 1998 owing to the lack of permission to transport its gas to markets through the Russian pipeline network, which was the country's only available major route to export gas. The resolution of transport issues between Russia and Turkmenistan enabled Turkmenistan to increase its natural gas output (Eder, 2007).

The majority of the country's natural gas was produced in the southeastern part of Turkmenistan from the large Dauletabad-Donmez field, which produced about 40 billion cubic meters per year and which had resources initially estimated to be 4.5 trillion cubic meters. Potential increases in natural gas production were expected to come from a group of fields associated with the Caspian Shelf on the right bank of the Amu Dar'ya River and from the Yashlar–South-Iolotan group of fields, which includes the South-Yolotan deposit; this deposit has reserves reported to be 15 trillion cubic feet (more than 400 billion cubic meters) of natural gas and 17 million metric tons (Mt) of oil, making it one of the largest deposits of natural gas in Central Asia (Eder, 2007).

To fulfill its signed delivery agreements, Turkmenistan would need to take additional measures, such as make major new investments to accelerate oilfield and gasfield development and construct transport infrastructure (Interfax Russia & CIS Oil and Gas Weekly, 2007). In May, the chairman of Turkmengaz reported that the country's energy strategy was to increase gas production to 120 billion cubic meters per year in 2010 and then to more than triple production to 240 billion cubic meters per year by 2030. To achieve these goals, Turkmenistan would not only need to have adequately appraised its reserves, but also have the ability to attract foreign investment to develop deposits and to construct infrastructure to bring the gas to market (Hug, 2008).

Petroleum.—In 2007, the country had raised its oil and gas condensate production by 9% to 9.75 Mt compared with that of 2006 after it fell from between 6 and 7 million metric tons per year (Mt/yr) in the 1980s to about 4 Mt/yr in the mid-1990s. The country's major oil producer was the state company Tukmenneft'. Turkmenistan had an oil refining industry that was represented by the the Seydi oil refinery and the Turkmenbashi complex of oil refineries, which had a total combined capacity of 12 Mt/yr (Eder, 2007).

Outlook

Exports of natural gas could double in coming years as new pipelines are completed to improve links to China, Russia, and other countries, including Pakistan. The pipeline agreement that Turkmenistan signed with Kazakhstan and Russia is expected to be operational by 2010. This proposed pipeline could possibly supplant the proposed TCGP, which would have supplied European markets and bypassed the Russian pipeline network. Besides the TCGP, a number of other alternate routes have been proposed that would enable Turkmenistan to export gas through routes that bypass Russia. It is possible that construction of one or more of these pipeline routes is still feasible. In 2006, Turkmenistan signed an agreement with China to begin exporting about 30 billion cubic meters of gas annually to China by way of a proposed pipeline that could be operational by the end of 2009 (Zissis, 2006; Abdurasulov, 2007).

To fulfill all its signed contracts for gas delivery, Turkmenistan would have to increase its gas exports to 95 billion cubic meters in 2010 and to 135 billion cubic meters in 2020. Russia is expected to increase purchases of natural gas from Turkmenistan to 90 billion cubic meters per year after 2010 (Eder, 2007).

Turkmenistan's crude oil exports also could increase with increased oil production, with projections calling for crude oil exports to increase to 12 Mt in 2010 and 15 Mt in 2015. Projections called for crude oil production to increase to 19 Mt in 2010, 25 Mt in 2015, and to 30 Mt in 2020 (Eder, 2007).

To meet the projections by the chairman of Turkmengaz of almost doubling gas production to 120 billion cubic meters in 2010 and then more than tripling production to 240 billion cubic meters by 2030 would require the country to attract sufficient foreign investment. Turkmenistan stated that it was interested in broad international cooperation to implement large

investment projects in Turkmenistan's sector of the Caspian Sea on a production-sharing agreement basis. Such projects would consist not only of developing gasfields and oilfields, but also constructing gas transport facilities, overhauling existing gas and oil wells, modernizing refining facilities, and supplying updated equipment and technology (Interfax Russia & CIS Oil and Gas Weekly, 2008).

References Cited

Abdurasulov, Abdujalil, 2007, Turkmenistan—Multiple gas pipelines still possible: Environment News Service, May 24. (Accessed March 21, 2009, at http://www.ens-newswire.com/ens/may2007/2007-05-24-02.asp.)

Eder, L.V., 2007, Neftegazovyy kompleks Turkmenistana [The oil and gas complex of Turkmenistan]: Mineral'nye Resourcy Rossii—Ekonomika i Upravleniye [Mineral Resources of Russia—Economics and Management], no. 2, p. 72-80.

Hug, Adam, 2008, The role of Caspian oil and gas in Europe's future energy security: Freedomhouse Energy Security in Europe roundtable, Budapest, Hungary, September 18, 2008, Presentation, 8 p. (Accessed March 21, 2009, at www.freedomhouse.hu/images/EnergySecPrez/adam hug.pdf.)

Interfax Russia & CIS Metals and Mining Weekly, 2007, Turkmenistan allows foreign investors to own property: Interfax Russia & CIS Metals and Mining Weekly, issue 42, November 12-18, p. 23.

Interfax Russia & CIS Oil and Gas Weekly, 2007, Turkmenistan aims to boost gas production 20%, oil 15% in 2007: Interfax Russia & CIS Oil and Gas Weekly, issue 12, March 22-28, p. 48.

Interfax Russia & CIS Oil and Gas Weekly, 2008, Turkmenistan ups gas, oil output 9% in 2007: Interfax Russia & CIS Oil and Gas Weekly, issue 11, March 27-April2, p. 40.

Pannier, Bruce, 2008, Turkmenistan—"Gas rich" residents shiver in the cold: Eurasianet.org, January 7. (Accessed February 2, 2008, at http://www.eurasianet.org/departments/insight/articles/pp010708.shtml.)

World Bank, The, 2007, Turkmenistan—Country brief: The World Bank. (Accessed January 12, 2008, at http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/TURKMENISTANEXTN/0,,contentMDK:20631627~menuPK:300743~pagePK:141137~piPK:141127~theSitePK:300736,00.html#Economy.)

Zissis, Carin, 2006, Which way will Turkmen gas flow?: Council on Foreign Relations, December 22. (Accessed February 2, 2008, at http://www.cfr.org/publication/12303/which_way_will_turkmen_gas_flow.html.)

TABLE 1

TURKMENISTAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		2003	2004	2005	2006	2007
INDUSTRIAL MINERALS						
Bentonite		1,600 r	1,500 r	1,400 r	2,000 r	2,000
Bentonite powder		250	250	250	250	250
Bischofite		100	100	100	100	100
Bromine	kilograms	150,000	150,000	150,000	150,000	150,000
Cement		450,000	550,000	650,000	1,000,000 r	1,500,000
Epsomite		NA	NA	NA	NA	NA
Ferrous bromide, 51% Br		85	85	85	85	85
Gypsum		1,700 r	1,600 r	1,580 r	3,000 r	3,300
Iodine		200,000	250,000	270,000	270,000	270,000
Lime		16,000	16,000	16,000	16,000	16,000
Nitrogen, N content of ammonia		150,000 r	200,000 r	220,000 r	250,000 r	270,000
Salt		4,300 r	4,500 r	4,800 r	5,000 r	5,200
Sodium sulfate		60,000	60,000	60,000	60,000	60,000
Sulfur		9,000	9,000	9,000	9,000	9,000
MINERAL FUELS AND RELATED MATERIALS						
Natural gas	million cubic meters	59,100 3	58,570 3	60,420 r, 3	66,300 r	72,300 3
Petroleum, crude		9,306,000 3	10,051,000 3	9,700,000 3	8,950,000 r	9,750,000 3

[r]Revised. NA Not available.

[1]Estimated data are rounded to no more than three significant digits.

[2]Table includes data available through February 28, 2009.

[3]Reported figure.

TABLE 2

TURKMENISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007[1, 2]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity
Ammonia	thousand metric tons	Maryzoat Association	Mary Region	400,000
Argillite	cubic meters	Keramzit plant	Yagmanskoye deposit	200,000
Barite-witherite		Arpaklenskiy mining enterprise	Arpaklen deposit	10,000
Do.		Kumytash deposit and other deposits	NA	NA
Bench gravel and loam:				
Bench gravel		Bezmeinskiy deposit	Near Ashkhabad	1,200,000
Loam		do.	do.	12,000
Bischofite, epsomite, Caspian Sea salt, Glauber's salt		Karabogazsulfate Association	Kara-Bogaz-Gol Lagoon, off the Caspian Sea	NA
Bromine		Cheleken plant	Cheleken Region	4,740
Do.		Nebitdag plant	Nebitdag Region	2,370
Cement		Bakharlinskiy cement plant	South of Kelyata train station	1,000,000
Do.		Bezmeinskiy cement plant	Kelyata	1,400,000
Clays:				
Bentonite		Oglanly Mine	Oglanly Region	100,000
Kaolin		Ashkhabad glass plant	Kyzylkainskoye deposit	80,000 [e]
Do.		Tuarkyrskoye deposit	250 kilometers southeast of Turkmenbashi	NA
Coal, oxidized		do.	do.	NA
Dolomite		Ashkhabad glass plant	Kelyatinskoye deposit	6,000 [e]
Gypsum		IA Turkmenmineral	Mukry, Tagorin deposits	300,000
Do.		Wastes from Gaurdak sulfur deposit	Gaurdak, Gora	400,000
Do.		Krasnovodsk Aylagy (anhydride) deposit	9 kilometers east of Turkmenbashi	160,000
Iodine		Cheleken plant	Cheleken Region	355
Do.		Nebitdag plant	Nebitdag Region	255 [e]
Limestone		Deposits:		
Do.		Gaurdak	4 kilometers northeast of Gaurdak	NA
Do.		Kara-Dzhumalakskoye	60 kilometers from Gaurdak	NA
Limestone, for facing materials		Charshanginskoye, Gaurdakskoye, Geok-Tepinskoye, Kaylyu, Krasnovodsk Aylagy (tuff and granite), and Tyuzmergenskoye deposits	NA	NA
Do.	cubic meters	Tagarinskoye deposit	8 kilometers from Gaurdak	1,000 [e]
Limestone, for filing stone	do.	Aeroport deposit	21 kilometers northeast of Turkmenbashi	2,000
Do.	do.	Bekdashskoye deposit	200 kilometers north of Turkmenbashi	5,000
Do.	do.	Dostluksoye deposit	230 kilometers southeast of Turkmenbashi	2,000
Do.	do.	Mukrinskoye deposit	60 kilometers southwest of Gaurdak	25,000
Natural gas	million cubic meters	Achakskoye, Dauletabad-Donmez, Gygyrlinskoye, Yolotan (South Yolotan-Osman), North and South Naipskiye, Shatlyk, and Yashlar deposits	Onshore in eastern and southwestern parts of country and offshore in Caspian Sea; Amu-Dar'ya and Murgab Basins; Dashoguzskiy, Lebapskiy, Maryyskiy deposits	90,000 [e, 3]
Natural pigment		Bakhchesu/Cheshme/Gadyn deposit	28 kilometers southwest of Serdar	NA
Ozokerite		Cheleken mining enterprise	NA	NA
Petroleum:				
Crude	thousand metric tons	Barsa-Gelmesskoye, Burunskoye, Cheleken, Gograndagskoye, Yolotan (South Yolotan-Osman), Kamyshldzhinskoye, Korturtepinskoye, Kum Dag, Kuydzhikskoye, Okaremskoye, and Yashlar deposits	Centered in Caspian plain in west Turkmenistan and in offshore oilfields to the west of Cheleken Peninsula in Caspian Sea	11,000 [e, 3]
Refined	do.	Facilities: Seydi oil refinery; Turkmenbashi complex of oil refineries	Locations: Chardzhou Rayon; Turkmenbashi	12,000 [3]

See footnotes at end of table.

TABLE 2—Continued

TURKMENISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007[1, 2]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity
Potash (sylvinite, carnallite)		Karlyuk deposit (experimental mine closed 1998)	25 kilometers from Gaurdak	NA
Do.		Karabil'skoye deposit	17 kilometers south of Gaurdak	NA
Quartz sand		Annauskoye, Babadurmazskoye, Bakhardenskoye, and Kelyatinskoye deposits	NA	NA
Rock salt		Gaurdak deposit	8 kilometers from Gaurdak	15,000 [e]
Do.		Khodzhaguymaskoye deposit	4 kilometers west of Gaurdak	NA
Do.		Kugitangskoye deposit	75 kilometers from Gaurdak	2,000 [e]
Do.		Uzun-Kudukskoye deposit	20 kilometers from Gaurdak	2,000 [e]
Salt		Kuulinskoye deposit	40 kilometers north of Turkmenbashi	650,000 [e]
Sand and gravel	cubic meters	Dushaksoye deposit	NA	1,150,000
Do.	do.	Kala-I-Morskoye deposit	NA	925,000
Do.	do.	Kernayskoye deposit	NA	36,000
Do.	do.	Kubatayskoye deposit	NA	740,000
Do.	do.	Ufrinskoye deposit	NA	900,000
Sodium sulfate		Karabogazsulfate Association	Bekdash, Kara-Bogaz-Gol lagoon (off Caspian Sea)	400,000
Strontium (celesite)		Arikskoye deposit (mining ceased 1992)	Near Gaurdak	NA
Do.		Shakhtaminskoye deposit	do.	NA
Sulfur		Darvaza, Segli-Kar, and Kara-Kum sulfur plants	Kara-kum deposit (mining ceased 1962)	NA
Do.		Gaurdak plant	Gaurdak deposit (mining ceased 1997)	500,000 [e]
Do.		IA Turkmenmineral	Gora deposit	340,000
Do.		Kugitangskoye deposit	75 kilometers from Gaurdak	NA

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Table includes data and information available through March 31, 2009.

[2]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

[3]Capacity estimates are totals for all enterprises that produce that commodity.