

**Announcing the release of the Coal Quality and Resources
of the Former Soviet Union—An ArcView Project:
U.S. Geological Survey Open-File Report 01-104**

The U.S. Geological Survey (USGS), the Committee on Geology of the Use of Subsurface Resources of the Russian Federation (ROSKOMNEDRA), and the Russian Academy of Sciences (RAS) has signed a Memorandum of Understanding (MOU) on Cooperation in Geoscience. The USGS, the Vernadsky State Geologic Museum (VSGM) representing the ROSKOMNEDRA, and the RAS collaborated to produce a Geographic Information System (GIS) product that contains information on geology, resources, and quality of coal from the Former Soviet Union (FSU). The FSU includes the Russian Federation (RF), the Commonwealth of Independent States (CIS), and the countries of Estonia, Latvia, and Lithuania (fig. 1).

The purpose of the GIS project is to integrate views of the geology, coal basins and deposits by coal rank, coal reserves and resource categories, rail lines, rivers, and roads of the FSU utilizing Environmental Systems Research Institute, Inc. (ESRI) ArcInfo and ArcView software. The Russian coauthors supplied ArcInfo files that were modified by the USGS and combined with USGS data files to create an ArcView project. Coal deposit data contained in this project were selected from monographs, reference books, and unpublished sources of data that were reviewed and deemed reliable by the authors. Information on the deposit name, location, age, and rank are included in the database and obtained from Russian geologic maps and publications. The database includes more than 265 coal deposit data points with information on the deposit name, location, age, and rank; coal reserve and resource reliability categories are listed for 671 coal-bearing areas in the FSU.

According to several studies, within the boundaries of the FSU there are hundreds of coal deposits (fig. 2) that contain as much as 40 to 50 percent of the Earth's total coal resources. Russia is the sixth largest coal producer in the world with a total coal production of 163 million metric tons (World Coal Institute, 2000) and coal exports of less than 27 million metric tons in 1999 (Knapp, 2000). Coal deposits in the FSU formed under diverse geochemical and climatic conditions and have undergone various structural histories, and are found in 8 geological periods: Devonian, Carboniferous, Permian,

Triassic, Jurassic, Cretaceous, Paleogene and Neogene. Because of this diversity the coal quality shows wide ranges in composition.

Coal samples included in the coal sample point database were selected from the most reliable sources of data critically reviewed by the Russian coauthors. Coal quality and chemical analyses are included for 180 coal samples with information on deposit name, location, age, rank, mine name and operator, lithology of coal-bearing rocks, proximate and ultimate analyses, mineral composition, and major-, minor-, and trace-element content. This is the most comprehensive study compiled by the USGS to date of the coal in the FSU.

The Coal Quality and Resources of the Former Soviet Union ArcView project (Brownfield and others, 2001) is a complex and dynamic geologic publication and figure 3 shows the many different steps that were necessary to produce the CD-ROM product and maintain the coal quality databases.

Russian Standard classification for FSU coals

Because of differing classification schemes, it is sometimes difficult to compare Russian coals with the same coal rank (equivalent to Russian coal mark) from different basins and deposits, as well as to compare Russian coals with coals from other countries (USA, Australia, Southern Africa, Great Britain) that have developed their own coal classifications. The Committee of the Russian Federation for Standardization, Metrology, and Certification (GOSSTANDART or GOST) and its FSU predecessor approved several classification systems in an attempt to standardize the coal classification.

A comparison between the Russian coal marks classified according to the GOST 25543-88 (Yeriomin, 1988) standards and the American Society for Testing and Materials (ASTM) standard coal classification ASTM D388-98a (American Society for Testing and Materials, 1999) is shown in table 1.

References

American Society for Testing and Materials (ASTM), 1999, Standard classification of coals by rank, D388-98a: *in* 1999 Annual Book of ASTM Standards: Petroleum products, lubricants, and fossil fuels, sect. 5, v.05.05: Gaseous fuels, coal, and coke: Philadelphia, Pa., ASTM, 522 p.

Brownfield, M.E., Steinshouer, D.W., Povarennykh, M.Yu., Eriomin, Ivan, Shpirt, Mikhail, Meitov, Yeygeny, Sharova, Irena, Goriunova, Nina, and Zyrianova, M.V., 2001, Coal quality and resources of the Former Soviet Union—An ArcView Project: U.S. Geological Survey Open-File Report 01-104, CD-ROM.

Knapp, Ron, 2000, Environmental Challenges for Coal, Seminar on Environmentally Clean Coal Technologies in the Russian Sector, Reformugol Foundation, Moscow, July 4-5, 2000: World Coal Institute Web site, www.wci-coal.com, 6 p.

World Coal Institute, 2000, World Coal Institute web site, www.wci-coal.com.

Yeriomin, I.V., ed., 1988, Burye ugli, kamennye ugli i antratsity. Klassifikatsiya po geneticheskim i technologicheskim parametram, [Brown coals, hard coals and anthracites. Classification according to the genetic and technological parameters]: GOSSTANDART, GOST 25543-88, Governmental Standard of the USSR, Moscow: Printing house of Standards, 20 p. [In Russian]

For further information and to request a CD-ROM (USGS Open-File Report 01-104) containing the ArcView project and the supporting documentation and data files, contact:

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Figure 1. Chernogorsky strip mine, located in the high volatile bituminous (Coal mark D) Permian Chernogorskoye coal deposit, Krasnoyarsky district, Khakassiya region, Minusinsky coal basin, Russia. Photo by Mikhail Povarennykh, Vernadsky State Geological Museum.

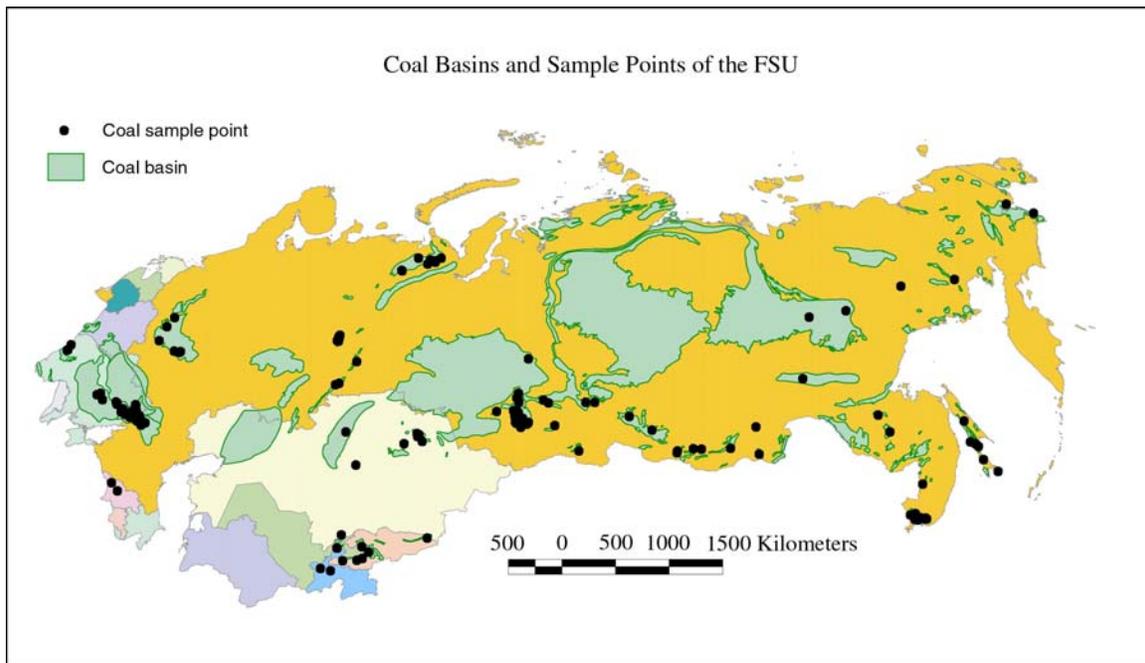


Figure 2. Map showing the coal basins and sample points of the Former Soviet Union

World Coal Quality ArcView Project

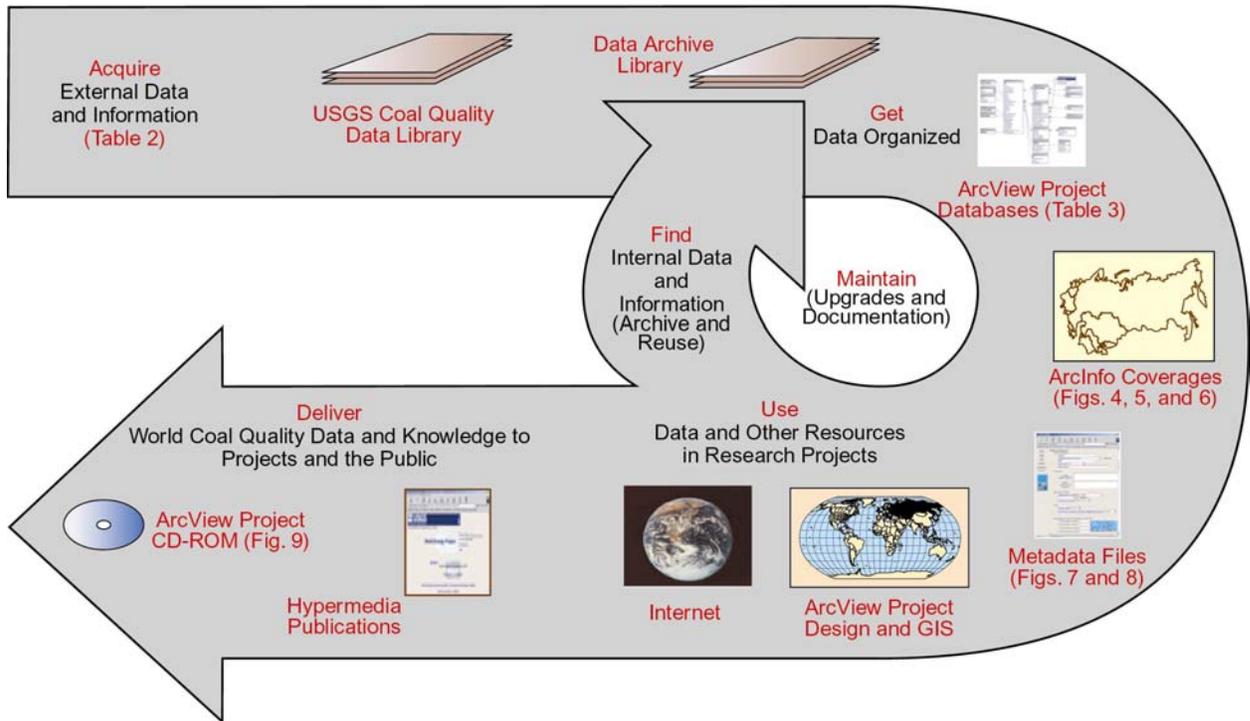


Figure 3. A diagram showing the different steps that are necessary to create and maintain the Coal Quality and Resources of the Former Soviet Union—An ArcView Project publication. Figures showing examples of data, ArcView databases, ArcInfo coverages, and metadata files are shown in parentheses.

Table 1. Approximate coal rank relationships between the Former Soviet Union (GOSSTANDART) and United States (ASTM) coal classifications. Exact equivalence of a particular sample is difficult because the conditions of sample handling and chemical analyses, and variation in usage of terms in the coal industry in the Former Soviet Union is often unclear.

FSU, GOST 25543-88			USA, ASTM 380-98a	
Brown Coals	Brown (B)	1B	ligB	Lignite
			ligA	
		2B	subC	Subbituminous
3B	subB			
Hard Coals	Long-Flame (D)		sub A hvCb hvBb	
	Long-Flame-Gas (DG), Gas(G), Gas-Fat(GZh), Gas-Fat-Mearge(GZhO), and part Fat(Zh)		hvAb	
	Fat(Zh), Coking-Fat(KZh), Coking(K), Coking-Mearge(KO), Coking-Caking(KSN and KS)		mvb	
	Mearge-Caking (OS) and Lean-Caking (TS)		lvb	
	Lean (T)		sa	
	Semi-anthracite (PA)			
	Anthracites (A)	A1	an	Anthracitic
		A2		
A3		ma		