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# Bibliography on Northern Pipelines in the Former Soviet Union

Elisabeth R. Smallidge

August 1997

**Abstract:** In 1993 a pilot project between the Defense Technical Information Center and the U.S. Army Cold Regions Research and Engineering Laboratory resulted in a proposal to conduct a state-of-the-art review of technology and techniques for building, operating, and maintaining arctic natural gas and liquid petroleum pipelines in the former Soviet Union. This bibliography was compiled to meet the objectives of the pipeline review. References were compiled on dates of construction, location, route conditions, design, construction, maintainence, environmental impact, accidents, and production management. The bibliography is divided into three sections: Oil and Gas Pipelines, Construction of Oil and Gas Pipelines, and Accidents; it was compiled using commercially available databases. Subjects searched included information on pipelines in the former Soviet Union, primarily in the eastern and western areas of Siberia. References were eliminated that were not of direct interest to the pipeline study.

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Prepared for
DEFENSE TECHNICAL INFORMATION CENTER

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## PREFACE

This report was prepared by Elisabeth R. Smallidge, Librarian, Library and Technical Publications Branch, Technical Resources Center, U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, New Hampshire.

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# Bibliography on Northern Pipelines in the Former Soviet Union

ELISABETH R. SMALLIDGE

## INTRODUCTION

In 1993 a pilot project between the Defense Technical Information Center and the U.S. Army Cold Regions Research and Engineering Laboratory resulted in a proposal to conduct a state-of-the-art review of technology and techniques for building, operating, and maintaining arctic natural gas and liquid petroleum pipelines in the former Soviet Union. The objectives of the pipeline review were to

1. Review the design, construction, operation, and maintenance procedures of oil and gas pipelines in the permafrost areas of eastern and western Siberia.
2. Assemble data on the evolution of Siberian pipelines, reflecting changes in size, modes of construction, and age.
3. Assemble data on maintenance procedures and practices, including inspection techniques with respect to corrosion, pipe wrinkling, and metal fatigue.
4. Assemble data on pipeline failures and attempt to predict life expectancy of different pipelines under the harsh arctic environment.
5. Evaluate the environmental impact of different pipeline construction techniques and relate it to ruptures and breaks.

In conjunction with the study objectives, a literature search was conducted on northern pipelines in the former Soviet Union. References were compiled on dates of construction, location, route conditions, design, construction, maintenance, environmental impact, accidents, production management, and other pertinent facts.

In the resulting bibliography, references are separated into three categories: Oil and Gas Pipelines, Construction, and Accidents. There is some repetition of references between the categories because some are relevant to more than one of the subject categories.

The bibliography was compiled using commercially available databases. Multiple databases were searched and references were retrieved. Additional references were taken from relevant literature. The subjects searched included information on pipelines in the former Soviet Union, primarily in the eastern and western areas of Siberia. References were eliminated that were not of direct interest to the pipeline study.

## PRIMARY DATABASES SEARCHED

The *COMPENDEX PLUS* databases are produced by Engineering Information, Inc., New York, and provide coverage of the world's significant engineering and technological literature. Each record in COMPENDEX PLUS is a reference to a journal article, technical report, engineering society publication, book, conference proceedings, or individual conference paper, and includes a concise abstract describing the document. Approximately 25% of the records indexed are published in a language other than English. The database contains more than 3.5 million records from 1970 to the present. This database was searched on the Dialog Search Service, Palo Alto, California; it is copyrighted by Engineering Information, Inc., Hoboken, New Jersey. Use or copying of all or part of COMPENDEX PLUS is not authorized. The use of materials supplied in the database or any copies thereof for the purpose of loan, resale, rental use, or gift to any third person, organization, or corporation is strictly forbidden. No part of COMPENDEX PLUS may be copied in machine-readable form for delivery to or made available for the use of any third party.

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*ITAR/TASS News* is the official state news agency of Russia. ITAR/TASS correspondents collect news from 74 bureaus in Russia and the other countries in the Commonwealth of Independent States and 62 bureaus in 59 foreign countries. The ITAR/TASS News database contains over 14,000 records since 1996. The database is produced by Comtex Scientific Corp. in Alexandria, Virginia, and is provided on Dialog Search Service, Palo Alto, California. The ITAR/TASS News database is copyrighted by ITAR/TASS News Agency via Comtex.

The *World Translations Index* provides access to existing translations of literature relating to all fields of science and technology. The World Translations Index currently contains over 400,000 records from 1979 to the present. The database is provided by ITC, Delft, The Netherlands, and is available from Dialog Search Service, Palo Alto, California.

*PASCAL* is produced by the Institut de l'Information Scientifique et Technique (INIST) of the French National Research Council. It provides access to the world's scientific and technical literature and contains over 11 million records from 1973 to the present. The database is available from Dialog Search Service, Palo Alto, California.

*APILIT*, the American Petroleum Institute Literature Abstracts, provides coverage of literature related to petroleum and petrochemical industries. APILIT contains information from over 200 sources, including technical journals and reports, meetings, papers, trade magazines, and dissertations. APILIT contains more than 561,000 records from 1964 to the present. It is produced by the American Petroleum Institute, New York, and is available from Dialog Search Service, Palo Alto, California.

*IAC PROMPT* is a multiple-industry database that provides broad, international coverage of companies, products, markets, and applied technologies for all industries. IAC PROMPT contains 3.7 million records from 1972 to the present. The database is produced and copyrighted by Information Access Company and is available from Dialog Search Service, Palo Alto, California.

*Energy Science & Technology* is a multidisciplinary database containing worldwide references to basic and applied scientific and technical research literature. The information is collected for use by government managers, researchers at the national laboratories, and other research efforts sponsored by the U.S. Department of Energy, and the results of the research are transferred to the public. Energy Science & Technology contains over 3.4 million records from 1974 to the present. This database is available from Dialog Search Service, Palo Alto, California. Use of the database is restricted to users located within the United States and the following countries: Australia, Belgium, Brazil, Canada, Denmark, Finland, France, Italy, Netherlands, Norway, Poland, Republic of Korea, Spain, Sweden, Switzerland, and the United Kingdom. Information obtained from the database must be for use only within the user's country and must not be transferred, in whole or in part, to individuals or organizations outside the user's national boundaries. This is a requirement of the information exchange agreement between these countries and the U.S., which forbids third-party disclosure.

*Newspaper Abstracts* is produced by University Microfilms Inc., Ann Arbor, Michigan, and is available from Dialog Search Service, Palo Alto, California. This database provides coverage of 20 major regional, national, and international newspapers. Newspaper Abstracts contains over 2.5 million records from 1984 to 1988. This database is available from Dialog Search Service, Palo Alto, California.

*Newspaper Abstracts Daily* is produced by University Microfilms Inc., Ann Arbor, Michigan, and is available from Dialog Search Service, Palo Alto, California. This database provides coverage from more than 25 major regional, national, and international newspapers. Newspaper Abstracts Daily contains over 3.5 million records from 1989 to the present. This database is available from Dialog Search Service, Palo Alto, California.

*AP NEWS* is produced by the Associated Press, New York, and provides the full text of its coverage of national, international, and business news. AP NEWS is available 24 hours after it is transmitted and is compiled by more than 1,100 journalists in 141 United States news bureaus and 83

overseas news bureaus. The Associated Press is the largest supplier of general-interest news to the media worldwide, serving more than 15,000 newspapers and broadcast outlets in 115 countries around the world. AP NEWS is available from Dialog Search Service, Palo Alto, California, and contains over 1.5 million records from 1984 to the present. This database is copyrighted by the Associated Press. No part of the AP NEWS database may be published, reprinted, or otherwise redistributed without written authorization from the Associated Press.

*WELD* (Weld Search) contains over 140,000 records from 1967 to the present. Coverage includes joining metals and plastics, metals spraying, thermal cutting and related topics such as brazing, soldering, and microjoining. Weld is produced by the Welding Institute, Cambridge, England, and is available from Orbit Questel, McLean, Virginia.

*Safety Science Abstracts* covers the broad interdisciplinary science of safety —identifying, evaluating, and eliminating or controlling hazards. Safety Science Abstracts covers liability information and phenomena that directly threaten humanity, the environment, or the technology upon which they depend. This database is produced by Cambridge Scientific Abstracts, Bethesda, Maryland, and is available from Orbit Questel, McLean, Virginia. Safety Science Abstracts contains over 80,000 records from 1981 to the present.

The *Bibliography of Cold Regions Science and Technology* (COLD) is produced by the Library of Congress for the U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire. The bibliography contains 150,000 records and is available online from Orbit Questel, McLean, Virginia, and in CD format from NISC Corporation, Baltimore, Maryland. The COLD database provides coverage of areas that are temporarily or permanently affected by freezing temperature, including materials in the Arctic and Antarctic. Snow, ice, frozen ground, navigation in ice, civil engineering in cold regions, and the behavior and operation of materials and equipment in cold temperatures are major subject areas included. The database contains records from 1951 to the present.

*ENERGYLINE* is produced by Petroleum Abstracts, University of Tulsa, and is available from Orbit Questel, McLean, Virginia. Coverage includes economics, U.S. policy and planning, international political and economic issues, R&D, resources and reserves, and petroleum and natural gas resources. Energyline contains approximately 167,000 records from 1965 to the present.

*ICONDA* is produced by the Information Centre for Regions Planning and Building Construction of the Fraunhofer Society, Stuttgart, Germany, and is available online from Orbit Questel, McLean, Virginia. The ICONDA database covers areas of construction and civil engineering. Currently the database contains over 400,000 records from 1976 to the present.

*TULSA* is the online version of Petroleum Abstracts, which is produced by the University of Tulsa, Tulsa, Oklahoma. TULSA provides worldwide coverage of technical literature and patents related to the exploration, development, and production of oil and natural gas. The search of the TULSA database was performed by a TULSA search services specialist. The University of Tulsa, holder of the copyright to Petroleum Abstracts, has given permission for the U.S. Army Cold Regions Research and Engineering Laboratory to include the results from the TULSA search in the larger search contained in this report. The University of Tulsa waives any liability for direct or consequential damages resulting from the use of these records. These records are warranted only as to readability of the medium. The TULSA database contains approximately 565,000 records from 1965 to the present.

## TERMS AND ABBREVIATIONS

The following abbreviations are used in these bibliographies:

| | |
|---|---|
| CIS | Commonwealth of Independent States |
| CWF | Coal-water fuel |
| E&P | Exploration and production |
| EBRD | European Bank for Reconstruction and Development |
| FSU | Former Soviet Union |
| JV | Joint venture |
| R&D | Research and development |

In addition, many of the items appear in non-English journals, books, and newspapers. For the reader's convenience, the titles are translated here:

*Erdoel, Erdgas, Khole* (German): Oil, Natural Gas, Coal.

*Stroitel'stvo Truboprovodov* (Russian): Pipeline Construction.

*Izvestiia Vysshikh Uchebnykh Zavedenii, Neft i Gaz* (Russian): College and University News, Oil & Gas.

*Trudy Ukrainskogo nauchnoissledovatel'skogo gidrometeorologicheskogo instituta* (Russian): Annals of the Ukrainian Scientific Research Hydrometeorological Institute.
*BBR: Wasser und Rohrleitungsbau* (German): Federal Department of Wells, Canals and Pipeline Construction: Water and Pipeline Construction.
*ZIS Mitteilungen* (German): Transactions Central Institute for Welding Technology
*Gazovaya Promyshlennost* (Russian): Gas Industry.
*Koninklijke Vlaamse Ingenieursvereniging* (Belgian): Royal Flemish Engineers Association.
*Energietechnik* (German): Energy Technology.
*Melkomasshtabnye karty otsenki prirodnykh uslovii* (Russian): Small-scale Maps for the Evaluation of Natural Conditions.
*Helsingin Sanomat* (Finnish): Helsinki Newspaper.
*Moskovskie Novosti* (Russian): Moscow News.

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13. ABSTRACT (*Maximum 200 words*)

In 1993 a pilot project between the Defense Technical Information Center and the U.S. Army Cold Regions Research and Engineering Laboratory resulted in a proposal to conduct a state-of-the-art review of technology and techniques for building, operating, and maintaining arctic natural gas and liquid petroleum pipelines in the former Soviet Union. This bibliography was compiled to meet the objectives of the pipeline review. References were compiled on dates of construction, location, route conditions, design, construction, maintainence, environmental impact, accidents, and production management. The bibliography is divided into three sections: Oil and Gas Pipelines, Construction of Oil and Gas Pipelines, and Accidents; it was compiled using commercially available databases. Subjects searched included information on pipelines in the former Soviet Union, primarily in the eastern and western areas of Siberia. References were eliminated that were not of direct interest to the pipeline study.

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