ENERGY
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NUCLEAR ENERGY

NUCLEAR FUEL CYCLE

ERI performs analyses of the present and future international markets for nuclear fuel materials and services. These markets include uranium mining and production of uranium concentrates, conversion services, enrichment services, and fuel fabrication services. Analyses address supply, demand, cost of production for individual suppliers, market factors, price and geopolitical and other issues.

NUCLEAR FUEL PROCUREMENT

ERI supports its clients with the design and development of nuclear fuel management and procurement strategies, including: security of supply, cost, flexibility, and risk; procurement alternatives associated with inventory position, price, schedule and timing; contract types; supplier diversification and flexibility; and procurement procedures. ERI also assists its clients with the preparation of bid specifications for nuclear fuel materials and services; review of supplier facilities; development of guidelines for evaluation of supplier proposals; review and evaluation of supplier proposals; preparation of alternative contract terms and conditions; contract negotiation with suppliers; and evaluation of fuel performance.

NUCLEAR FUEL MANAGEMENT

ERI implements and supports the FUELMACS© Fuel Management and Accounting System, a PC-based system for nuclear fuel management activities including nuclear fuel cost forecasting, financial planning, and fuel fabrication bid analyses. ERI assists nuclear operating company clients in developing realistic nuclear fuel cost goals based on existing contract commitments, future fuel cost analyses, and future fuel cycle designs.

SPENT FUEL MANAGEMENT

ERI provides support to both government and privately managed spent fuel and nuclear waste management programs. ERI prepares technical, economic, and policy analyses. ERI assesses spent fuel storage requirements and costs, spent fuel transportation issues, spent fuel storage costs for decommissioning studies, costs for private and government central storage facilities.

REPROCESSING, RECYCLE, AND POLICY ISSUES

ERI performs assessments of non-proliferation issues, nuclear fuel reprocessing and recycle, plutonium disposition options, the utilization of nuclear weapons derived fissile material in the commercial nuclear fuel cycle; international nuclear trade issues; analysis of the views of key U.S. energy policy makers regarding the nuclear energy option.

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ENERGY RESOURCES INTERNATIONAL, INC.

NUCLEAR FUEL CYCLE CONSULTING

CONSULTING SERVICES

ERI's internationally recognized nuclear fuel cycle experts provide nuclear fuel cycle consulting services to a broad base of clients, including U.S. and international nuclear operating companies, fuel cycle supply and services companies, governments, and industry organizations. ERI provides fuel cycle consulting services in the following areas:

- Supply and demand analyses of individual market segments
- Analysis of market competition and projection of market prices
- Fuel procurement strategies
- Fuel supply bid evaluation and preparation of draft commercial contracts and contract review
- Fuel contracting audits
- Fuel cost analyses and strategic goals planning
- Expert testimony on nuclear fuel market and nuclear waste issues
- Spent fuel storage cost analyses
- High-level waste and spent fuel transportation issues
- Nuclear weapons material disposition

URANIUM & CONVERSION MARKETS

ERI assists its clients in assessing the ever-changing uranium concentrates, natural uranium hexafluoride, and uranium conversion services markets. ERI's staff consultants have extensive experience in analysis of world-wide uranium mining capabilities and production costs, analysis of uranium and conversion services supply, requirements, and price projections, and preparation of bid specifications, and analyses of supply contracts.

ENRICHMENT MARKET

ERI has prepared comprehensive as well as very specialized market assessments for a broad range of clients. It has also provided assistance regarding procurement and contracting of uranium enrichment services to numerous nuclear operating companies. ERI's staff consultants have extensive expertise in analyzing the cost of production for uranium enrichment facilities,

FUEL FABRICATION MARKET

ERI provides analyses of commercial aspects of light water reactor fuel fabrication technologies and commercial contract terms and conditions. ERI prepares assessments of the fabrication market and prices, prepares bid specifications and performs economic and commercial evaluations of contract terms and conditions. ERI also supports its clients by performing internal audits and participating in design review and manufacturing audits.

SPENT FUEL MANAGEMENT

ERI supports its clients in their assessments of the options and costs associated with spent fuel storage, transport and disposal. ERI staff consultants have significant experience in providing technical, economic, and policy analyses to government, nuclear operating company, and privately organized spent fuel management programs.

COMPUTER BASED ANALYTICAL TOOLS

An example of ERI's computer based analytical tools is the widely used FUELMACS© -Fuel Management and Accounting System, which is a personal computer-based system that supports commercial nuclear fuel management activities, including nuclear fuel cost forecasting, financial planning, and evaluation of commercial proposals for nuclear fuel materials and services.

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NUCLEAR ENERGY POLICY

CONSULTING SERVICES

ERI assists its clients in assessing nuclear energy policy issues in the U.S. and worldwide. ERI offers nuclear energy policy consulting services that include:

- Analyses of international nuclear trade issues and non-proliferation policies.
- Assessment of technical, economic and policy issues associated with spent nuclear fuel reprocessing and recycle of plutonium and uranium
- Assessment of the political and regulatory issues associated with the use in U.S. light water reactors of mixed-oxide (MOX) fuel derived from excess weapons grade plutonium

REPROCESSING AND PLUTONIUM UTILIZATION

ERI has performed a variety of analyses assessing the technical, economic and policy issues associated with nuclear fuel reprocessing. ERI performs assessments of non-proliferation issues, nuclear fuel reprocessing and recycling, plutonium disposition options, utilization of nuclear weapons derived fissile material in the commercial nuclear fuel cycle, international nuclear trade issues, views of key U.S. energy policy makers regarding the nuclear energy option. Examples of these analyses include preparation of:

- Report on the realities of reprocessing and plutonium and uranium recycle, addressing differences in policy between the U.S. , Europe, and Japan on this issue
- Study of the potential for constructing a nuclear explosive device using civilian grade plutonium
- Analyses of U.S. institutional policies and attitudes regarding non-U.S. reprocessing and plutonium disposition

NUCLEAR ENERGY

ERI has assisted clients in a wide-range of nuclear energy related issues. Examples of these projects include:

- Review of the background and status of the advanced light water reactor program in the U.S.
- Compilation of a database of the Chernobyl accident health and safety mitigation measures undertaken by the U.S. for the European Union TACIS program
- Analysis of the viewpoints of key U.S. policymakers and institutional participants with respect to the role of nuclear power

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URANIUM CONCENTRATES, URANIUM HEXAFLUORIDE, AND CONVERSION SERVICES

CONSULTING SERVICES

ERI assists nuclear operating companies, fuel suppliers, governments, and investors with assessments of the global markets for uranium concentrates, natural uranium hexafluoride and uranium conversion services. ERI offers consulting services in this area that include:

- Production cost analyses of uranium properties and uranium conversion plants
- Impact assessments of key market factors, including the introduction of surplus nuclear weapons derived materials on the commercial markets for nuclear fuel materials and services
- Analyses of the market opportunities for bringing uranium deposits into production
- Due diligence reviews of uranium properties for prospective buyers
- Analyses of procurement strategies for uranium concentrates, natural uranium hexafluoride and uranium conversion services
- Design of bid specifications for uranium concentrates, natural uranium hexafluoride and uranium conversion services
- Evaluation of contracting issues and supply proposals for uranium concentrates, natural uranium hexafluoride and uranium conversion services

URANIUM AND CONVERSION SUPPLY ANALYSES

ERI has extensive experience in the analysis of issues related to the global markets for uranium concentrates, natural uranium hexafluoride and uranium conversion services. Specific analyses and assistance for clients include the preparation of:

- Nuclear operating company position statements in the matter of the International Trade Administration/International Trade Commission investigations of uranium dumping
- Prospectus for domestic uranium properties, together with assistance in marketing the producer's uranium assets
- Reports on the production cost of uranium at specific major production centers in the Western World, as well as Russia, Kazakhstan and Uzbekistan
- Assessments of the uranium and uranium-equivalent inventories held around the world

URANIUM AND CONVERSION HANDBOOK

ERI prepared a comprehensive Uranium and Conversion Handbook for use by U.S. electric utility company fuel management and procurement personnel, which was widely distributed by the Edison Electric Institute.

EXPERT TESTIMONY

ERI staff consultants provide expert testimony and litigation support related to uranium supply and procurement issues for numerous clients. This support has included the preparation and delivery of:

- Testimony regarding world uranium requirements, supply, economics, industry structure, contracts and market issues
- Testimony for electric utility companies in rate case proceedings regarding the procurement of uranium conversion services

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URANIUM ENRICHMENT SERVICES

CONSULTING SERVICES

ERI assists nuclear operating companies, fuel suppliers, governments, and investors with assessments of the global markets for uranium enrichment services. ERI offers consulting services in this area that include:

- Production cost analysis of suppliers of uranium enrichment services
- Comprehensive analyses of the market for enrichment services with respect to supply, requirements, competition, cost and pricing
- Impact assessments of key market factors, including the introduction of surplus nuclear weapons derived materials on the commercial markets for nuclear fuel materials and services
- Analyses of procurement strategies for uranium enrichment services
- Design of bid specifications for enrichment services
- Evaluation of contracting issues and supply proposals for uranium enrichment services

URANIUM ENRICHMENT MARKET ANALYSES

ERI has extensive experience in analyzing the global market for uranium enrichment services, assessing factors that affect the market, analyzing uranium enrichment production costs, and providing advice to clients regarding uranium enrichment procurement and contracting strategies. Specific analyses completed for clients include the preparation of:

- Reports on uranium enrichment services production costs
- Analyses of alternative uranium enrichment services procurement strategies, which included the evaluation of key contract issues
- Due diligence review of USEC prior to its privatization
- Due diligence review of a potential laser isotope separation technology
- Analysis of the impact of proposed clean air legislation on electric power costs for U.S. gaseous diffusion enrichment plants
- Studies of the economic and institutional issues and options confronting privatization of the U.S. Department of Energy enrichment enterprise

ENRICHMENT HANDBOOK

ERI prepared a comprehensive Enrichment Handbook for use by U.S. electric utility company fuel management and procurement personnel, which was widely distributed by the Edison Electric Institute.

EXPERT TESTIMONY

ERI staff consultants provide expert testimony and litigation support related to enrichment services supply and procurement issues for numerous clients. This support has included the preparation and delivery of:

- Testimony in support of electric utility rate case proceedings in the area of uranium enrichment services procurement
- Testimony in U.S. Nuclear Regulatory Commission license application hearings for the first proposed U.S. centrifuge enrichment plant enterprise

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NUCLEAR FUEL FABRICATION SERVICES

CONSULTING SERVICES

ERI assists nuclear operating companies with assessments of the global markets for nuclear fuel fabrication services. ERI offers consulting services in this area that include:

- Comprehensive analyses of the market for fuel fabrication services with respect to supply, requirements, competition, products, cost and pricing
- Design of bid specifications for nuclear fuel fabrication services
- Development of evaluation guidelines and negotiation strategies for procurement of fuel fabrication services
- Commercial and economic review of fuel fabrication contract terms and conditions
- Audits of fuel fabricator design documents, manufacturing facilities, and fabrication processes
- Seminars on procurement of nuclear fuel fabrication services

FABRICATION MARKET AND CONTRACTING

ERI has extensive experience in evaluating the commercial aspects of light water reactor fuel fabrication technologies, economics and contracting terms. Specific analyses and assistance for clients include the preparation of:

- Analyses of the nuclear fuel fabrication market, including overviews of fuel designs and design trends
- Analysis of market prices and commercial contract terms and conditions – including warranties, lead times, loss rates, termination provisions, etc.
- Complete bid specifications and evaluation guidelines for procurement of fuel fabrication services
- Negotiating strategies for electric utility companies worldwide
- Commercial and economic evaluations of commercial proposals for fuel fabrication services, as both new contracts and contract extensions, and extensive support in negotiation of nuclear fuel fabrication contracts
- Comparison of European fuel fabrication services contracts with typical commercial terms and conditions in U.S. contracts

DESIGN AND MANUFACTURING AUDITS

ERI has experience in fuel fabrication audits, including:

- Serving as technical experts for a nuclear operating company's internal quality assurance audit of nuclear fuel, including procurement and in-core analysis functions
- Assisting with design review audits at the fuel fabricators' design facilities
- Participating in technical design review and manufacturing audits of nuclear fuel manufacturers

FABRICATION HANDBOOK

ERI prepared a Nuclear Fuel Fabrication Handbook for use by U.S. electric utility company fuel management and procurement personnel, which was widely distributed by the Edison Electric Institute.

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SPENT FUEL MANAGEMENT

CONSULTING SERVICES

ERI assists nuclear operating companies in determining the full extent of spent nuclear fuel storage costs over the life of their nuclear facilities and the impacts of projected U.S. Department of Energy acceptance of spent nuclear fuel. ERI offers spent fuel management consulting services that include:

- Comprehensive analyses of alternatives for expansion of onsite spent fuel storage, including estimates of post-decommissioning storage duration and the associated costs
- Projections of plant-by-plant spent fuel shipping schedules based on projected U.S. Department of Energy spent fuel acceptance rates
- Assessment of the licensing status of storage and transportation technologies.
- Comprehensive analyses of the costs, timing, and issues associated with the construction of interim storage facilities
- Analyses, testimony and expert support for spent fuel damages claims against the U.S. Department of Energy.
- Expertise in communicating with the media, public, and government officials about spent nuclear fuel storage, transportation, and disposal issues

SPENT FUEL STORAGE TRANSPORTATION AND DISPOSAL

ERI has extensive experience in providing technical, economic, and policy analyses to government, utility and private spent fuel management programs. Specific analyses completed for clients include:

- Ongoing technical, regulatory, economic and policy analyses of the U.S. civilian radioactive waste management program on behalf of nuclear industry organizations and U.S. nuclear operating companies
- Policy analyses regarding nuclear industry legislative efforts on central interim storage, transport and disposal programs
- Lectures on the subject of U.S. safety requirements for spent fuel storage at International Atomic Energy Agency-sponsored workshops for Eastern European countries
- Preparation of testimony and expert spent nuclear fuel management support to electric utility company in a Certificate of Need application of an onsite spent fuel storage facility.
- Preparation of cost benefit analysis and expert support for the licensing of a private spent fuel storage facility in the U.S.
- Technical and policy support to governments regarding high-level radioactive waste management programs and policies.

SPENT FUEL STORAGE HANDBOOK, TRANSPORTATION OVERVIEW & WORKSHOPS

ERI prepared a comprehensive Industry Spent Fuel Storage Handbook for use by U.S. electric utility companies, which was widely distributed by the Nuclear Energy Institute. ERI also prepared a Spent Nuclear Fuel Transportation Overview, a technical report sponsored by the Electric Power Research Institute, which describes the technical, regulatory and policy framework for transporting spent nuclear fuel.

ERI assisted with the organization and implementation of two jointly sponsored U.S. spent fuel storage workshops for Edison Electric Institute, Electric Power Research Institute, and U.S. Council for Energy Awareness.

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FUELMACS© Fuel Management and Accounting System

DESCRIPTION

FUELMACS© is a comprehensive personal computer-based software application for nuclear fuel management. It is designed to aid in the preparation of the extensive financial planning and nuclear fuel forecasting reports that are associated with nuclear fuel cost planning, reporting and forecasting. Preparation of these financial planning and forecasting reports can be time-intensive. These reports draw information from a multitude of plant operating schedules, supply contracts, pooling and financial arrangements that are associated with nuclear power plant projects within the operating company's system.

The objectives of FUELMACS© are:

- To significantly reduce the amount of time spent in the manipulation of data associated with preparation of these financial and accounting reports
- To provide a single, well-maintained and controlled source of physical, contractual, and financial fuel cycle data for each nuclear power plant in a nuclear operating company's system
- To facilitate the updating and expansion of required analytical capabilities as well as a broad range of data requirements

FUELMACS CONCEPT

FUELMACS© is comprised of a number of well integrated program modules that access and process all relevant data.

Basic fuel cycle design schedules, and contractual and financial data for each nuclear power plant are stored in FUELMACS© data bases. Controlled maintenance and updating of data bases is accomplished through the use of a Visual Basic driven user interface provided as part of FUELMACS©.

FUELMACS© simulates the plant and fuel cycle operating strategies as well as the contractual and financial environment in which the plant(s) operate.

The user may choose to model an entire project comprised of up to 24 plants and 5 participant owners. Alternatively, the user may model the obligations of as few as one of the participant owners for a single nuclear power plant. Studies may be performed for periods of up to 60 years, in a single run.

FUELMACS© is composed of individual modules including:

- Fuel Cycle Design and Scheduling
- Fabrication • Enrichment Services • Conversion Services • Uranium Supply
- Back End • Amortization • Reporting • Reload Detail and • Cash Flow

INDUSTRY EXPERIENCE WITH FUELMACS

FUELMACS© is presently licensed to twelve nuclear operating companies that have fuel management responsibility for more than one-half of the nuclear power plants currently operating in the U.S.

As fuel managers are being asked to do more with less, FUELMACS© may be just the tool to assist you in simplifying your fuel management accounting and reporting requirements

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ANNUAL NUCLEAR FUEL CYCLE SUPPLY AND PRICE REPORT

DESCRIPTION

The ERI annual Nuclear Fuel Cycle Supply and Price Report is a comprehensive report of approximately 400 pages that provides a current and in-depth assessment of each segment of the international nuclear fuel market. Market segments addressed in the report include nuclear power generation, natural uranium, uranium conversion services, uranium enrichment services, fuel fabrication, and spent fuel disposal, as described below.

NUCLEAR POWER

ERI develops nuclear power growth forecasts on a plant-by-plant basis for the United States, Canada, Western Europe, East Asia, Eastern Europe, the Commonwealth of Independent States, the Peoples Republic of China, and other countries. These forecasts are based on assessments of the social, political, and economic conditions and prospects for nuclear power in these countries and regions.

NATURAL URANIUM

ERI examines the world uranium market, including analysis of worldwide inventories, projection of uranium requirements, uranium supply contract commitments, and unfilled requirements. Uranium supply analyses includes evaluation of uranium reserves and resources of supplier countries and projected uranium production capability. Long-term prices for uranium are projected.

CONVERSION SERVICES

ERI analyzes the international market for conversion of natural uranium from U_3O_8 to UF_6. This includes an assessment of the requirements for uranium conversion services, primary conversion services supply capability and weapons-derived inventories, factors affecting the conversion services market, and the long term market outlook. Long-term prices for conversion services are projected.

ENRICHMENT SERVICES

ERI analyzes the international market for uranium enrichment services. This includes an examination of the major factors affecting the requirements for enrichment services, such as world nuclear capacity, operating performance and tails assay. Individual supplier production capability and weapons-derived inventories are assessed. The result of these analyses is a projection of the outlook for competition in the enrichment market, as well as price projections for uranium enrichment services under a range of scenarios.

FABRICATION SERVICES

ERI assesses the U.S. fuel fabrication market, including the supply capability of individual fabricators and projected commercial fabrication requirements. ERI also examines the worldwide market for fabrication services, including individual supplier capability and projected fuel fabrication requirements. Long-term prices for U.S. light water reactor fuel fabrication services are projected.

SPENT FUEL MANAGEMENT

ERI describes the status of current developments in the U.S. civilian radioactive waste management program and their implications for the future. ERI also examines the adequacy of the current nuclear waste disposal fee with respect to projections of program expenditures. The regulatory status of dry storage systems and the unit costs for onsite dry spent fuel storage are also examined.

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