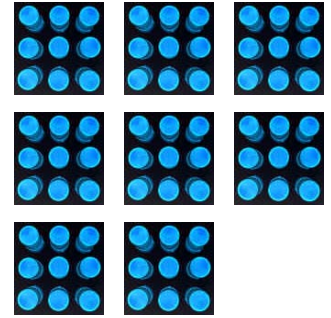


The
RESOURCE
in
UTILITY
RESOURCE
ASSOCIATES



FROM THE PRESIDENT



"The electric utility industry continues to be a changing landscape. Changes range from new plant owners or managers to who is performing the analysis of record. This continues to create a challenging environment for both the utility companies themselves as well as their consultants. In response, URA is continuously examining its role during this period to remain competitive, continue to offer quality services and adapt to the changing market place."

"URA is nuclear fuel. Our services cover the full spectrum of utility fuel organization activities from scoping evaluations to reload design and safety evaluations. We have provided services for engineering and economic analysis, software development, and for technical oversight and assessments.

Traditionally, we have helped licensees develop and perform their own independent in-house capabilities in fuel procurement, reload design and operations support. Today the trend is toward the analysis of record being performed by the fuel vendor with the utility staff performing reload design evaluations. URA is currently re-evaluating its role in staff augmentation services to help meet the void in nuclear resources.

However, with changes still looming on the horizon during this era of utility consolidation, we will remain flexible and respond as quickly as possible to our client's changing needs."

- Rodney L. Grow, President

ABOUT URA

Utility Resource Associates (URA) offers a comprehensive range of technical and management services to the electric utility industry. Our team of engineers, physicists, computer scientists, and economists combine to bring expertise in nuclear engineering, reactor analysis, software development, quality assurance, economic evaluations, training, and project management.

Founded in June 1986 to bring technical and management consulting resources to the electric utility industry, URA develops workable real world solutions to the complex spectrum of problems facing reactor operator and fuel service companies today. Whether it's in fuel management, reactor analysis, procurement planning, safety analysis, quality assurance, or on-site staff augmentation, URA focuses on reliable results which exemplify a commitment to quality and long-term performance.



The material presented in this brochure highlights the services and products available from URA. As you read through the material, we hope you gain an appreciation of the strength of shared experience among the talented associates who make URA the strong company it is today. Our products and services are highly respected within the nuclear industry as evident by the impressive list of leading companies URA has supported over the last 19 years.

Finally, we hope you find this brochure informative and a handy reference for any future consulting needs you may have. We are here to help.

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SERVICES



URA provides an array of engineering, economics, software, and management consulting services to the nuclear power industry. Chances are we have the experience you're looking for. Review the various services provided by URA and see if URA can help meet the needs of your organization.

Don't see the service you need? Contact URA at **301-294-1940** to arrange a face-to-face meeting to better explore how URA can fulfill your business needs.

TECHNICAL ASSESSMENTS AND VENDOR OVERSIGHT

URA has a 19 year history of providing utility fuel organizations independent assessments of their analysis or the analysis performed for them by their fuel supplier. The scope of the technical assessments may range from a specific reload campaign to a broader analysis methodology review. Vendor oversight activities are technical in nature, examining both the methodology used to perform the analysis, and adherence to technical and administrative procedures. URA will also review the critical aspects of the core design and reload safety analysis used in the preparation of the final reload licensing report. Deliverables typically include an on-site inspection of the vendor's analysis at the vendor's facility, and a report documenting the assessment of the reload design conformance by the vendor.

Our familiarity with all U.S. fuel vendor reload design and safety evaluation methodologies, plus our hands-on experience with BWR and PWR fuel designs, provides a solid foundation for multi-discipline technical assessments pertaining to new fuel designs, new fuel management strategies, or new analysis methodology. In fact, URA was selected to provide technical expertise to the NRC as part of the NRC fuel vendor inspection team of all five U.S. nuclear fuel vendors in business at the time of the reviews (General Electric, Westinghouse, Combustion Engineering, Siemens, and B&W). NRC inspection support activities included evaluations of the nuclear fuel design and safety evaluation process, fuel production processes, nuclear analysis methodology and benchmarking. If URA can help the NRC keep tabs on the fuel vendors, imagine what we can do for your vendor oversight.

IN-CORE FUEL MANAGEMENT

URA provides a range of in-core fuel management services to the nuclear power industry. Frequently utilized services include independent reload design evaluations, multi-cycle fuel plans, and technical evaluations of competitive fuel bids. URA developed for a large nuclear operating company a series of fuel assembly and reload design procedures for their PWR and BWR reactors. These procedures provide the staff engineers with the design criteria and guidelines necessary to develop optimum assembly and reload designs.

RELOAD ANALYSIS SUPPORT

URA performs reload analysis verification and independent design reviews for both PWR and BWR customers, and has developed multiple core physics models in support of a customer's transition from one code set to another. This activity includes historical benchmark calculations covering three or more reload cycles to validate the reload models. The most recent model developments have utilized the CASMO-4¹ lattice physics code and both the SIMULATE-3¹ and MICROBURN-B2² core physics codes. URA has a use-license and was a primary participant in developing the EPRI CPM3 and CORETRAN computer codes, and has experience with multi-cycle analysis using all of the code sets noted above.



SAFETY ANALYSIS SUPPORT

URA has performed numerous Reload Safety Evaluation (RSE) activities for both domestic and international customers. These activities have included the preparation of a program plan for RSE development, preparation of topical reports for NRC submittal, and review of topical reports prior to NRC submittal. One example of URA safety analysis support was the technical assessments and methodology assistance provided to a Spanish operating company seeking regulatory approval for the generic application of their RSE methodology. URA also provides long term support of utility RETRAN³ analysis activities, and has recently completed the development of a safety related code to link MICROBURN-B2² and RETRAN-3D³ to perform 1-D and 3-D analysis of transients.

CORE MONITORING SUPPORT

URA developed the one-point method of PWR ex-core nuclear instrumentation calibration in the early 1990's. The methodology and supporting 10CFR50.59 evaluations were implemented at most domestic Westinghouse units and at the Koeberg plant in South Africa. On the BWR side URA has developed monitoring system models and performed multi-cycle benchmark calculations in support of utility transitions from older monitoring systems to newer core monitoring systems.

SIMULATOR SUPPORT

The URA staff has supported the procurement and construction of several full scope nuclear simulators. Activities included the preparation of the technical material of the plant simulator proposals, monitoring vendor construction progress and compliance to the procurement specification, software design reviews, interim design specification evaluations, recommendations on equipment substitutions, and acceptance testing.



CODE DEVELOPMENT AND ENHANCEMENTS

URA software services include the customization of customer licensed software, development of industry and customer-funded stand alone applications, and the internal development of a range of productivity enhancing applications. These activities have included:

- Development and licensing of the PC-based Core Physics Workstations with integrated linking software used for lattice physics and multi-cycle reactor simulation to five companies that use different legacy codes (CPM-2³/PCNODE, CASMO-3¹/NEMO², CASMO-4¹/SIMULATE-3¹, and CASMO-3/SIMULATE-E³). This URA product is highlighted in the Products section and a demonstration CD is available upon request.
- Supported the development of the code specifications, Verification & Validation plans, and implementation of the next generation EPRI nuclear analysis software packages including CPM3 and CORETRAN.

FUEL ACCOUNTING

URA has developed and licensed Microsoft Office applications to four companies to manage nuclear fuel purchase orders, work orders, invoices, resulting inventory lots with country of origin designations, and the fuel expense forecast. Two of these products are highlighted in the Products section. URA also has performed a review of technical and financial bases of a company's spent fuel and reactor decommissioning plans to assess the adequacy of the current decommissioning fund.

TECHNICAL TRAINING

Have corporate cutbacks cost your organization the collective knowledge it needs to carry out its responsibilities? URA staff have developed and provided methods training to multiple utility nuclear analysis organizations covering topics such as CASMO-4/SIMULATE-3¹ model development and reload applications, reload design, fuel management, enrichment setting, vendor RSE methodology and safety parameters, overview of UFSAR events, and setpoint verification. URA has also performed competency assessments to identify the skill gaps in an organization so the maximum benefit could be obtained from training by concentrating on specific areas.

RECORDS MANAGEMENT

Administrative procedures, technical procedures, vendor documents, calculation files, plant drawings, corrective actions, industry event assessments, training and qualification records, incoming correspondence, outgoing correspondence, electronic correspondence, and software error notices and updates. How can an organization keep track of all the information it receives? The URA staff has experience in developing design specifications, database product evaluation and selection, and process implementation for the records management systems needed for today's nuclear industry organizations.

MANAGEMENT AND WORK PROCESS ASSESSMENTS

URA has performed organizational and capabilities reviews to assess the reload fuel design functions involving central nuclear engineering groups servicing several nuclear power plants, and developed a strategy for each organization to carry out the reload design and accounting responsibilities consistent with the goals of the company and the various engineering groups.

STAFF AUGMENTATION

How many times has your organization delayed or canceled important development projects because you just didn't have the resources available? As a result, your organization is still using those same inefficient, out-dated tools and processes you've been using for years. Break free from the treadmill and get the resources you need today! URA can provide the resources your organization needs to get the work done. Whether you want URA to manage a specific project or just free up your staff to work on new projects, URA has the expertise to help you take your organization to the next level.

PRODUCTS

URA has developed several productivity applications to improve the ease of performing specific engineering and fuel accounting tasks for which the utility customer is responsible. Contact URA at **301-294-1940** for more information concerning existing URA productivity applications or to find out if URA can develop a tailored solution to improve the productivity of your organization.

The screenshot shows a window titled 'SIMO SHUFFLE' with a sub-window 'Unit 1 Cycle 8 BOC trial LP starting at 0 GWd/MTU PWR'. The main area contains a grid of numerical data organized into rows labeled H, G, F, E, D, C, B, and A, and columns labeled 1 through 7. The data represents various parameters across different core regions. At the bottom right of the grid, there are summary statistics: Power=100.0%, Core Expt=18.54, K-eff=1.0000, Burnup=1526.77, Peak LTR of 6.6,17, and AO=0.95%.

CORE PHYSICS WORKSTATION. The Core Physics Workstations developed by URA provide a Windows graphical user interface (GUI) to lattice physics and nodal simulation codes used for core design, operations support and fuel management. Both PWR and BWR versions were developed with Visual Basic Interface programming that easily permits customization of displays, yet provides flexibility for all reactor designs. Interfaces to SIMULATE-3¹, NEMO² and CORETRAN³ have been implemented as well as our fast running PCNODE for scoping studies.

The Core Physics Workstation is used by design engineers to modify loading patterns using the computer mouse to “drag and drop” assemblies, setup and submit full core nodal cases to analyze the loading patterns, retrieve and summarize results using graphical output displays, and develop cycle depletion step out and control rod sequence cases for BWRs.

After the design for the new reload is completed, the core analysis engineer or the reactor engineer can use the CPW to setup and submit full core or quarter core cases to analyze cycle depletion scenarios, setup and submit cases to analyze ECPs and shutdown margins, and evaluate thermal margins and analyze alternate operating strategies.

To aid in the quick analysis of results, the CPW graphics provides full and quarter core maps displaying bundle power, exposure, reactivity, thermal limits and fuel description information, axial distributions for power, reactivity, and exposure, and time dependent displays of reactor power, boron, rod insertion, thermal limits and reactivity coefficients. In addition, the CPW provides tabulated results in spreadsheet format which can be saved directly in a spreadsheet program.

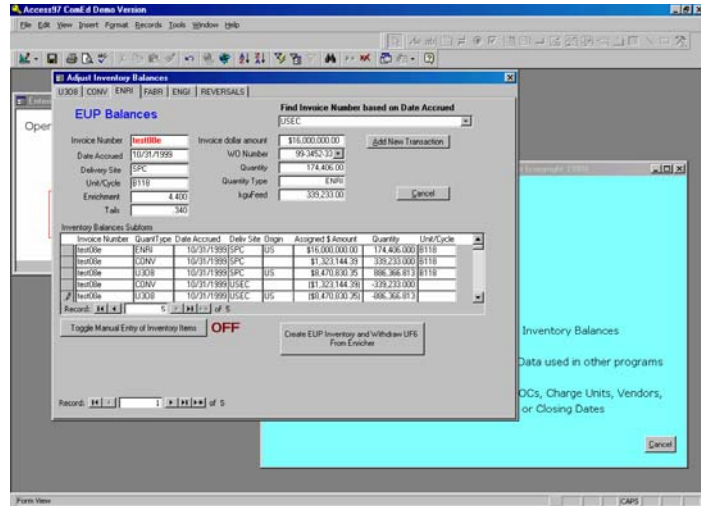
CUSTOMIZED MODEL BUILDING APPLICATIONS.

URA has developed various customized auxiliary applications for passing neutronic data between lattice physics codes, nodal simulation codes and safety analysis codes. URA can customize the existing applications to meet your specific core model building process.

The screenshot shows a window titled 'Spent Fuel Pool'. It contains a table with columns: Fuel Num., Fuel Type, Next Avail., Next Descrp., Next ID, Locat, Burnup, K-Inf, and (I,J). The table lists several fuel assemblies, including 026 004 46014800 R02, 035 012 48006400 S03, 036 016 48006416 S01, 037 008 48010000 S33, 038 032 48014816 S41, and 039 001 14000000 S77. A 'Fresh Fuel Listing' section is also visible at the top of the table.

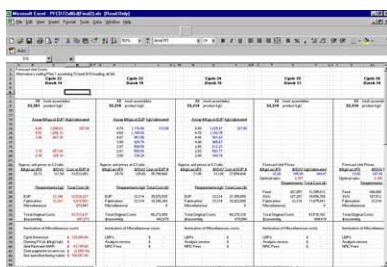
FUEL INVENTORY DATABASE. URA has developed four Microsoft Access databases to assist the core management and procurement specialists in performing their job functions. Each database is easy to customize, use, and maintain, and may be an ideal simple solution for any organization that is consolidating data from several diverse sources. The databases include embedded text and graphical reporting capabilities, as well as hyperlinks to Excel and Word applications for additional report preparation and analysis. Because of the familiar Microsoft interface, individuals may perform software training at their own pace and can customize the database as the need arises.

The most requested database is the Fuel Inventory Database. This database assists the core management and procurement specialists in performing their job functions. The Fuel Inventory Database uses Visual Basic coding to update inventory quantity and dollar balances as “feed material” is processed through the fuel cycle. This is done for U_3O_8 and UF_6 -natural on an average inventory cost basis. The application performs a calculation of total U_3O_8 feed requirement for a conversion invoice, and then employs a drop-down box to let the user assign specific pounds U_3O_8 by Country of Origin as feed material up to the total requirement to feed the invoiced kgU of conversion service. The inventory held at each converter site by Country of Origin should be the same in the database as is reported by the conversion company in its “detail reports.”



For enrichment invoices, the application performs a calculation of total UF_6 feed requirement based on information entered on the Invoice Form (enrichment assay, kgU enriched product, and tails assay) for each of the enrichment invoices. Fabrication invoices may be assigned to both capital and expense Work Orders. For engineering, the database can monitor and assign both outside contract services and internal engineering labor expense and assign these to a specific reload.

FUEL ACCOUNTING AND EXPENSE FORECASTING WORKBOOK. URA has developed and licensed a Microsoft Excel workbook that allows the customer to calculate monthly and forecast fuel expense for procurement activities without the use of a complicated proprietary computer program. Customers have used the workbooks to review fuel cost computations, analyze cost projection methodologies, develop multi-year fuel budgets, perform present value analysis of UF_6 inventory disposition options, and assess the projected funding level in the decommissioning funding plan.



CLIENTS

URA has been a valued resource to a significant portion of the domestic power industry in the United States. However, as seen by the list below, our reputation for ready support and technical expertise is not limited to our borders. And the list of customers is growing every year. Contact URA at **301-294-1940** to get your company added to the list.

Domestic Power Industry

- AmerenUE
- American Electric Power Service
- Arizona Public Service
- Constellation Energy
- Dominion Energy
- Duke Energy
- Energy Northwest



- Entergy Nuclear Northeast
- Entergy Nuclear South
- Exelon Nuclear
- FirstEnergy Nuclear Operating
- Florida Power & Light
- Nebraska Public Power District
- Northern States Power (Xcel Energy)

- Nuclear Management Company
- Pacific Gas & Electric
- PPL Susquehanna LLC
- Progress Energy
- Public Service Electric & Gas
- Public Service of New Mexico
- Salt River Project



Domestic Power Industry (continued)

- South Carolina Electric & Gas
- STP Nuclear Operating Company
- TVA Nuclear
- TXU Energy
- Wisconsin Electric Power
- Wisconsin Public Service
- Wolf Creek Nuclear Operating Corp.



Regulatory Agencies

- Nuclear Regulatory Commission

Research Organizations

- Electric Power Research Institute

Education

- University of Maryland

International Organizations

- British Nuclear Fuel Limited
- Decision Focus Incorporated
- Eskom
- Iberdrola, S.A.

Fuel Services

- Siemens Power Corporation
- U.S. Enrichment Corporation
- Westinghouse Electric Company

ACKNOWLEDGMENTS

1. The computer programs CASMO-3, CASMO-4 and SIMULATE-3 and related methodology are products of Studsvik Scandpower, Inc.
2. The computer programs MICROBURN-B2 and NEMO and related methodology are products of Framatome ANP.
3. The computer programs CPM-2, CPM-3, CORTRAN, RETRAN, and RETRAN-3D and related methodology are products of the Electric Power Research Institute.

PROFILES

URA provides expertise to its customers through a dedicated and experienced staff of engineers, physicists, and economists, retired industry experts, and affiliated associates. These individuals have substantial experience in resolving industry issues, as well as helping to identify and promote positive trends in fuel analysis methodology and plant operations support procedures. URA has substantial breadth of experience in its staff.

URA provides consulting service in accordance with accepted quality assurance practices that conform to applicable portions of 10CFR50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants", and pertinent codes, standards and regulatory requirements to control and monitor these activities.

The URA Quality Assurance Program is governed by four documents:

- The Quality Assurance Plan (URA-RP-87-001) which describes in general how the URA Quality Assurance Program will function.
- Engineering/Programming Procedures (URA-PC-87-001) which govern how a particular task is to be performed.
- Quality Assurance Procedures (URA-PC-87-002) which describe how the Quality Assurance Program is implemented.
- Software Development Procedures (URA-PC-95-001) which govern the development of software by URA.

URA is a qualified vendor of safety related engineering analysis and software as noted in NUPIC Audit Report SA2001-07 done by Entergy Nuclear Operations in August 2001 and the audit conducted by Arizona Public Service and Exelon Nuclear in 2004. Several other nuclear generating companies maintain information about URA services in the NUPIC database.

The effectiveness of our quality assurance program is measured by the individuals who perform the work under the program. Resumes are available upon request.

CONTACT INFORMATION



Corporate Headquarters

Utility Resource Associates Corporation
1901 Research Boulevard, Suite 405
Rockville, MD 20850-3164

Tel. 301-294-1940
Fax 301-294-7879

Directory

URA - Rockville, MD

| | | |
|-----------------|-------------------|--------------|
| Rodney L. Grow | rlgrow@urac.com | 301-294-0866 |
| Donald D. Hines | ddhines@urac.com | 301-294-1330 |
| Don Hodges | dhodges@urac.com | 301-294-1336 |
| Peggy F. Corbin | pfcorbin@urac.com | 301-294-1940 |

Associates

| | | |
|----------------------|-------------------------|--------------|
| Leila M. Bristow | lmbristow@urac.com | 410-461-4900 |
| Richard C. Kern | rckern@urac.com | 301-473-8099 |
| Donald A. Lampe | dalampe@urac.com | 301-530-2958 |
| Eric K. Rockett | ekrockett@urac.com | 509-377-4193 |
| Kurt A. Weidenhammer | kaweidenhammer@urac.com | 612-664-0061 |
| Alex C. Schafer | acschafer@urac.com | 301-294-1940 |