Information Management in Nuclear Power

Frank-Peter Ritsche, PMP
Project Management Initiative / AREVA Framatome ANP

DaratechPLANT 2006
Houston, January 23-25, 2006
AREVA in the United States

The #1 nuclear energy vendor in America and a key player in the distribution and transmission of electricity.

AREVA, Inc. is headquartered in Bethesda, Maryland.

Subsidiaries: COGEMA, Framatome ANP, Canberra and AREVA T&D.

www.us.areva.com

AREVA US Key Figures

5,300 employees

locations in 23 states

2004 Revenues: $2,1B

Constellation Energy announce its intent to file with the Nuclear Regulatory Commission (NRC) for a combined construction & operation license (COL). Sites under consideration are Calvert Cliffs NPP and Nine Mile Point NPP. (2005-10-27)

FPL Group and Constellation Energy announce strategic combination of their two companies, creating the nation’s # 1 competitive energy supplier. (2005-12-19)
UniStar Nuclear – A joint venture for the U.S. EPR

„UniStar Nuclear provides the business framework through which the first fleet of advanced nuclear power plants in America in nearly three decades could be developed and deployed.“

„UniStar Nuclear will market a standard advanced design called the U.S. Evolutionary Power Reactor (U.S. EPR), a 1,600-megawatt evolutionary power reactor designed for America by AREVA Inc.“

„The design will be licensed and ready to deploy in America to help companies meet their demand forecasts for new power on the grid by 2015“

UniStar Nuclear - Press release, September 15th, 2005
The EPR is an advanced evolutionary pressurized water reactor (PWR) designed by Framatome ANP, an AREVA and Siemens company.

Electric Output: 1,600 MWe  
Reactor Power: 4,300 to 4,500 MWt  
Design Life: 60 years  
Fuel Type: Enriched (up to 5%) uranium and/or mixed-oxide (MOX)

More information on: [www.unistarnuclear.com](http://www.unistarnuclear.com)
The EPR in Europe

Olkiluoto 3 (Finland)
First concrete: 2005
Operation: 2009

Flamanville 3 (France)
First concrete: 2007
Operation: 2012
Information Management in a project comprises

- Project Management
- Design Integration
- Engineering
Project Management considers the integration of

- time & resource information
- commercial information and
- scope, which for a plant project is
  - documentation
  - data and
  - material

Project reporting covers in addition

- quality
- risks
Design Integration
in Framatome ANP is achieved within Aveva’s VANTAGE suite of Engineering tools

- **Vantage VPE**
  Systems Design database
- **Vantage VPD (PDMS)**
  3D Design
- **Vantage VPRM**
  Material Management
Information Management in New Plants Projects

Engineering within the specific disciplines is supported by specific design tools from market or in-house.
The Framatome ANP Information Management System
The Framatome ANP Information Management System

- Time Scheduling
- Reporting
- Commercial Management
- Document Management
- System Design Engineering DB
- Plant Layout 3D-Model
- Material Supply Chain
Our partners are the world market leaders in their field
Engineering Information Technology for the EPR

In the frame of the implementation of Aveva‘s VANTAGE tools for the Olkiluoto 3 project Framatome ANP contracted to AVEVA major enhancements to VANTAGE VPE and VPD:

- integration of valve catalogue in VPE
- extension of attributes in VPE workbench (from 80 to > 300 per module)
- interface with electrical & I&C tools
- Full support of KKS throughout VANTAGE

- a successful partnership:
Today more than 200 Engineers in 5 different locations in France, Germany and Finland are designing simultaneously the EPR detailed plant layout in 3D.
Framatome ANP is taking full advantage of the complete and fully integrated VANTAGE suite of Aveva's tools

- VPE P&ID and VPE Workbench for process design
- PDMS (VPD) for 3D plant layout
- VPRM for material management
- MDS for detailed support design
- Model Manager for interfacing VPE and VPD
- Global for synchronizing the 3D around the globe
AREVA is serving the entire lifecycle of a nuclear power plant, from uranium mining to fuel fabrication, from plant construction to service and power transmission and distribution.

Framatome ANP as part of AREVA provides supplies and services in the four business groups plants, service, components and fuel
Life Cycle Asset Management requires the Owner/Operator not only to maintain the physical plant during its entire life time, but also the plant information: documents and data.
Life Cycle Asset Management

The challenge of maintaining information

Data volume and application diversity increases over life-time

Data integrity and application richness decreases over life-time

Design → Construct → Commission → Operate → Service → Maintenance
Life Cycle Asset Management

The benefit of managing plant information

Study from Coopers & Lybrand analyzing the benefits that accrued from managing information for offshore oil and gas installations through the plant life: “an operator could reduce the whole life cost of the asset by 10%”

- Reduce 10-30% of concept development time
- Reduce 15-28% of engineering hours
- Increase 30% engineering productivity
- Reduce 10-30% cost of quality and change management time
- Reduce 15-20% commissioning engineering hours
- Reduce 60% handover and startup costs
- Reduce 10-20% IT costs
- Reduce 10-20% operational costs

Since start of the EPR-project on Olkiluoto 3 site, Framatome ANP implemented a fully integrated „Information Management System“ for Engineering and Project Management.

The information generated by Framatome ANP is being handed over to the Owner/ Operator in a continuous process.
Data Handover to the Owner/Operator

*Increasing sophistication in information management and business benefit*

**Structured data**
- native file
- electronic image
- hard copy

**Structured data model**
- Word
- Excel
- AutoCAD
- TIFF
- PDF

**Filing & retrieval**
**Tracking & monitoring**
**Workflow for creation**

**Life Cycle Asset Information Management**
**Content management**

*Increasing sophistication of Information Forms and cost of conversion from hard copy*
Only data handover in a structured data model of neutral format provides maintainability of information beyond the life time of specific system applications over 60 years of plant operation.
Data Handover to the Owner/Operator

Life Cycle Asset Management Solution – An Owners’ system

Enterprise Portals

Enterprise Application, Process & Information Integration

O&M Web-Portal

O&M Data Integration

Other O&M Applications

DMS

Technical Data Hub

3D Visualization

CMMS

DCS

Inspection

PI

Material Management

ERP
Standardization of Data Handover

Standardized Data Model

- Engineering Subcontractor
- Supplier/Manufacturer
- Operation of other plants

Handover EPC → C/O

Mapping

- Design
- Construct
- Commissioning
- Operation
- Service
- Maintenance

EPC/Plant Designer

Supplier/Manufacturer

Operation of other plants
Standardization of Data Handover

Standardization for Data Handover is driven by oil & gas industry:

1998 – EPISTLE handover guide 1+2
2004 – ISO 15926
2005 – Capital facility information handover guide
2006 – ... might be the time, power industry adopts ISO 15926 as a standard ...

ISO 15926 is an International Standard for the representation of life-cycle information for process plants.

ISO 15926-2 Data Model - specifies a generic, conceptual data model that supports representation of all life-cycle aspects of an oil and gas production facility.

ISO 15926-4 Reference Data - defines the initial set of standard reference data for oil and gas production facilities. This part is also known as the EPISTLE Reference Data Library (ERDL).

ISO-15926-7 XML Implementation - specifies the methods by which part 2 and part 4 can be implemented using XML.
ISO 15926 - Part 7

Source: [http://www.fiatech.org/projects/idim/dsciso15926.htm](http://www.fiatech.org/projects/idim/dsciso15926.htm)

A Confederation of participating Façades
By mapping system data to and from the standard ISO 15926-7 Transfer File format a Façade can be populated or read.

Façades can communicate with each other over the Internet on a semantic level (they "understand" each other).

In this way the standard ISO 15926-7 format plays the same role for computer systems as English (or any other important natural language) in the communication between human beings.
Information Management and Handover Strategies

A challenge for Operators and Plant Designers in Nuclear Power:

- Evolute ISO 15926 standard to the needs of the nuclear power industry
- Establish ISO 15926 as standard for data handover
- Enforce IT-solution providers to provide tools conform with ISO 15926
- Enforce IT-solution providers to allow easy changes to the data without the need to implement the full original tool

The benefit for the Owners & Operators:

- Limit Operators‘ costs for software licenses/ updates & staff qualification
- Ensure life-time maintainability of information independent from IT-tools
- Facilitate and accelerate data handover processes
In the context of providing increased customer responsiveness and higher caliber products and services, the **Framatome ANP Project Management Initiative** has been initiated in 2003 by the president of Framatome ANP as a tool being developed throughout all business sectors and all regions of Framatome ANP to strengthen and to harmonize the project management practices.
# DaratechPLANT 2006 Agenda:

## Day Prior - Sunday, January 22, 2006

**Daratech Registration 4:00PM - 7:00PM**

## AVEVA Reception 4:00PM - 7:00PM First Floor Atrium Area

## Day One - Monday, January 23, 2006

### Morning Session 8:00am - 11:30am

**Sustaining Competitive Advantage in Today's Environment**

People, processes, technologies — these are the ingredients that, when coupled with a good business model, create competitive enterprises. Mostly, we are focused on the details of schedule compression, cost reduction, safety, business- and engineering-process enhancements, six-sigma quality, and the opportunities created by the rising price of oil and other energy sources and forget the human aspects of business without which all would be pointless or lost. This session presents Daratech's latest research on the psychology of process change and its impact on the deployment of new technologies.

**SPEAKER**

*Charles Foundyler*, Chief Executive Officer, *Daratech, Inc.*

### Keynotes — Visionary Insights from Industry Thought Leaders

Explore how the world's leading OO and EPC firms are harnessing the power of technology to streamline plant operations, reduce costs, combat security risks and make better business decisions. This session will highlight how an increased focus on strategy and innovation can position your company as a dominant force in the marketplace.

**SPEAKER**

*Brian Chang*, Chairman & CEO, *Yantai Raffles*

*Tim Killen*, Bechtel Group, Inc. (retired)

### Previews of Solution Providers' Breakout Sessions

Co-Sponsors will preview their breakout presentations. These breakouts will feature new technologies, early looks at new releases, and demonstrations of the latest products. This session is designed to help you decide how to allocate your time during the breakouts.

**Breakout Session 11:30AM - Noon**

### Luncheon Noon - 1:00PM

**AVEVA Luncheon: Noon - 1:00PM Wedgwood Room**

*Hosted Exclusively for OOs and EPCs*

**Breakout Session 1:00PM - 3:30PM**
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<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
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<tr>
<td>Afternoon</td>
<td><strong>ASSET LIFECYCLE MANAGEMENT</strong></td>
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<td>3:30PM - 6:00PM</td>
<td><strong>FIATECH Interoperation Initiative</strong></td>
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<td>Hear directly from FIATECH about this project, intended to fine-tune life cycle management across the industry and allow organizations to look at interoperation from a business perspective. Learn about the initiative and how it can save your company millions.</td>
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<td><strong>SPEAKER</strong></td>
<td><strong>Ric Jackson</strong>, Director, FIATECH</td>
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<td><strong>Interoperability — Is it Really Possible?</strong></td>
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<td>Lack of interoperation between IT systems is a major challenge. This session will focus on critical interoperability issues, approaches to overcoming obstacles and what users want from solution providers.</td>
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<td><strong>SPEAKERS</strong></td>
<td><strong>Yogesh Srivastava</strong>, Senior Project Information Manager, Fluor Canada Ltd.</td>
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<td><strong>Jerry Gipson</strong>, Director of Integrated Engineering Solutions Technology Center, Dow Chemicals</td>
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<td><strong>CTO Panel Discussion</strong></td>
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<td>Hear from leading supplier Chief Technology Officers about their initiatives to overcoming interoperation obstacles.</td>
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<td><strong>MODERATORS</strong></td>
<td><strong>Charles Foundyller</strong>, Chief Executive Officer, Daratech, Inc.</td>
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<td><strong>Ric Jackson</strong>, Director, FIATECH</td>
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<td><strong>PANELISTS</strong></td>
<td><strong>David Wheeldon</strong>, Group Product Development Director, AVEVA</td>
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<td><strong>Rob Whitesell</strong>, Chief Technology Officer, Bentley Plant, Bentley Systems</td>
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<td><strong>Thomas J. Van Laan, PE</strong>, President, COADE</td>
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<td><strong>Christian Barlach</strong>, Director, R&amp;D Solutions, Shipbuilding, Process, Power &amp; Petroleum, Dassault Systems</td>
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<td><strong>Charles Evans</strong>, Chief Technology Officer and Executive Vice President, Development, Intergraph</td>
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<td><strong>David Parry</strong>, Chief Technology Officer, McLaren Software</td>
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<td><strong>Ray Simonson</strong>, Chief Technology Officer, Software Innovation</td>
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<td><strong>Mitch Vaughn</strong>, CTO, Production Management Products, UGS</td>
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<td><strong>Alain Hubrecht</strong>, President and Chief Technology Officer, VRcontext</td>
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<td><strong>Trends In Instrumentation and Real-Time Operations</strong></td>
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<td><strong>SPEAKER</strong></td>
<td><strong>Curtis Kelly</strong>, Senior Business Consultant, Invensys</td>
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<td><strong>Agility: Coping with Fluctuating Energy Prices</strong></td>
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<td>Rising costs mean optimizing energy efficiency through innovation. How can your company lower energy costs without making drastic changes to the manufacturing process?</td>
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<td><strong>How to Execute Very Large High-Definition Survey Plant Projects</strong></td>
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<td><strong>SPEAKER</strong></td>
<td><strong>Luis Uriarte</strong>, President, S&amp;C Technologies</td>
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<td><strong>Automating Maintenance with CMMS</strong></td>
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<td>Learn how Computerized Maintenance Management Systems can provide complete control of the preventative maintenance process and how CMMS provides immediate access to critical maintenance information.</td>
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<td><strong>SPEAKER</strong></td>
<td><strong>R. Eric Bevevino</strong>, Business Manager, Industrial and Integrated Solutions, ChevronTexaco</td>
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<td><strong>World-Class Lifecycle Information Management</strong></td>
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<td>So much data - over a possible 50-year lifespan. How do leading companies ensure the availability of all information required for efficient decision making in operation and maintenance? Learn the processes and tools used to link asset data, plant control and maintenance management systems.</td>
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<td><strong>SPEAKERS</strong></td>
<td><strong>Rosli Abdul Hamid</strong>, CEO, GB3 Sdn. Nhd &amp; Head of LCAIM, Malakoff Berhad</td>
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<td>Afternoon</td>
<td><strong>Bentley’s Fourth Annual ENR Awards Dinner</strong></td>
<td>Wedgwood Room</td>
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<td>6:00PM - 8:00PM</td>
<td><strong>McLaren Software 10 Year Anniversary Reception</strong></td>
<td>8:00PM - 10:00PM in the first floor Atrium</td>
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<td>Co-Sponsor Receptions</td>
<td><strong>6:00PM - 10:00PM</strong></td>
<td><strong>AREVA</strong></td>
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<td>Day Two - Tuesday, January 24, 2006</td>
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<td>Morning Session 8:00AM - 11:30AM</td>
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| Keynotes — Leveraging Information Technology to Create Value and Drive Growth |
| One of the biggest challenges for OOs and EPCs is the ability to do more with less — cutting costs, intelligent collaboration — both internally and externally, and securing your IT infrastructure. This session provides insights into business metrics and justifications, people issues, and the underlying strategic implications for OOs, EPCs and IT solution providers. |

**SPEAKERS**
- **Michael Brady**, Vice President, Technology Division, Parsons Corporation
- **Raju Hingorani**, Vice President, IT Operations Services, Jacobs Engineering
- **Robert Jackson**, Principal Project Manager, Parsons Commercial and Technology Group, Inc
- **Jenni Voeller**, Representative to the National Science & Technology Committee, Office of Science and Technology Policy, Executive Office of the President, Department of Homeland Security
- **Senior Vice President, Chief Knowledge Officer, Chief Technology Officer, Black & Veatch**

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<th>CEO Debate: Vision, Policy, Reality</th>
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| **Gregory S. Bentley**, Chief Executive Officer, Bentley Systems, Incorporated
| **Richard Longdon**, President, Process, Power & Marine Division, Intergraph Corporation

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<th>Breakout Session 1:00PM - 2:30PM</th>
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<th>ASSET LIFECYCLE MANAGEMENT</th>
<th>INSTRUMENTATION &amp; REAL-TIME OPERATIONS</th>
<th>MAINTENANCE OPERATIONS</th>
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**Implementing a Successful Multi-Contractor Strategy**
Few projects today are single-contractor. What are the challenges and barriers to implementing and managing a data centric design environment with multiple contractors? Learn how to unlock hidden ROI by leveraging project data.

**SPEAKER**
**Burt Rosenbluth**, Project Management Technology Program Manager, ConocoPhilips

**Convergence Towards Global and Integrated Work Processes: Opportunities, Challenges and Success Criteria**
Discuss benefits and challenges around the global retooling of Air Products’s integrated engineering work processes and the related implementation of a new set of COTS software. The presentation will in detail explore the fragile balance between work process requirements, technology options and change management needs. Being driven by the corporate SAP implementation, the objectives of Air Product’s Project Phoenix were to replace front-end engineering work processes and IT tools as well as to standardize globally on best practices. Although there have obviously been challenges associated with engaging several hundred impacted individuals and getting them supportive of the change, Air Products

**SPEAKER**
**Troy Di Natali**, President and Principal Engineer, READCo, Inc.

**Applying LADAR Technology to Plant Restoration and Recovery**
After several years of severe natural disasters striking the Gulf Coast and damaging many offshore plants and refineries fast and efficient recovery and restoration strategies have become imperative to the success of the industry. Hear about the application of LADAR on damage of ChevronTexaco’s Petronius Deepwater Gulf of Mexico Platform after Hurricane Ivan and how this technology has helped in the restoration process. Understand the scope of work including dimensional control, 3D modeling, forensic analysis, and the repair engineering design.

**SPEAKER**
**Deborah Deats**, Manager, Design and Documentation, BP

**Mainstreaming Automation: Unifying Instrumentation and Control Across Projects**
Instrumentation and real-time operations solutions are key to achieving lean, agile manufacturing and maximizing uptime. Learn how leading OOs leverage automation.

**SPEAKER**
**Sandy Vasser**, Facilities Instrumentation and Electrical Manager, ExxonMobil Development Company

**Taking Laser Scanning to the Next Level**
Laser scanning is used for everything from modeling retrofits to minimizing shutdowns. This session will highlight best practices for integrating laser scanning into existing systems and work processes.

**SPEAKER**
**Woody Saylor**, Vice President, Commercial Management, Southeast Power Region, Calpine Power Company

**Strategic Use of 3D Visualization for Maintenance Process Optimization**
The presentation summarizes how 3D visualization techniques enable superior lifecycle maintenance work processes and examines key elements required for achieving world-class

**SPEAKER**
**Teri Stork**, Global Director of Energy Services, Datwyler Engineering
is expecting increase in productivity and reduction in project cycle time.

**SPEAKERS**

*Jere Schneck*, Director, Global Engineering, Air Products & Chemicals

**Transitioning From Design to Field Construction Operations**

The transformational impact of information technology on engineering and construction has barely begun. Increasing global cost pressures, the commoditization of services and growing demand from owners to deliver project lifecycle information all require an effective utilization of design models and data during construction. This session explores engineering/construction firm partnering on large and small projects to increase return on investment for both owner/operators and EPCs. Learn innovative approaches, what is and is not working and hear a view of the future.

**SPEAKER**

*Faith Junghans*, Director, Technology Communications, CH2M Hill

**Mixing Mechanical CAD Models with Plant Models**

**SPEAKER**

*James Close*, Senior Systems Analyst, Alstom Power Inc.

**Better Decisions Through Data Standardization**

ISO 15926 specifies the data model that defines a single context for process and equipment engineers, operators, maintenance engineers and others may have of the plant. How will this standard affect you?

**SPEAKERS**

*Nils Sandsmark*, Head of Business Development, DNV Information Quality Management

*Ric Jackson*, Director, FIATECH

*Jehu Burton*, Project Manager, Dupont Engineering

**PANELISTS**

*Dean Harvey*, PMP, Project Management Initiative, Framatome ANP Germany

*Rosli Abdul Hamid*, CEO, GB3 Sdn. Nhd & Head of LCAIM, Malakoff Berhad

**Virtual Operator Training and Assessment Reduces Time to First Oil**

**SPEAKER**

*Felipe Leyva*, Director, Maintenance and Operations, PEMEX Exploration Production

Visualization strategies for maintenance work process will be discussed along with how these strategies have the common goal of increasing reliability and plant availability while reducing costs.

**SPEAKER**

*Philip Harvey*, Global Technical Training Manager, Applied Technologies, Baker Energy

**Executive Networking Reception Hosted Exclusively for OOs and EPCs by Bentley and Microsoft**

6:00PM - 8:00PM

Co-Sponsor Receptions 6:00PM - 8:00PM
Day Three - Wednesday, January 25, 2006
Morning Session 8:00am - 11:30am

ASSET LIFECYCLE MANAGEMENT

Optimizing Startup and Life-cycle Performance for New Capital Projects
Hear a structured methodology for assessing, planning, and executing operational and support requirements necessary for the operational life-cycle phase of a new capital asset program. Focus is on operational readiness planning to minimize risks associated with startup and launch, while simultaneously driving operational programs based on best practices to optimize life-cycle asset performance.

SPEAKER
Tim Finigan, Senior Director, Performance Technologies, Operations & Maintenance, Fluor Corporation

Technology Optimization in Plant Design and Construction
Design re-use, modular design, mass-produced components. Learn about these and other innovative concepts used during plant design and construction.

SPEAKER
Shashank Shah, Senior Principal Process Engineer, Air Products & Chemicals

Merger Pain: Managing Engineering Data through Mergers, Acquisitions and Joint Ventures
Industry consolidation means companies must leverage systems and information from many sources. Learn strategies for effective business and IT integration with a focus on asset information management.

SPEAKER
Kevin Hunter, IT Manager, Business Solutions, Lyondell Chemicals

Key IT Issues of Mega EPC Projects in the context of Plant Lifecycle Engineering

SPEAKER
Junichi Masukawa, Deputy General Manager, IT Management Center, Chiyoda Corporation

The EPC-to-OO Handoff — Optimizing the Transition
Data transfer from EPC to OO is rarely smooth. How can you plan for win-win situations and optimum plant lifecycle data management?

SPEAKERS
Frank-Peter Ritsche, PMP, Project Management Initiative, Framatome ANP Germany
Dirk Hanewacker, ex-Alstom Power

INSTRUMENTATION & REAL-TIME OPERATIONS

Safety Instrumented Systems — Ensuring Process Safety
An SIS is key to reducing unacceptable risks to an acceptable level. Learn how to implement an SIS to take your process to a safe state when pre-determined conditions are violated.

SPEAKER
Jay West, Technology Development Manager, BE&K

Cybersecurity: Developing a Manufacturing Control System
Your plant’s MCS is connected to HQ’s business systems. You collaborate across public wires. How can you reduce the risk of malicious code infection, network intrusion and other threats while maintaining collaboration?

Intelligent P&IDs: Are We There?
Intelligent P&IDs are gaining momentum: they can increase the value of engineering information and enable more informed decisions. How do you go from P&IDs to intelligent P&IDs? Is it worth it?

SPEAKER
Ziyad M. J. Ghulam, Engineering Drawing Services, Saudi Aramco

MINIMIZE DOWNTIME WITH EQUIPMENT RELIABILITY

Minimize Downtime with Equipment Reliability
Information Systems
Reliability improvement programs replace reactive maintenance with planned events. Learn the keys to success and how to leverage this concept to increase uptime.

SPEAKER
Jay West, Technology Development Manager, BE&K

Integrating 2D drawings with Data-Centric Systems
During the design stage of mega projects, the contracted engineering firms are in the practice of using intelligent design applications to cut the design cost and to deliver accurate design information in a shortest possible time. At the end of the project, these firms deliver the engineering databases and the 2D drawings to the plant owner for the construction, operation and maintenance of the industrial facility. In the past, however, there has never been a smooth transition of materials during the turnover of these design databases and drawings, and as a result key information is lost and is often not successfully implemented by the owner/operator operations and maintenance departments. This session addresses transition, integration and implementation challenges of the data-centric systems with 2D engineering drawings and databases.

SPEAKER
Ziyad M. J. Ghulam, Engineering Drawing Services, Saudi Aramco

Conference Wrap-Up