10TH GLOBAL ENERGY FORUM

JANUARY
24
2013

Microsoft

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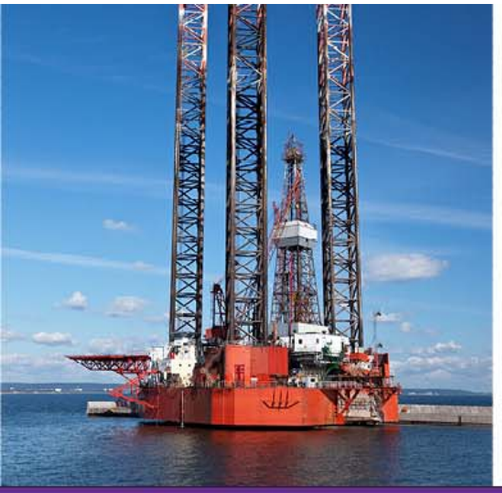

10TH GLOBAL ENERGY FORUM

The Path to Knowledge Transfer and Collaboration

Platforms for Connecting Results with Direction in a Changing E&P Landscape

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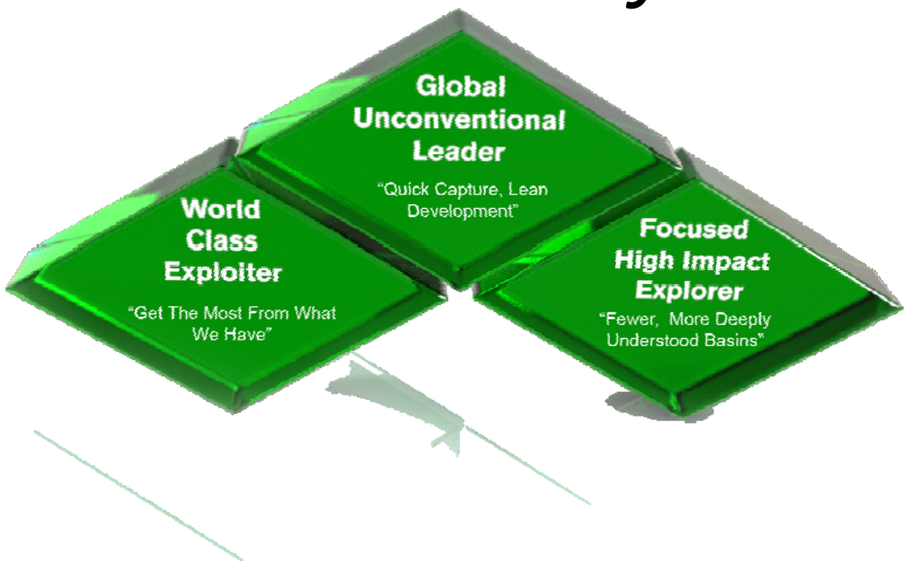
Our Business

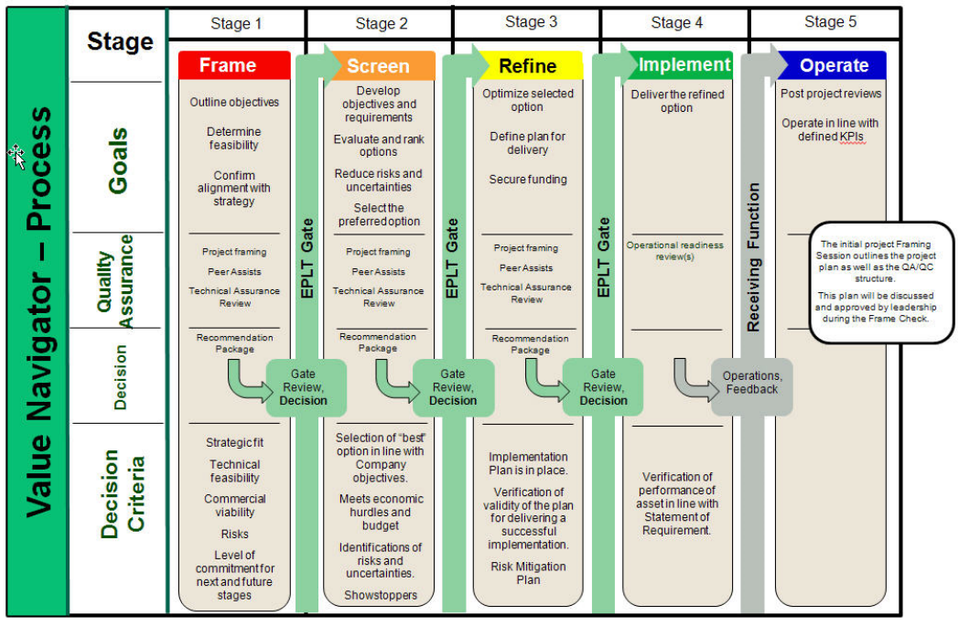
- Subsurface Teams Deployed Globally
- Diverse Portfolio

Context: Strategy and Value

3 Pathways



Value Navigator



E&P Strategy Transition

Quality Assurance

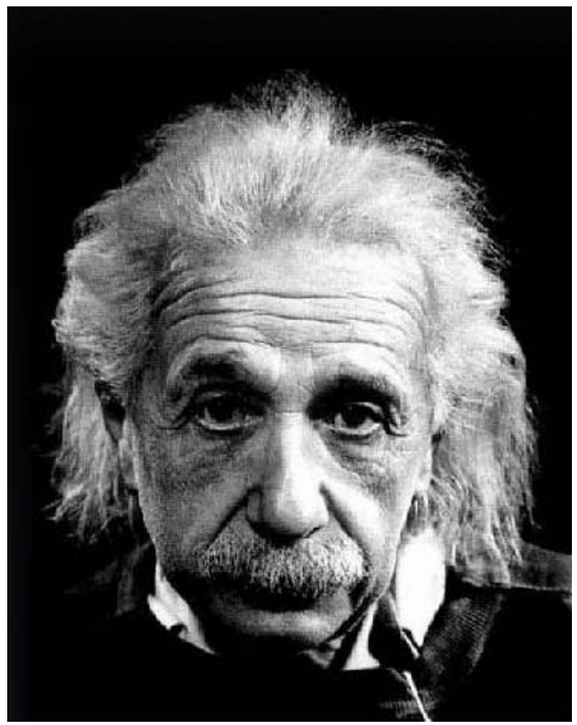
Goal

- **Develop a common system for subsurface evaluations performed by asset teams throughout the global E&P business**
  - Complementary with Value Assurance process

- ***Subsurface Milestone & Deliverables* (SMD) designed to :**
  - Provide guidelines for project management and stewardship
  - Define milestones for the delivery of technical products
  - Set standards for integrity of technical products
  - Emphasize timely collaboration, documentation and knowledge transfer

The Trick

“Everything should be made as simple as possible, but not simpler.”



Early Versions

Guidelines for Subsurface Work

DESCRIPTION

Geological and simulation models are the primary basis for Subsurface Uncertainty An
necessary to establish some team technical milestones for the subsurface interpretation
efforts that result in these key deliverables. This document describes a set of technical
definitions and expectations associated with each.

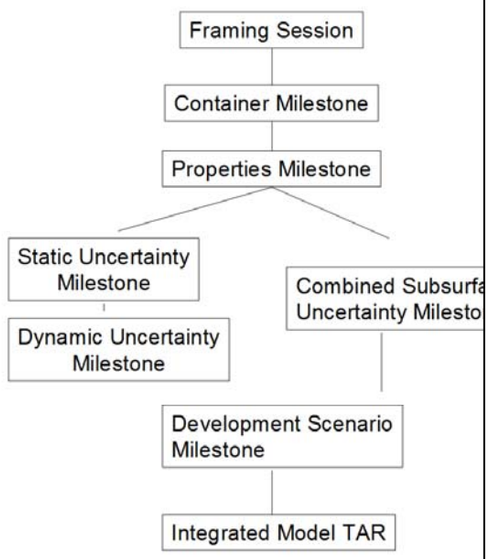
The benefits of this "process" include:

- Guidelines for project management and stewardship of technical work
- Setting deadlines for the delivery of technical products
- Setting a standard for the QC of technical products
- Real-time documentation of results of data collection, interpretation, integration
  recommendations
- Ensuring that all contributors to the asset-specific work have a clear understand
  the team and timelines for completing work
- Building a broader awareness and understanding of the results of our work with
  community
- Providing a means for ensuring consistency of technical approaches across the

These guidelines can be used for planning purposes and should be adapted to suit the n
or interpretation/modeling effort. **It is our recommendation that all asset teams will**
these guidelines.

The Project Technical Team Lead for each asset has the primary responsibility for plan
milestones and stewardship.

Some of these milestones represent significant peer assist opportunities. The participant
milestone peer assists should be appropriate Geoscience and Reservoir Engineering sta
experts from outside the project. The peer assists should planned in advance and be hel
that allows for incorporation of peer/expert recommendations.



FRAMING SESSION: This milestone represents an opportunity for reserv
interpreters and geologic modelers to agree upon projects needs, timelines, a
general scope of modeling effort. This working session should include all co
specific work early enough to incorporate recommendations and suggestion
learnings from other projects. This workshop should focus on available data
work plans.

- Define model objective(s): purpose(s), use(s), and expectation(s)
- Determine model AOI
- Determine grid size/cell size
- Well data and well-seismic ties
- Regional context and previous work
- Key stratigraphic surfaces (number of surfaces; level of detail)
- Preliminary EODs
- Early observations regarding reservoir stratigraphy (potentially s
  perm conduits, etc)
- Key faults and general structural styles
- Early observations regarding structural complexity, fault compar
- General seismic definition of resource
- Identification of data limitations and/or uncertainties
- Analogs

CONTAINER MILESTONE:
The objective of this peer assist is to determine if the structural and stratigra
appropriate to form the basis of the geocellular model framework. Limitatio
interpretation inputs will be identified and decisions on adequacy of geologi
purposes will be made. In cases where seismic interpretations were made in
conversion takes place in Petrel, detailed QC of depth conversion methods a
framework in Petrel will be reviewed. Documentation that includes the follo

Stratigraphic interpretation

- Demonstration of basis for proposed sequence straigraphic framewo
  hydrocarbon-bearing intervals into mappable, genetically related pac
  the model. This includes a review of well-seismic ties on seismic vo
  incorporating bio-stratigraphic data and/or regional correlation fram
- QC of horizon grids: definition, basis and reflection characteristics o
  (sequence boundaries, flooding surfaces, abandonment surfaces, etc)
  and consistency
- QC of isochron grids: produced for every interval to be replicated in
  geologic reasonableness and thickness variation across faults, etc.
- QC of seismic extractions, reservoir visualization products and preli
  produced for every interval to be replicated in the model reviewed g
  clarity of interpretation

Structural interpretation

- Demonstration of basis for proposed structural framework that utiliz
  and observations of local features. This includes a review of all ident
  and potential compartments.
- QC of TWT or Depth structure maps: produced for every framework
  in the model

- QC of fault networks: definition and basis of interpretations, appropriateness, extents and consistency of throws
- QC changes in thickness across faults
- Fault-plane profiles, and fault throw profiles

Definition of hydrocarbon contacts and distribution

- Demonstration of know of interpreted fluid contacts from log and MDT data
- Demonstration of rock physics characteristics of hydrocarbon and water bearing reservoir
- Seismic definition of hydrocarbon contacts and aquifer extents

Geo-cellular model framework

- Well ties
- Initial Horizon/ Fault QC in Petrel
- Review final isochron maps from Petrel framework
- Review/edit fault throw and changes in thickness across fault in Petrel framework
- Velocity model QC and depth conversion methodology
- Alternate depth-conversion scenarios

PROPERTY MODELING MILESTONE:
This milestone should include a through review of reservoir properties planned as inputs to the geologic model. Where appropriate, a discussion of various scenarios for reservoir description should be explored. Expected technical products include:

- Description of low-and high-order stratigraphy and finalized, reservoir nomenclature
- Demonstrative of sub-regional context and use of block-wide analogs
- Enhanced visualization and/or volume based seismic conditioning products used to refine reservoir description
- Description of uncertainties in reservoir description and/or data limitations
- Petrofacies logs (most current vintage)
- Lithofacies interpretations (edited petrofacies) with conventional core and/or sidewall core calibration where available
- EOD maps (Polygons) for all zones to be relicated in model
- NTG targets by Zone and EOD and basis for assignments
- Lithofacies targets by Zone and EOD and basis for assignments
- Preliminary volumetrics in Excel spreadsheet based on GRV from Petrel (by EOD); lithofacies targets (by EOD); average Porosity and Swi (by Lithofacies) and average Bo
- Choice of model layering style(s) (including the need for thin layers to model gas over-running and/or water under-running)
- Discussion of variogram ranges (by EOD and Lithofacies)
- Identification of seismically-resolvable baffles/barriers and/or high perm streaks
- Conceptually-driven model, analog data set, or approach to be used for sub-seismic architectures including baffles/barriers and/or perm streaks

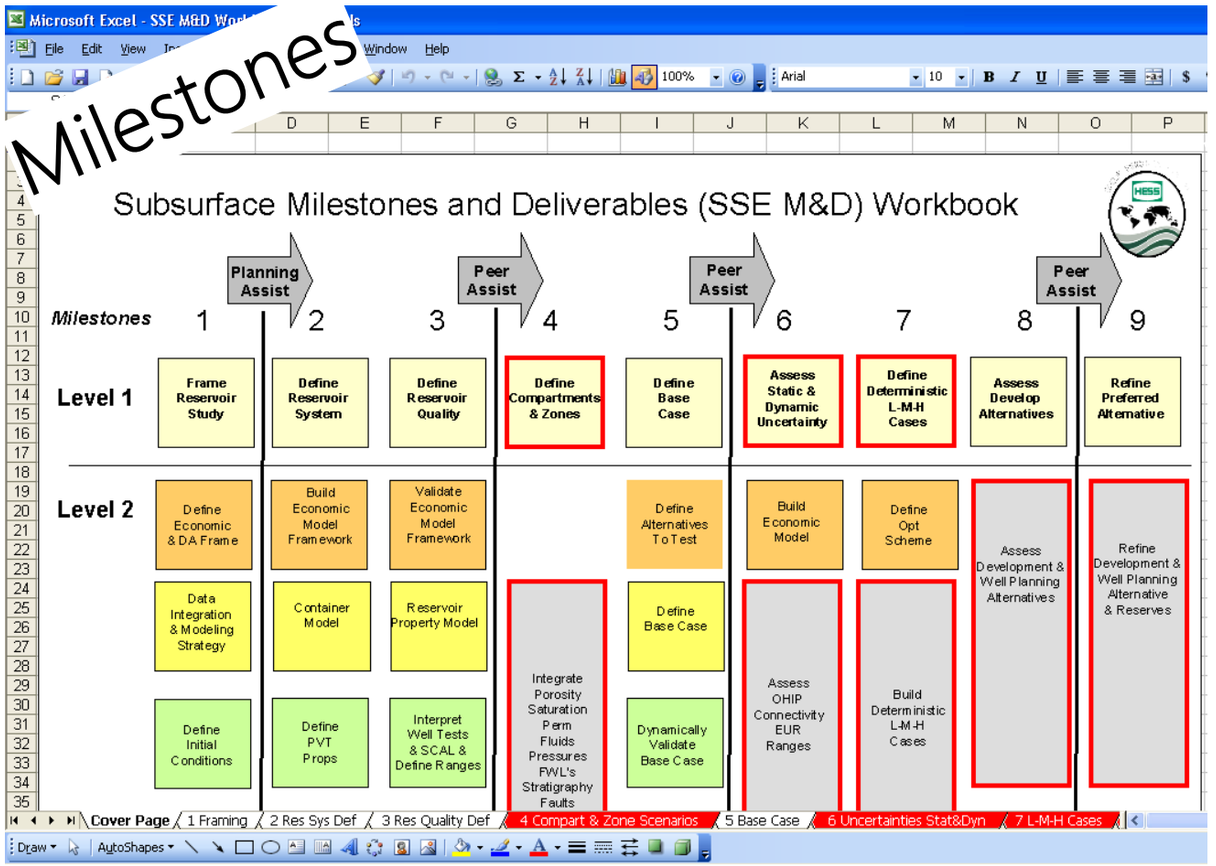
FINAL MODEL QC MILESTONE :
This milestone constitutes the final, detailed QC of the base geologic model prior to initiation of the Static Uncertainty Analysis. Expected technical products include:

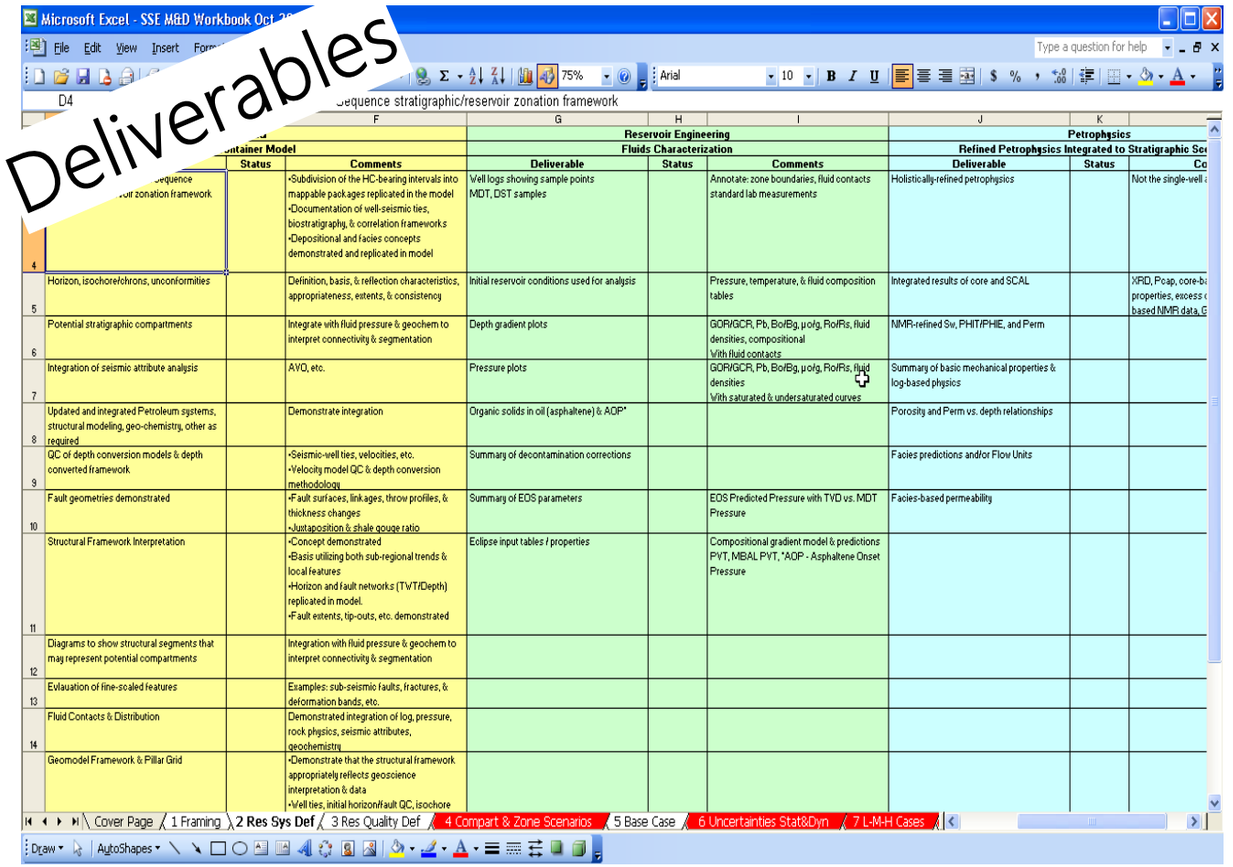
- Summary documentation of all previous technical milestones and related work
- Demonstration of match between well-based and seismically derived inputs and model characteristics
- Demonstration of match between model NTG and lithofacies to input targets
- Porosity distributions
- Poro-Perm relationships
- Satuations
- Volumetrics (GRV, NRV, HCPV, STOOIP)
- STOOIP and/or HCPV Maps

Written Guidelines

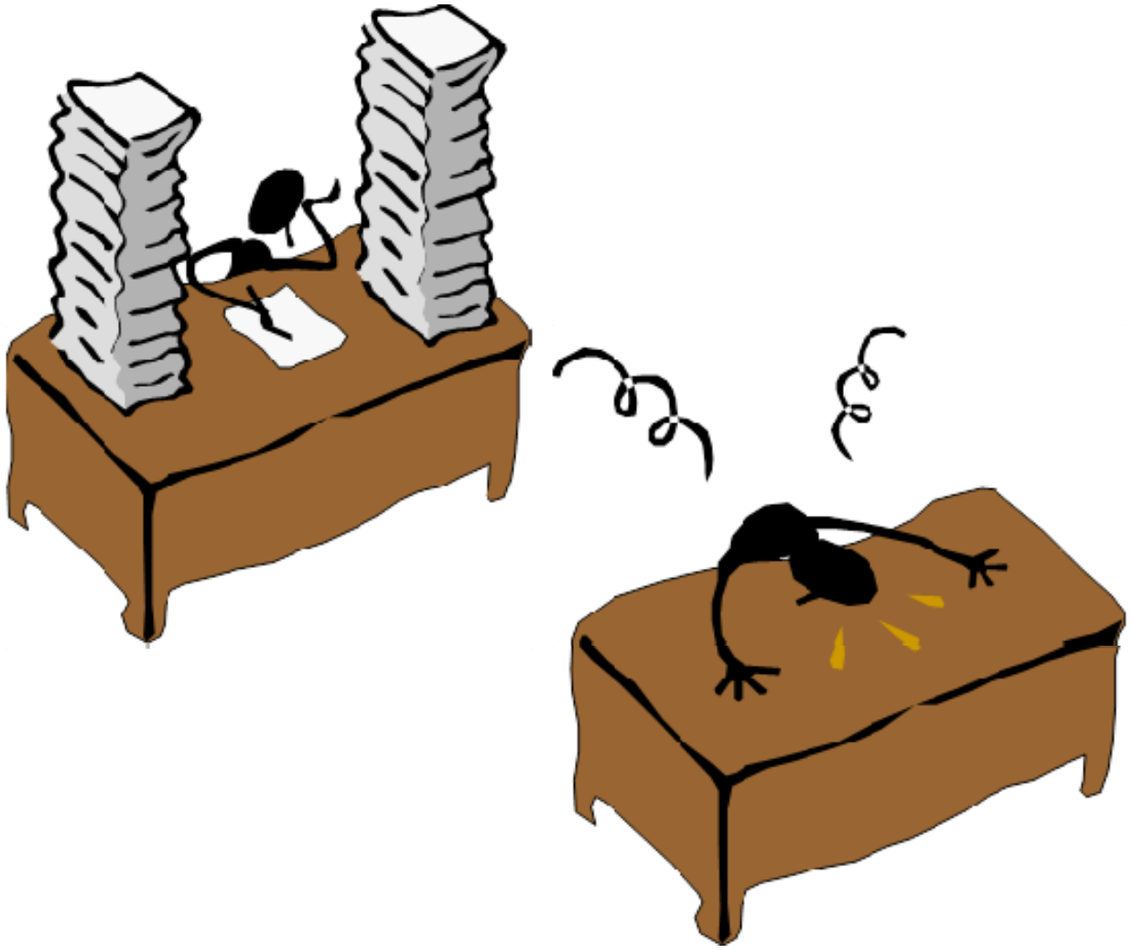
Next Steps

Workbook with Checklists





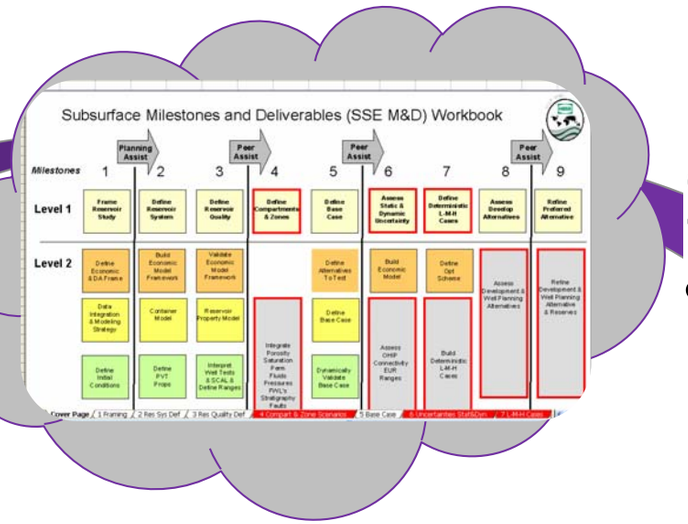
The Problem



Content was good, but implementation was difficult

- Amount of material was overwhelming
- Products were dull
- User case was not compelling
- Delivery was awkward
- Maintenance was impossible

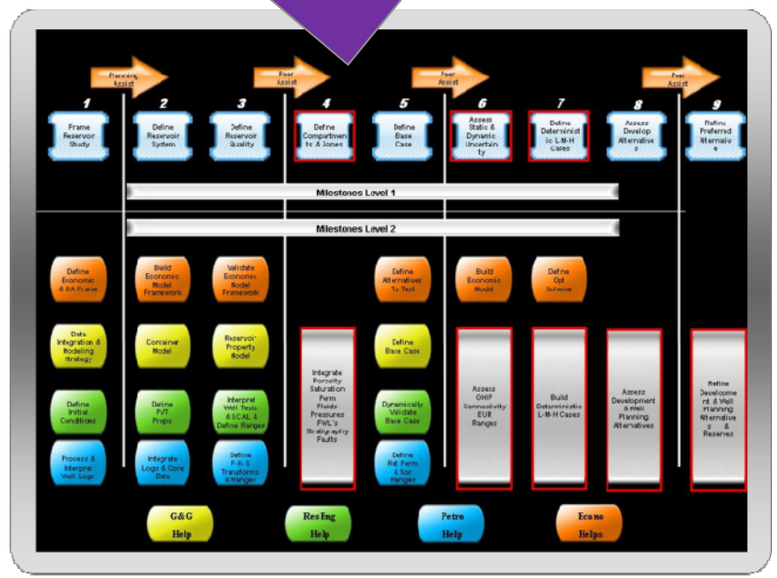
Inspiration



SMD

- Cover page graphic

i SMD



Popular Tablets

- compelling user interface designs

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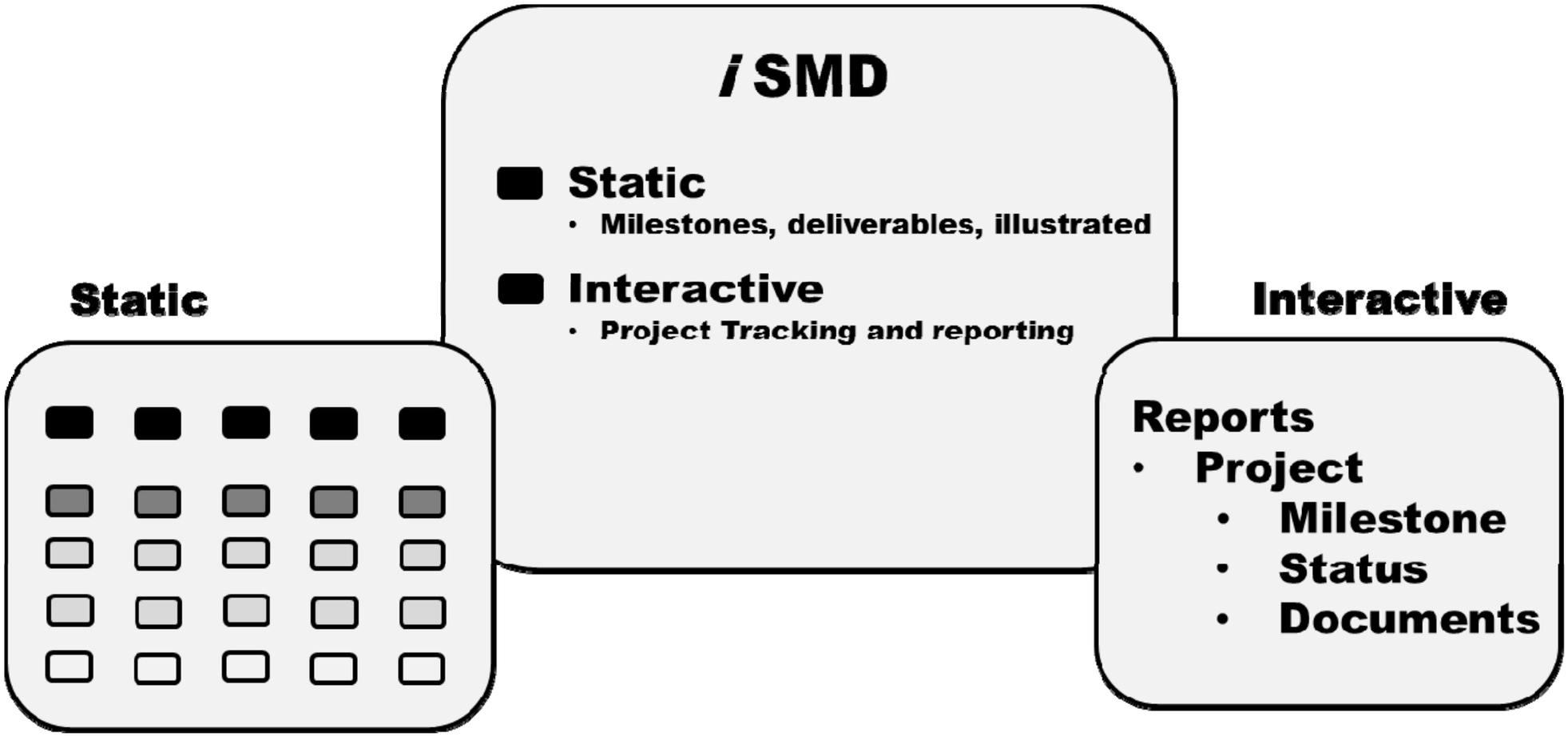
The Concept


Static
i SMD
Static
Milestones, deliverables, illustrated
Interactive
Project Tracking and reporting
Interactive
Reports
Project
Milestone
Status
Documents

Technology Platform

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Prospect Director™

Intelligent Technology. Smart Business.

Intranet Solution …

- ✓ Scalable
- ✓ Secure
- ✓ Intelligent
- ✓ Configurable
- ✓ Fast

Technology Implementations Focused on …

- ❑ Knowledge Management Systems/Bases
- ❑ Business Decision Support Systems
- ❑ Opportunity Inventories
- ❑ Ideas/Innovation Information Management
- ❑ Lead & Prospect Lifecycle Management

Leverages the following Standard Microsoft Technologies …

Windows Internet Explorer 9

Microsoft Office

Microsoft SQL Server 2008

Windows Server

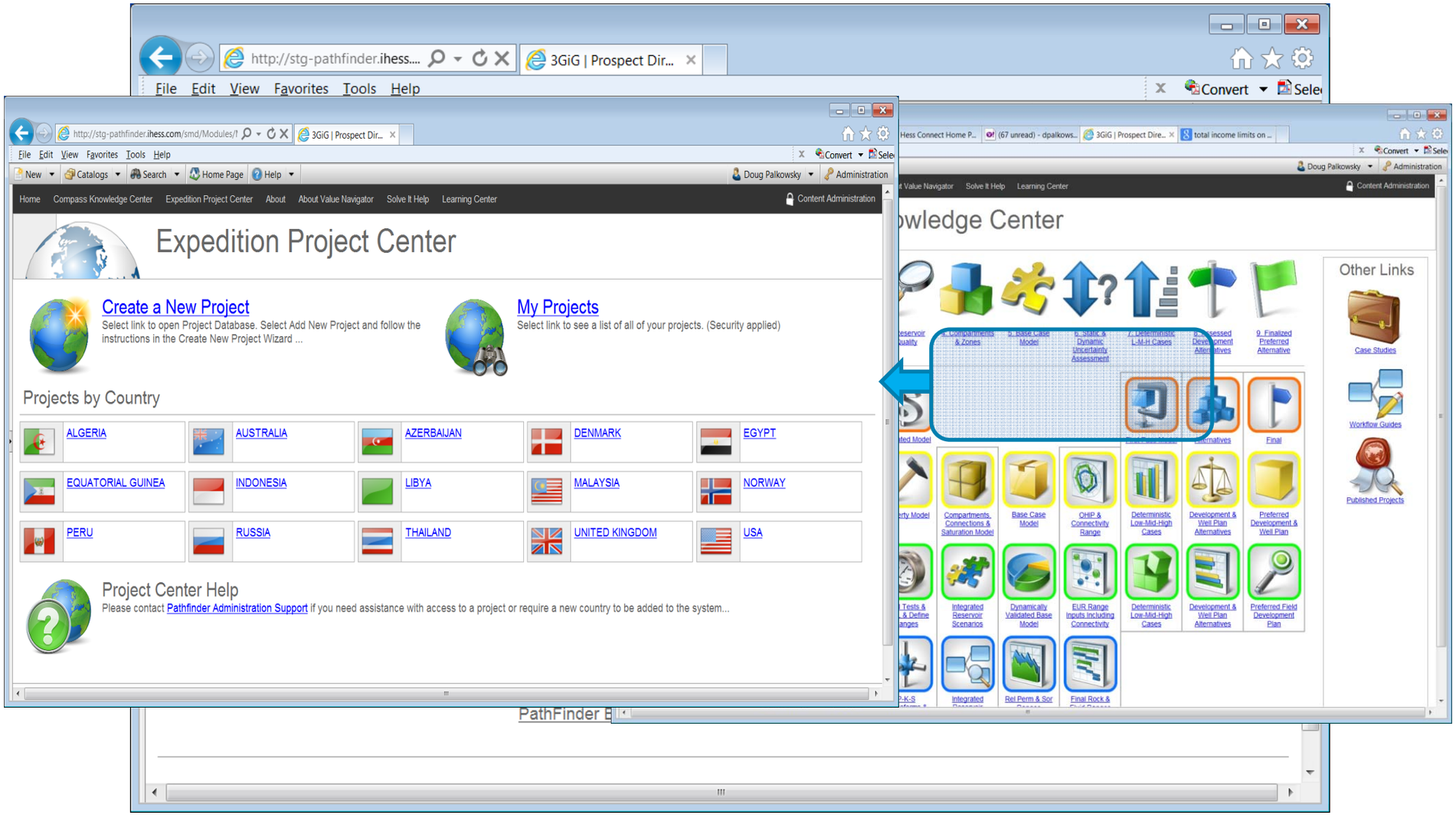
Implementation Challenge

Business Criticality

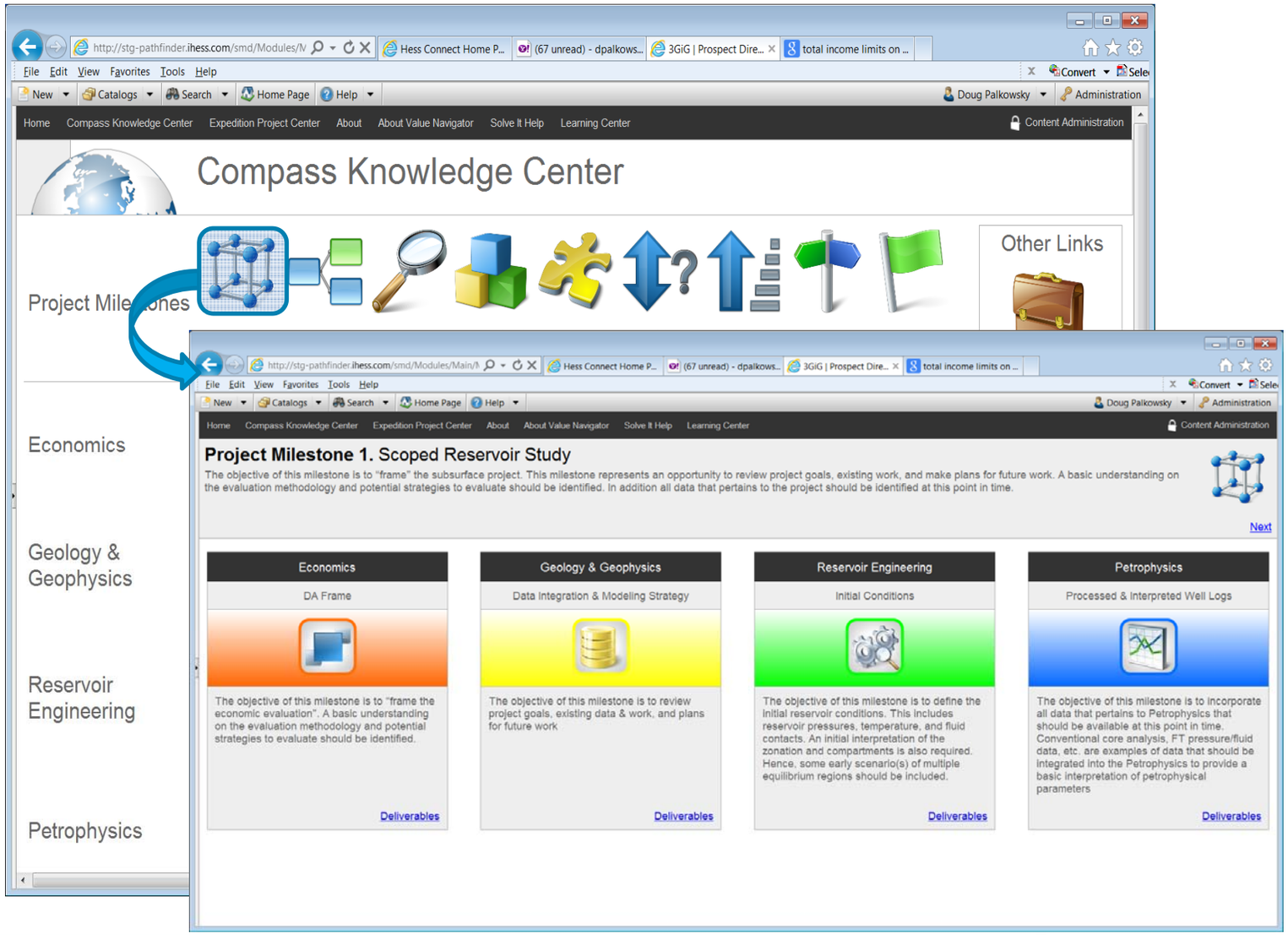
- **High quality information content**
  - Tried, true & tested
- **Alignment with the new Hess E&P strategy.**
  - Success possible only if tools are clearly identified with the goals of the E&P strategy
- **Deployment**
  - immediate user access within the Hess desktop environment on a global basis
- **Usability**
  - tools that complimented current workflows
  - required little training
  - compelling user interface

Uptake & Impact

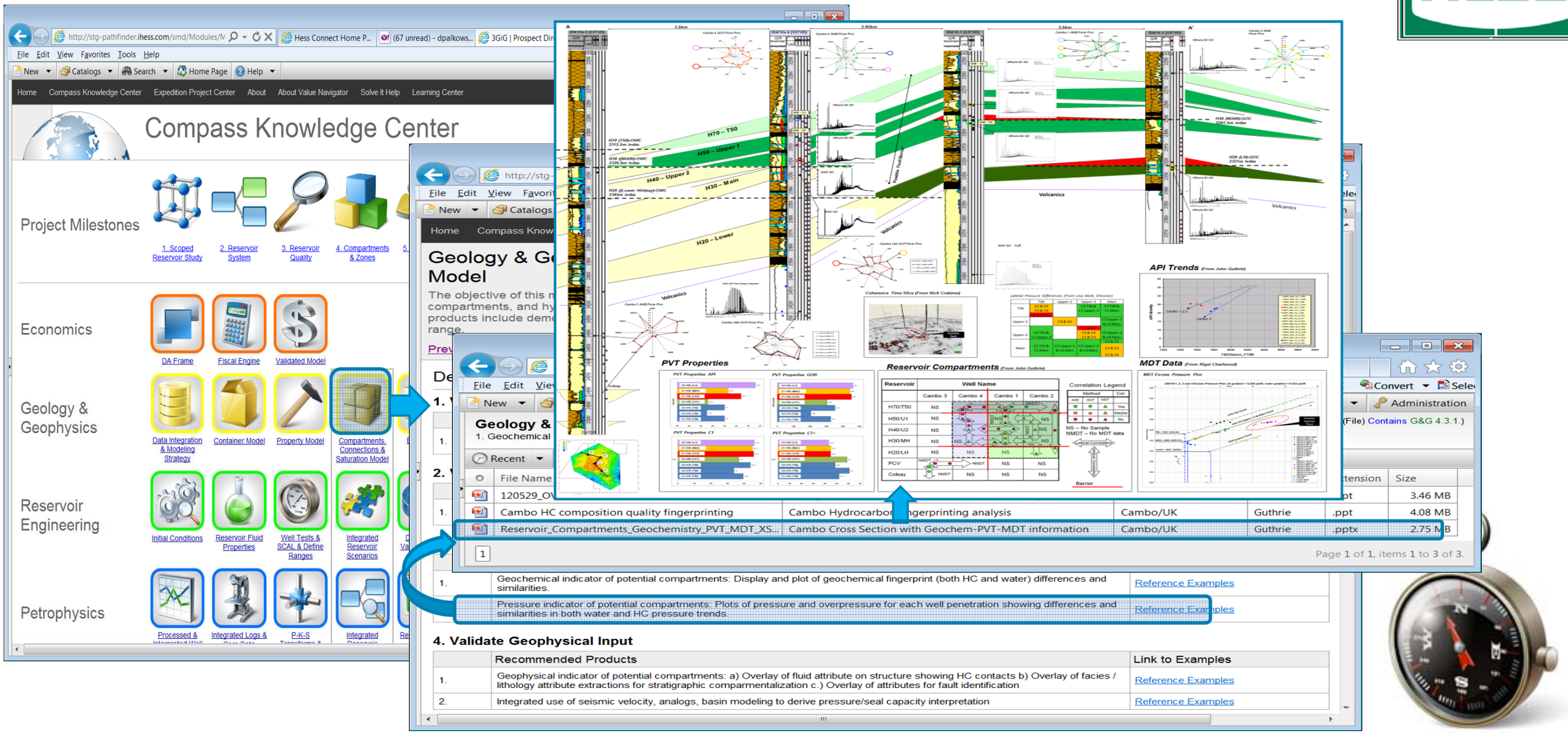
PathFinder


Expedition Project Center
Create a New Project
Select link to open Project Database. Select Add New Project and follow the instructions in the Create New Project Wizard ...
My Projects
Select link to see a list of all of your projects. (Security applied)
Projects by Country
ALGERIA
AUSTRALIA
AZERBAIJAN
DENMARK
EGYPT
EQUATORIAL GUINEA
INDONESIA
LIBYA
MALAYSIA
NORWAY
PERU
RUSSIA
THAILAND
UNITED KINGDOM
USA
Project Center Help
Please contact Pathfinder Administration Support if you need assistance with access to a project or require a new country to be added to the system...
Other Links
Case Studies
Workflow Guides
Published Projects

Compass Knowledge Center – Milestone Descriptions



Compass Knowledge Center – Deliverable Examples



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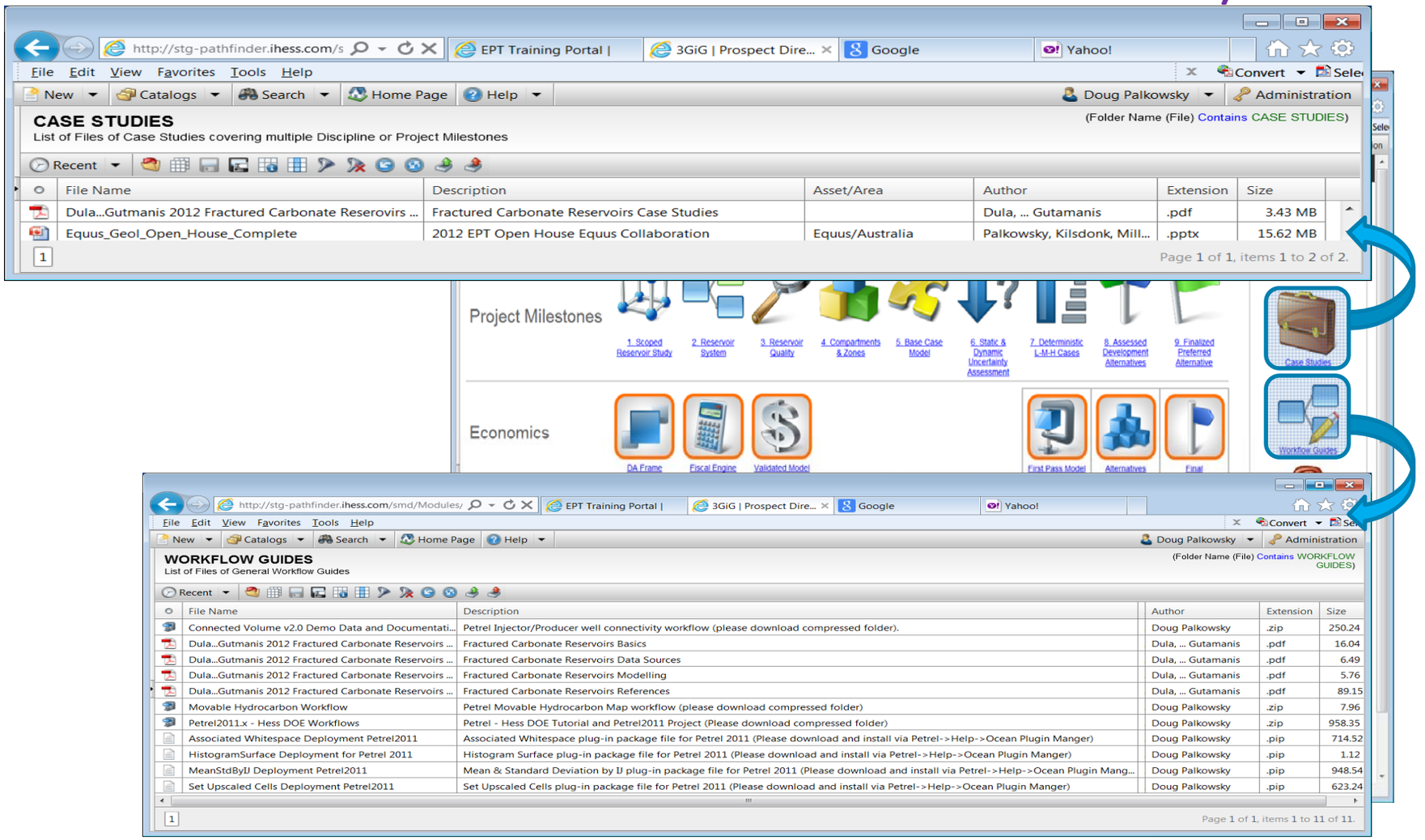
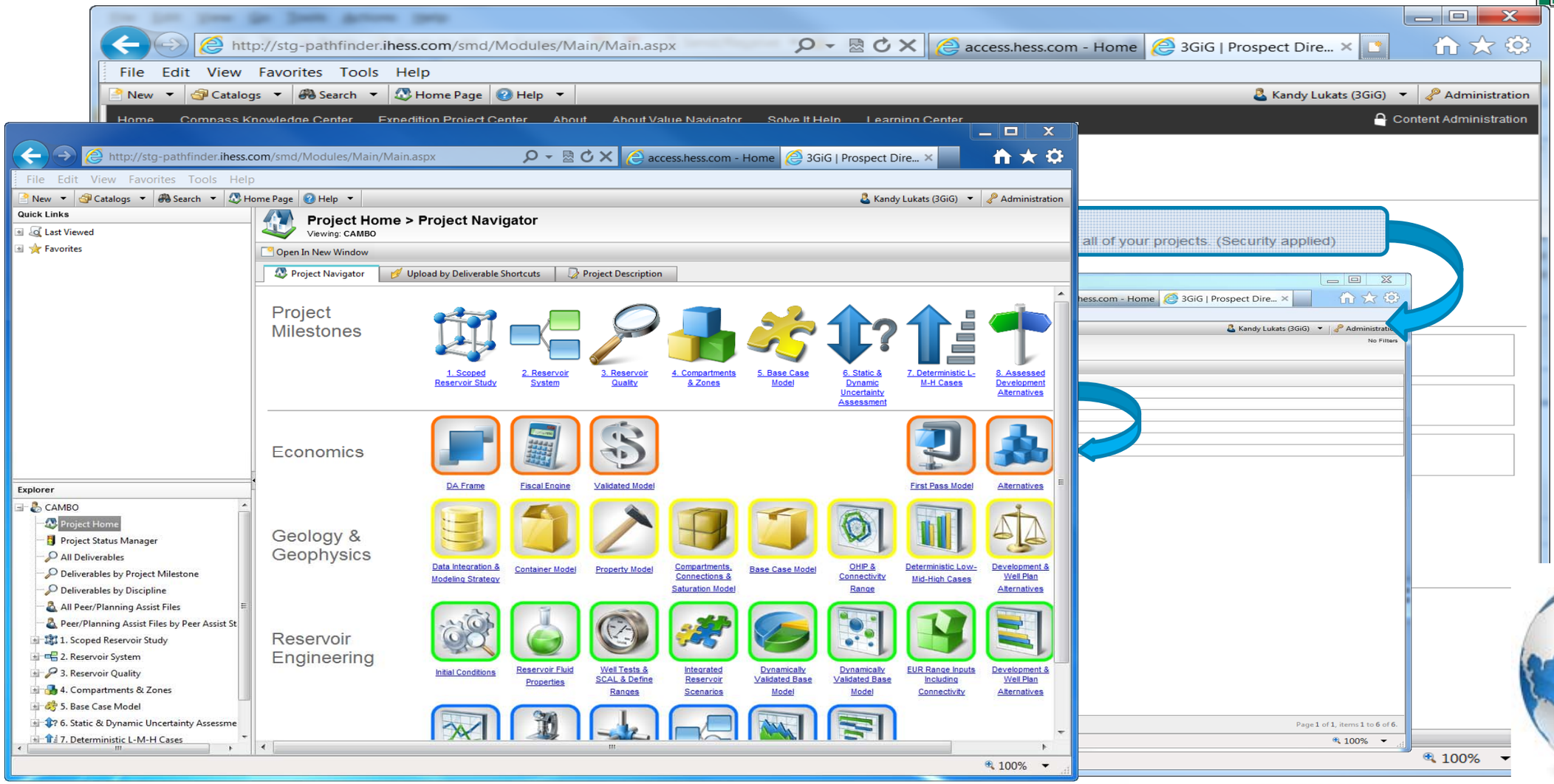
Compass Knowledge Center – Case Studies /Workflows



Expedition Project Center – Secured Project Access



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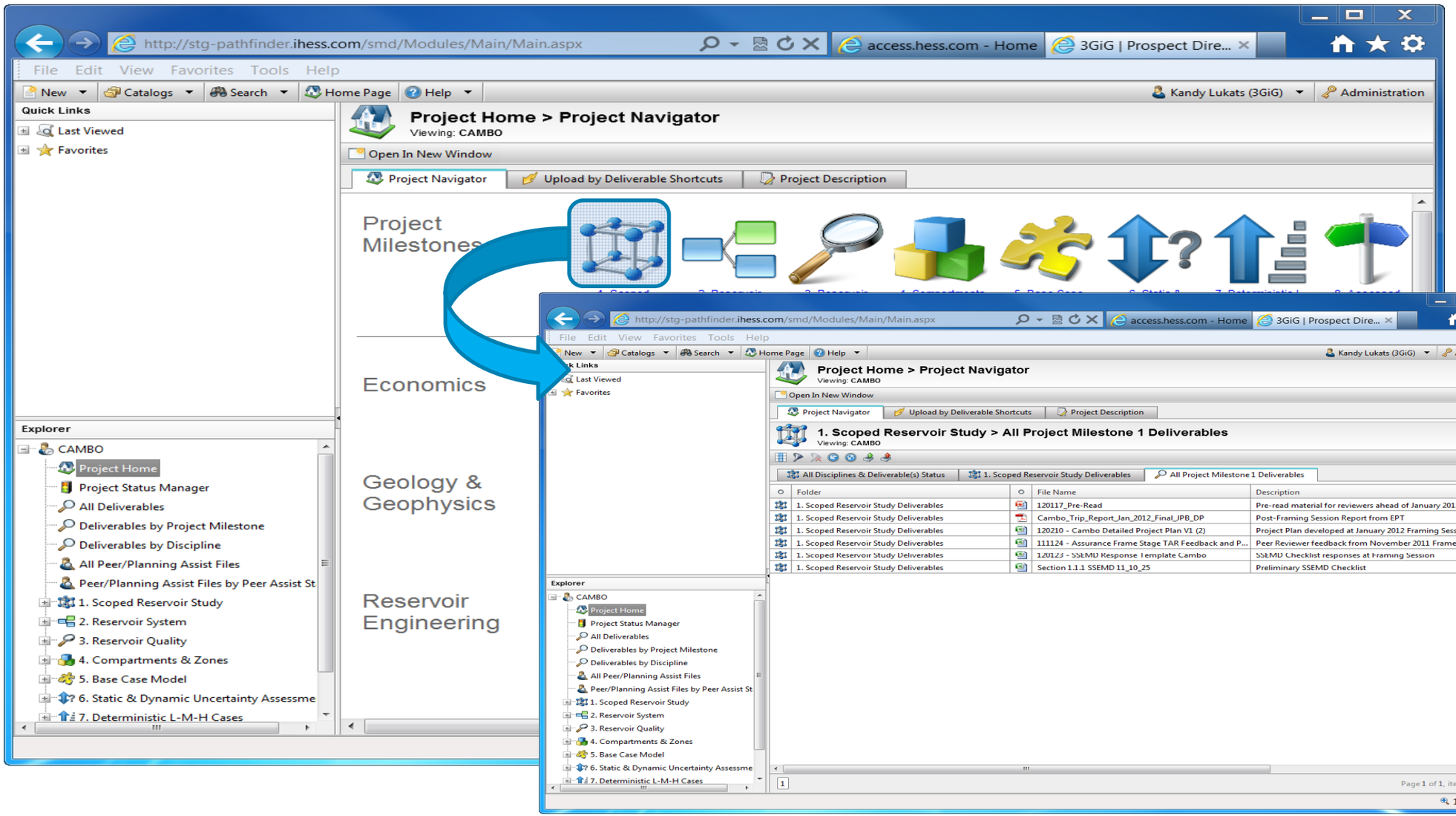
Expedition Project Center – Adding Documents



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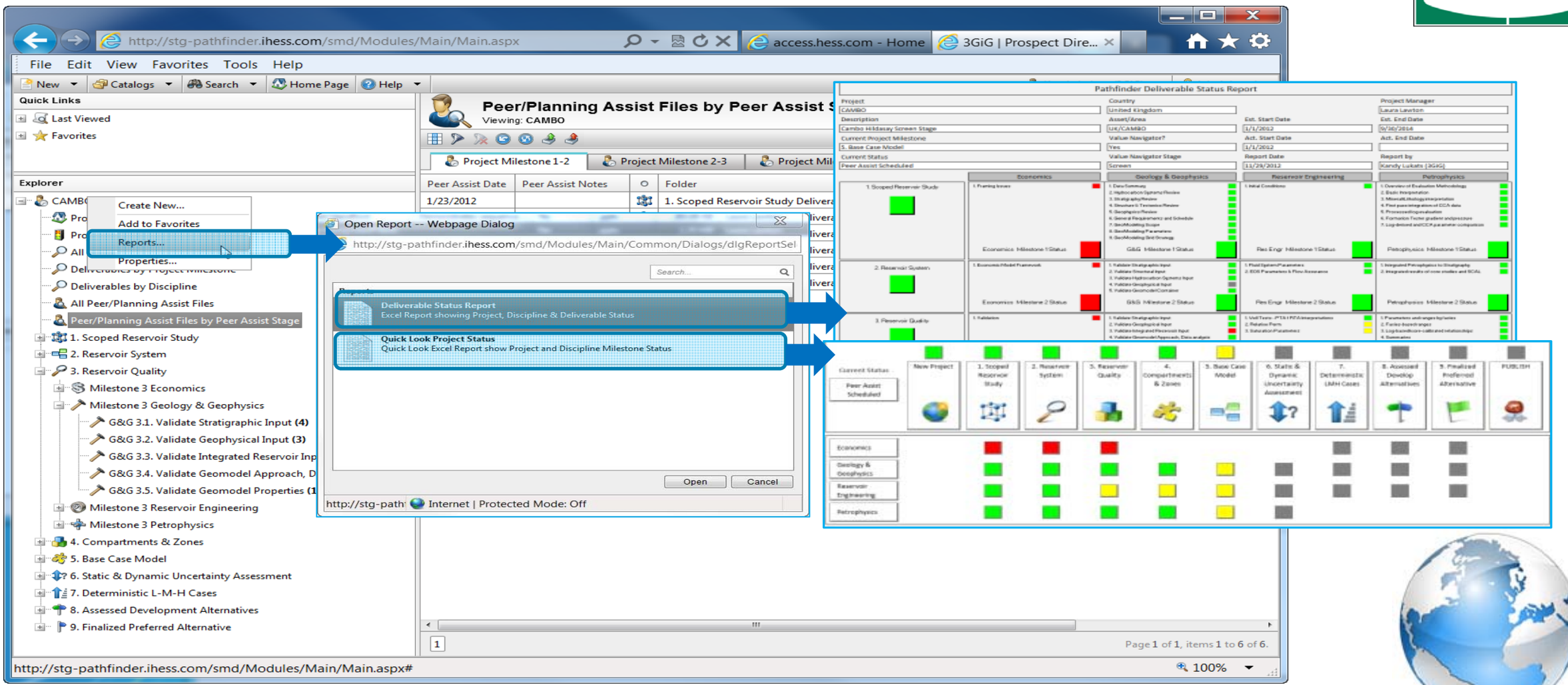
Expedition Project Center – Status Reports



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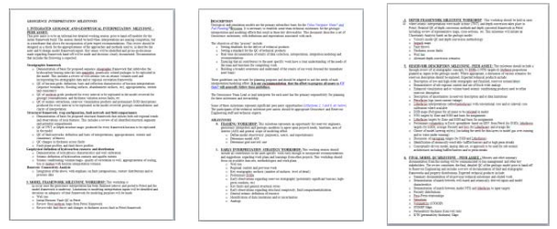
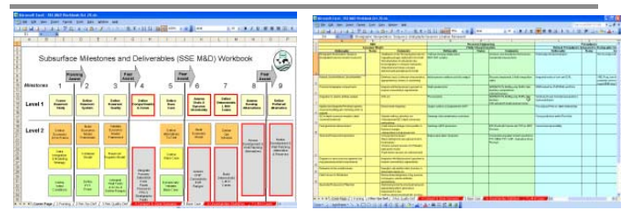
Development Timeline

	2009				2010				2011				2012				2013				Product Vision
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Early Versions																					
develop rollout implement				STOP																	**Written Guidelines**
SMD																					
develop rollout implement														STOP							**Workbook & Presentations**
***i* SMD v 1.0**																					
design & develop																					**Static** ***Glorified Help***
***i* SMD v 2.0**																					
design & develop																					**Dynamic** ***User Publishing***
***i* SMD v3.0**																					
pilot rollout implement																					**PathFinder 2020**

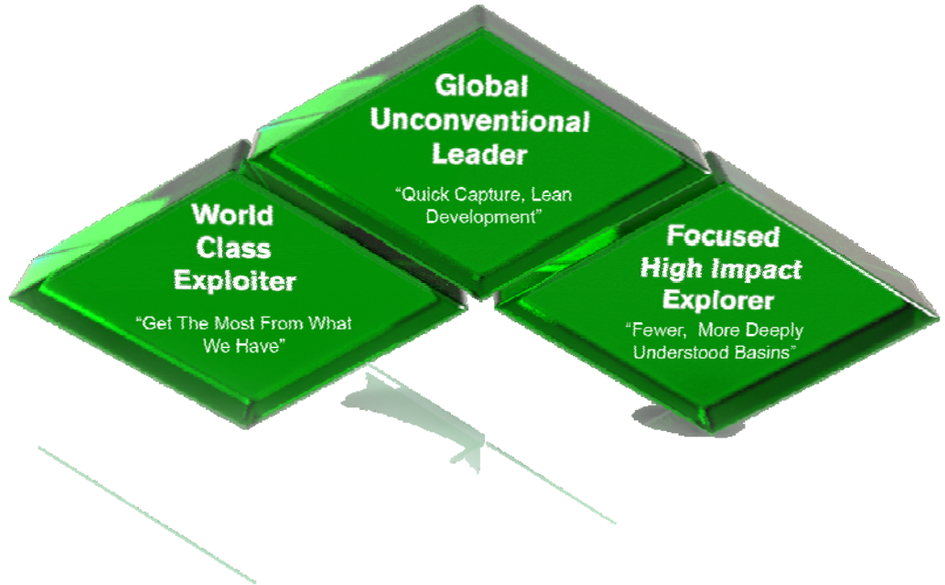
Online Tool Concept

GO





Conclusions



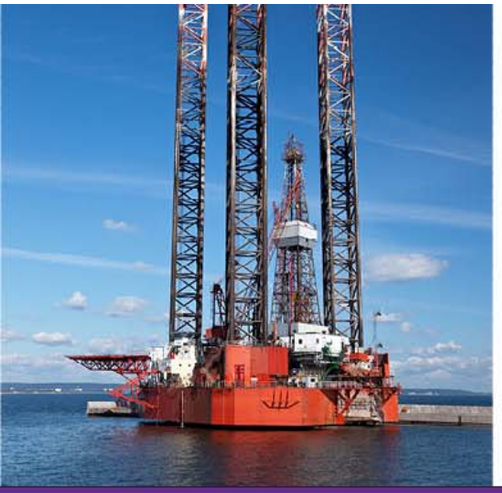
High quality information content is not enough

1. **Link to Company Goals**
2. **Immediate Access**
3. **Simplicity & Usability**
4. **Compelling User Case**

PathFinder 2020

Subsurface Milestones & Deliverables

Tools for the
Hess E&P Strategy



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Thank You!

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