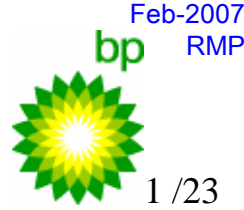




ESRI Petroleum Users Group Conference (PUG)
27-February 2007 (Tuesday) 2:30 – 3:00 pm



Adventures with ArcGIS at BP Sakhalin

Lorraine Wild, BP Russia Offshore

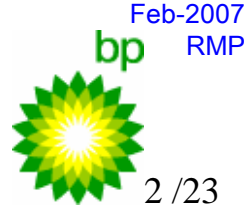
Dimitra Karpova, BP Russia Offshore

Rich Priem, Priemere GeoTechnology

PRIEMERE L.L.C.
GeoTechnology



Outline



Sakhalin Intro

GIS Strategy

Catalog Management

Applications

Challenges

Solutions

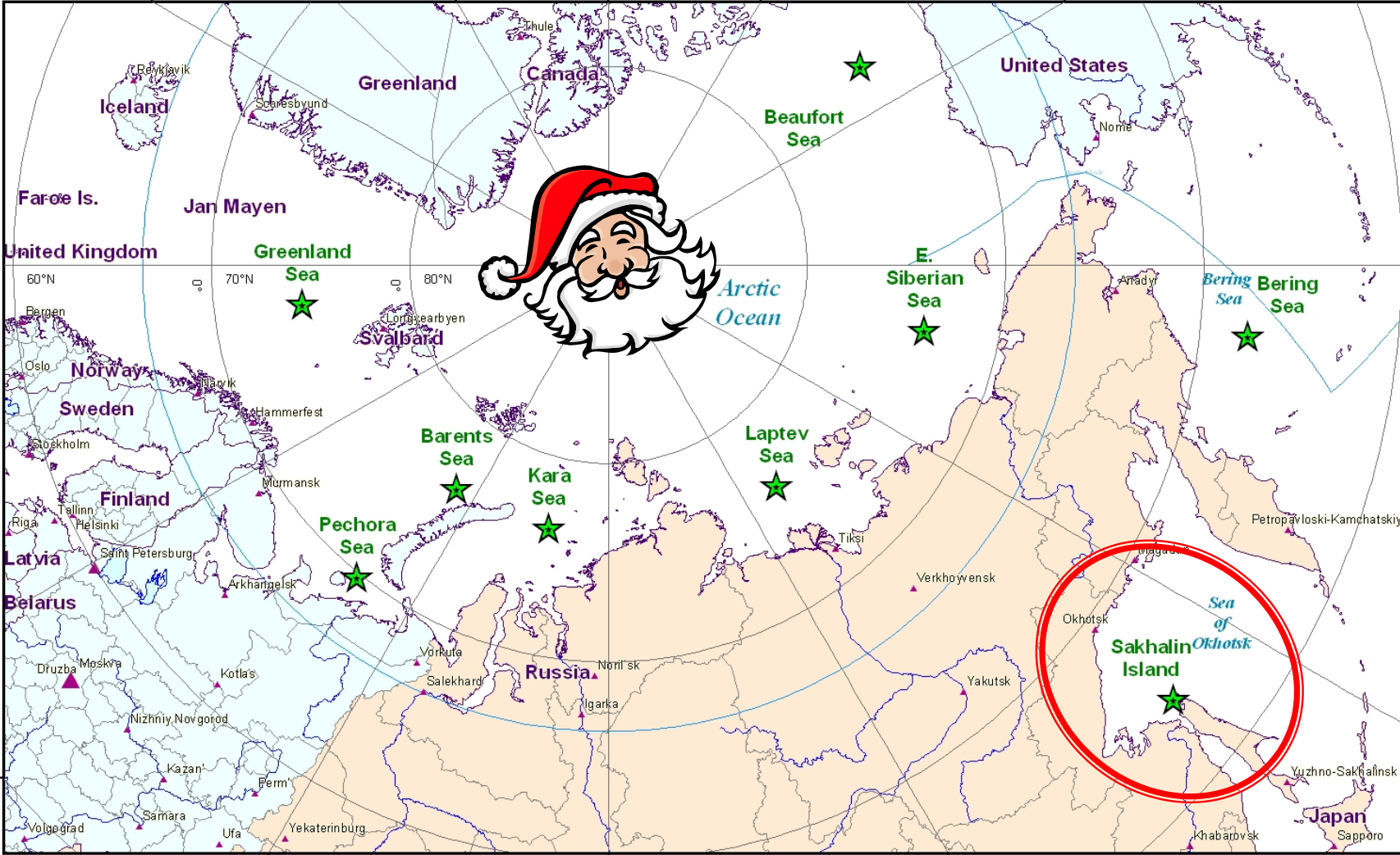


View from the North Pole

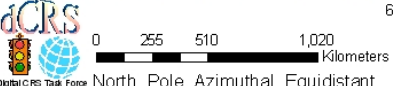


Confidential

1:20,000,000



PDF Export via BP Utilities ArcGIS by dCRS Task Force
MCI: 330_03101_ArcInfoFormat



Arctic Offshore Basins



PRIEMERE Sakhalin Island (East Russia) Regional. Team Leader: Jacek Jaminski
By: Rich Priem. Priemere Geo Technology LLC 1Q2006



Sakhalin Island



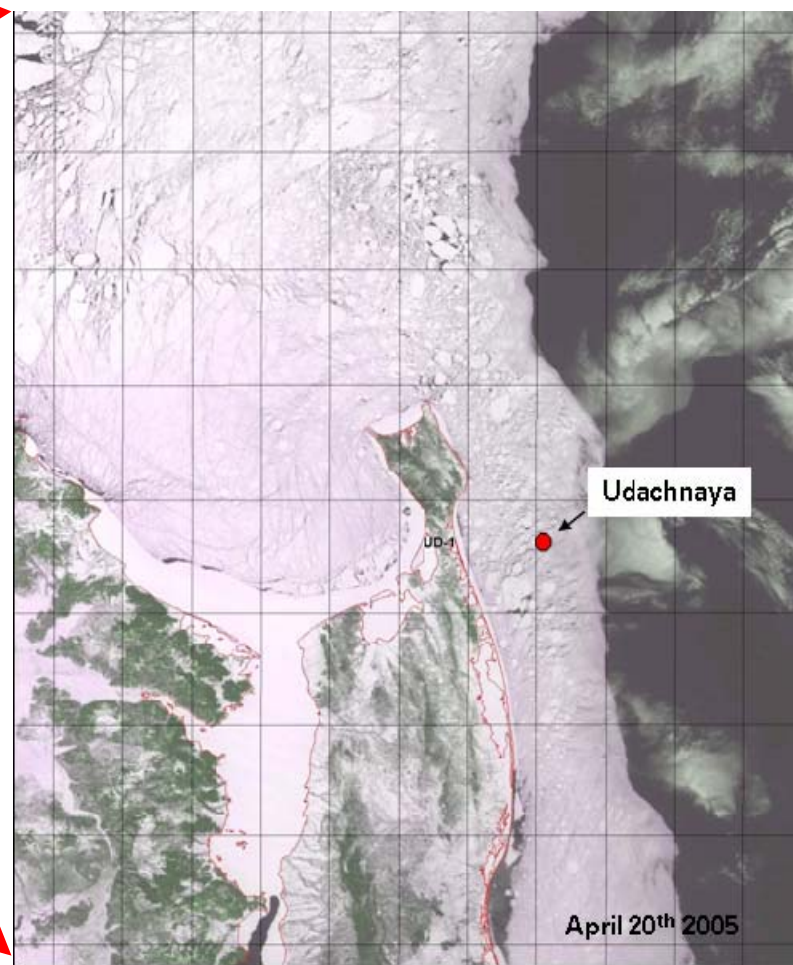
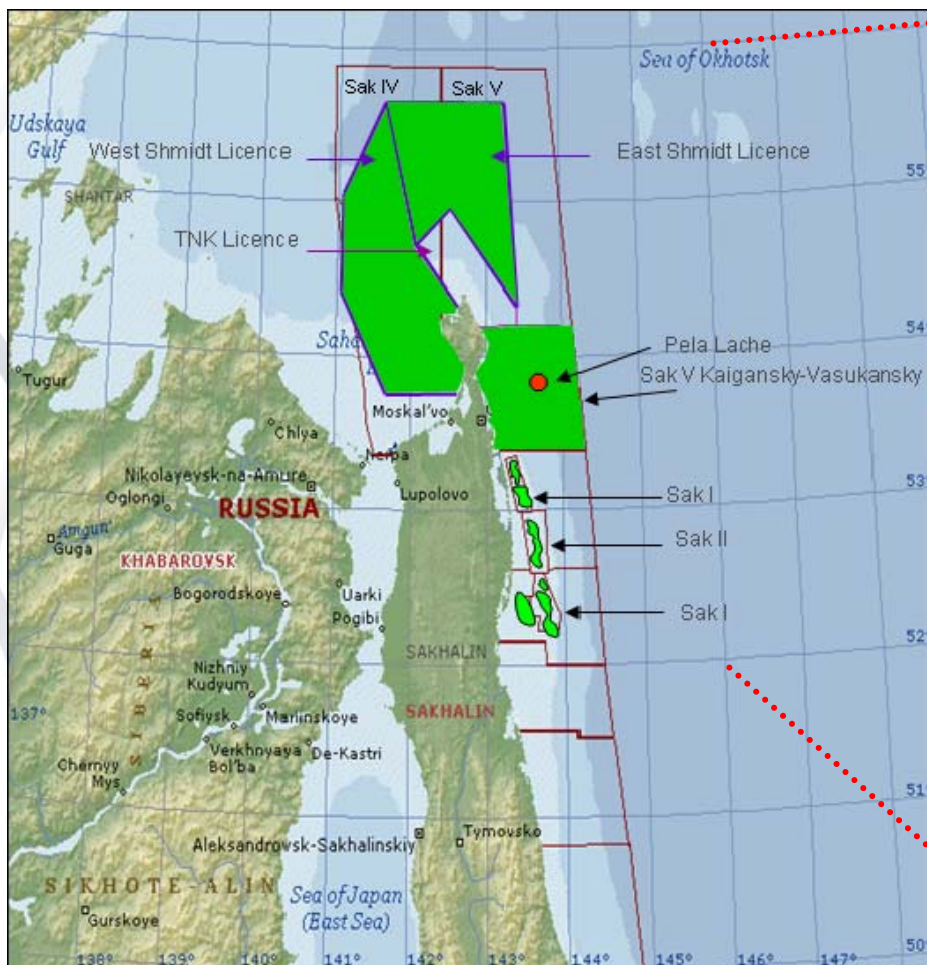
- ✓ Located off Russian east coast
 - total population est. 670,000
- ✓ Airport: Yuzhno-Sakhalinsk
 - population est. 200,000
- ✓ Oil industry onshore since 1920's
- ✓ Major offshore discoveries in 1970's
 - Development agreements with
 - ExxonMobil (Sak I) & Shell (Sak II)
- ✓ Sea of Okhotsk: area of environmental significance & sensitivity



Exploring North Sakhalin

✓ Sak License Blocks
Exxon (I), Shell (II), BP (IV/V)

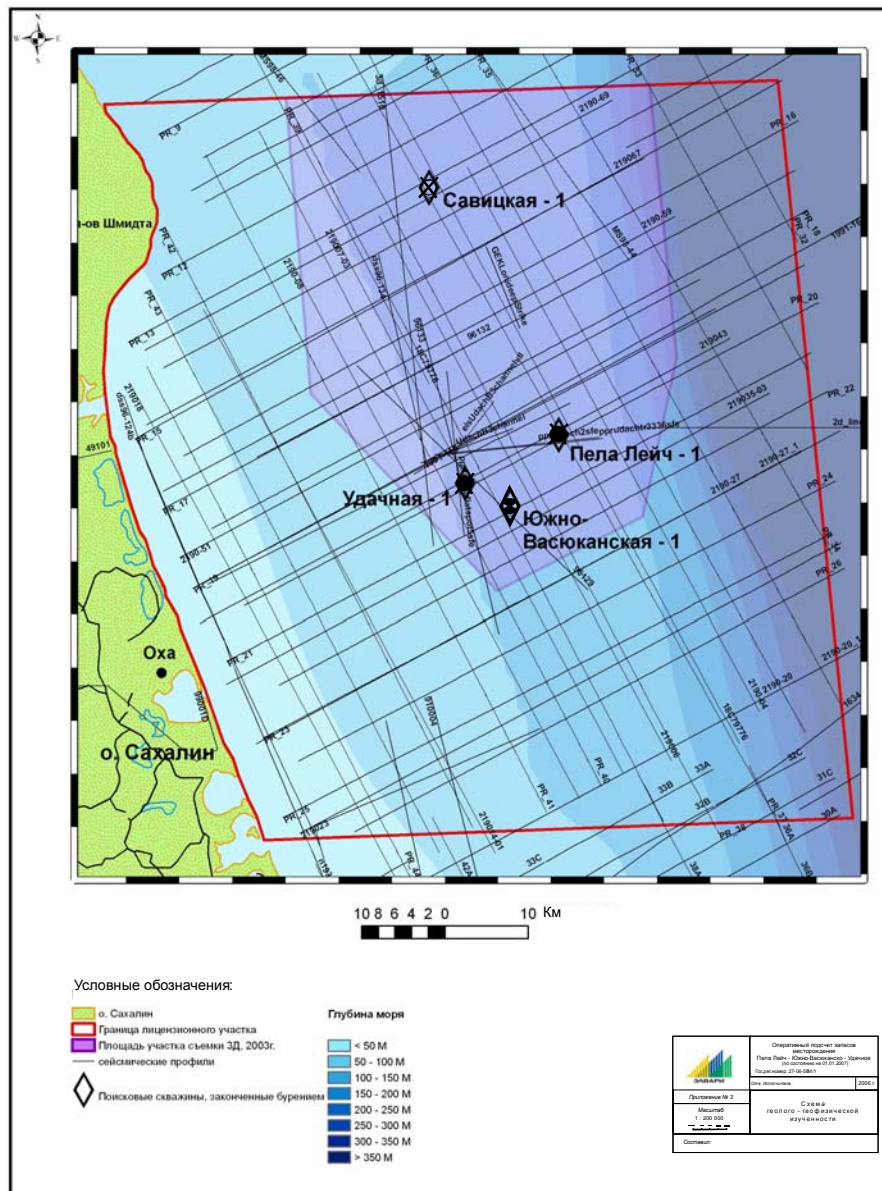
✓ Operational Challenges
Remote, Ice, Currents, etc.





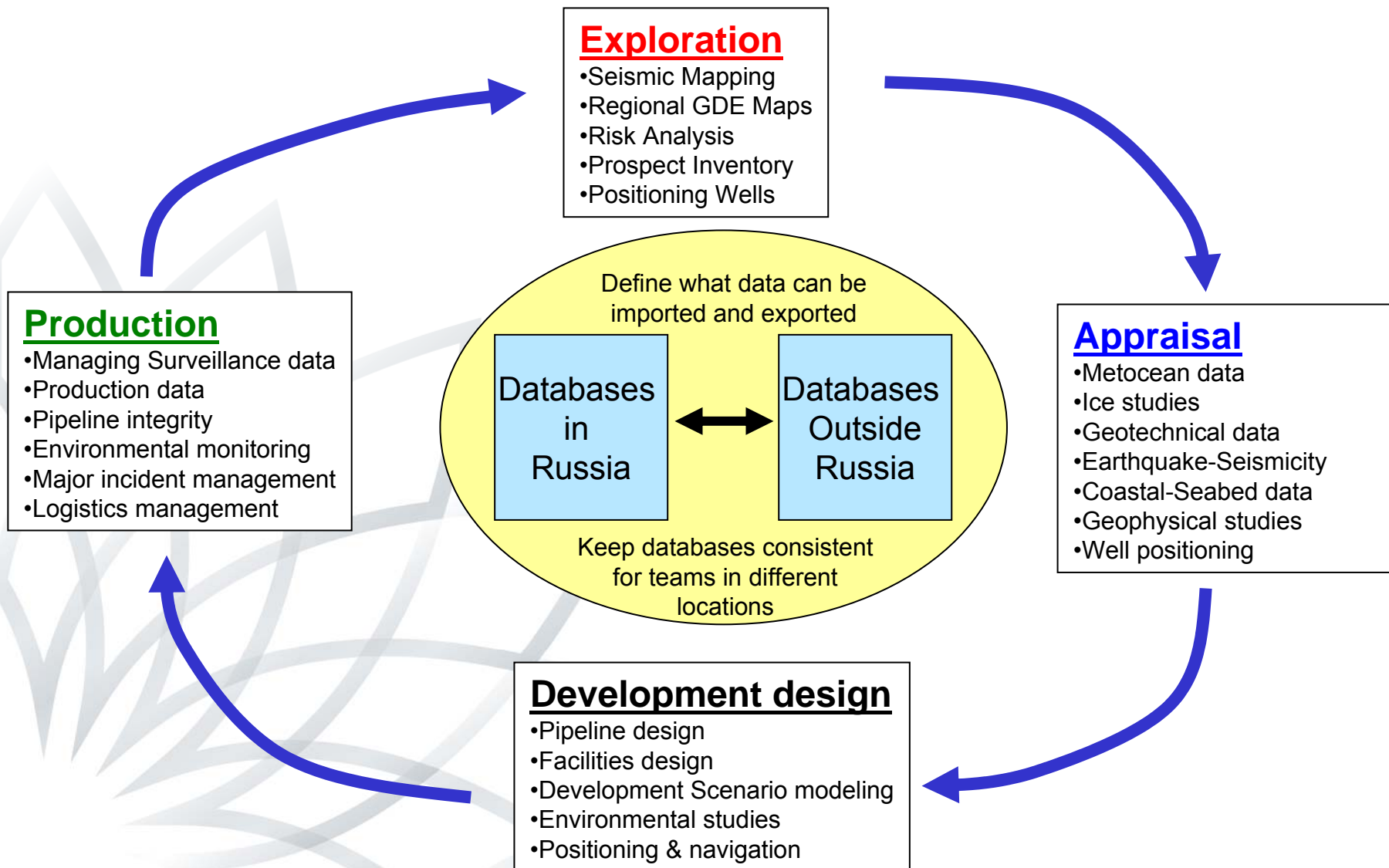
Sharing with Partners

- ✓ ENV Joint Venture
 - Elvry Neftegas Venture
 - 51% Rosneft 49% BP
- ✓ KV License Block
 - Kaigansky-Vasukansky
- ✓ Four Recent Wells (2004-06)
 - Summer drilling season
 - \$50-100 million each
- ✓ Continental Shelf
 - 100-150 m. Water Depth
 - Regional 2D Seismic
 - ~5km line spacing





GIS contributions through-out the Value Chain





GIS Strategy

✓ Diverse Staff

- 100 in Houston
 - Startup 4Q2005
- 25 Geoscientists in Exploration
- 20 in Development
- 20 in Commercial
- + Partners in Russia

✓ GIS Experience

- 2 Power Users (consultants)
- 3-5 Experienced Users
- 5-10 Intermittent Users
- 10-20 Occasional Browsers

✓ Training

- Just-in-time Mentoring
- In-House Workshops

✓ Leverage Experience

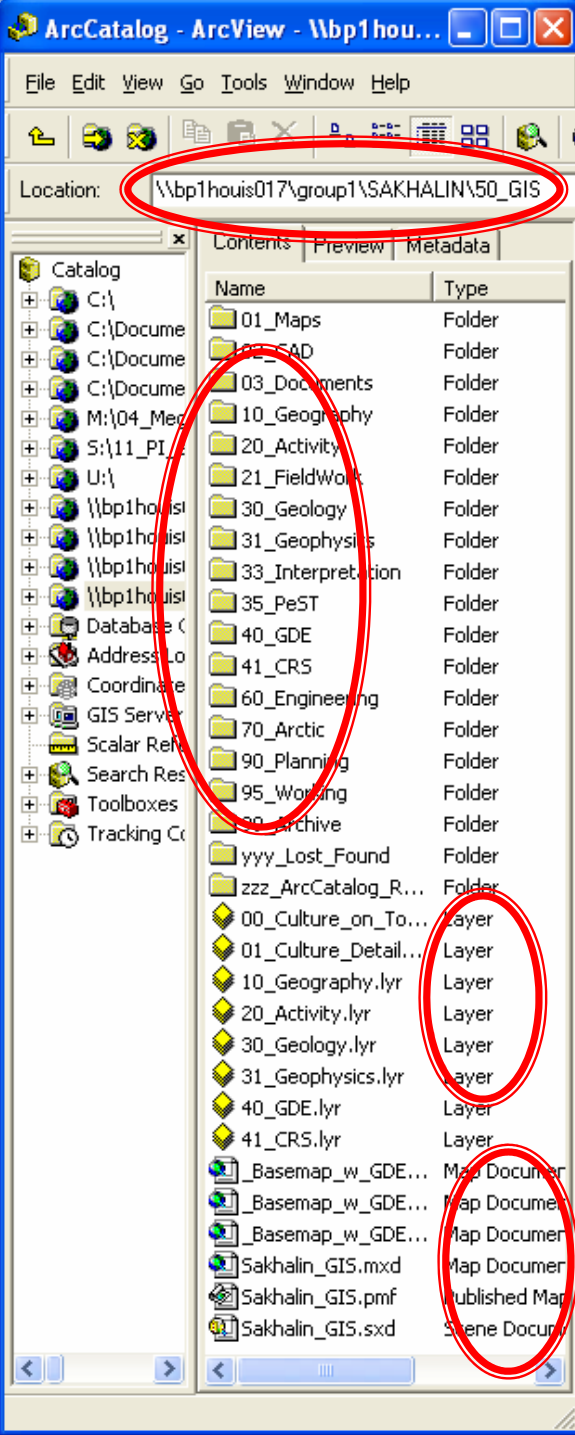
- Shared resources with GoM

✓ Publishing

- Data
 - MetaData
- Layer Files
 - Standard Bundles
- Documents
 - ArcMap MxD
 - Arc Reader PMF



GIS Catalog

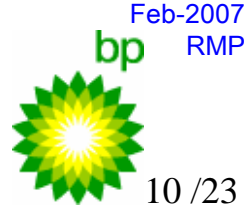


- ✓ Network File System
- ✓ Organized folder structure
 - Numerical hierarchy
 - Policed by Librarian(s)
- ✓ Publishing Strategy
- ✓ Inventory Report
 - 10 GB
 - & growing

Nax	Sak	----- August 2006
296	261	Broken Links
63	205	Map Documents
114	22	Group Layers
119	34	Individuals Layers
5398	1764	Total ArcGIS Objects Scanned
278	254	Total Map Documents
415	72	Total Group Layers
400	98	Total Individual Layers
58	45	Minutes to run Scan of Links
20	12	Minutes to run Scan of Catalog
20.4	9.8	Gb of disk space
28,371	9,353	Files
3,003	783	Folders



GIS Applications

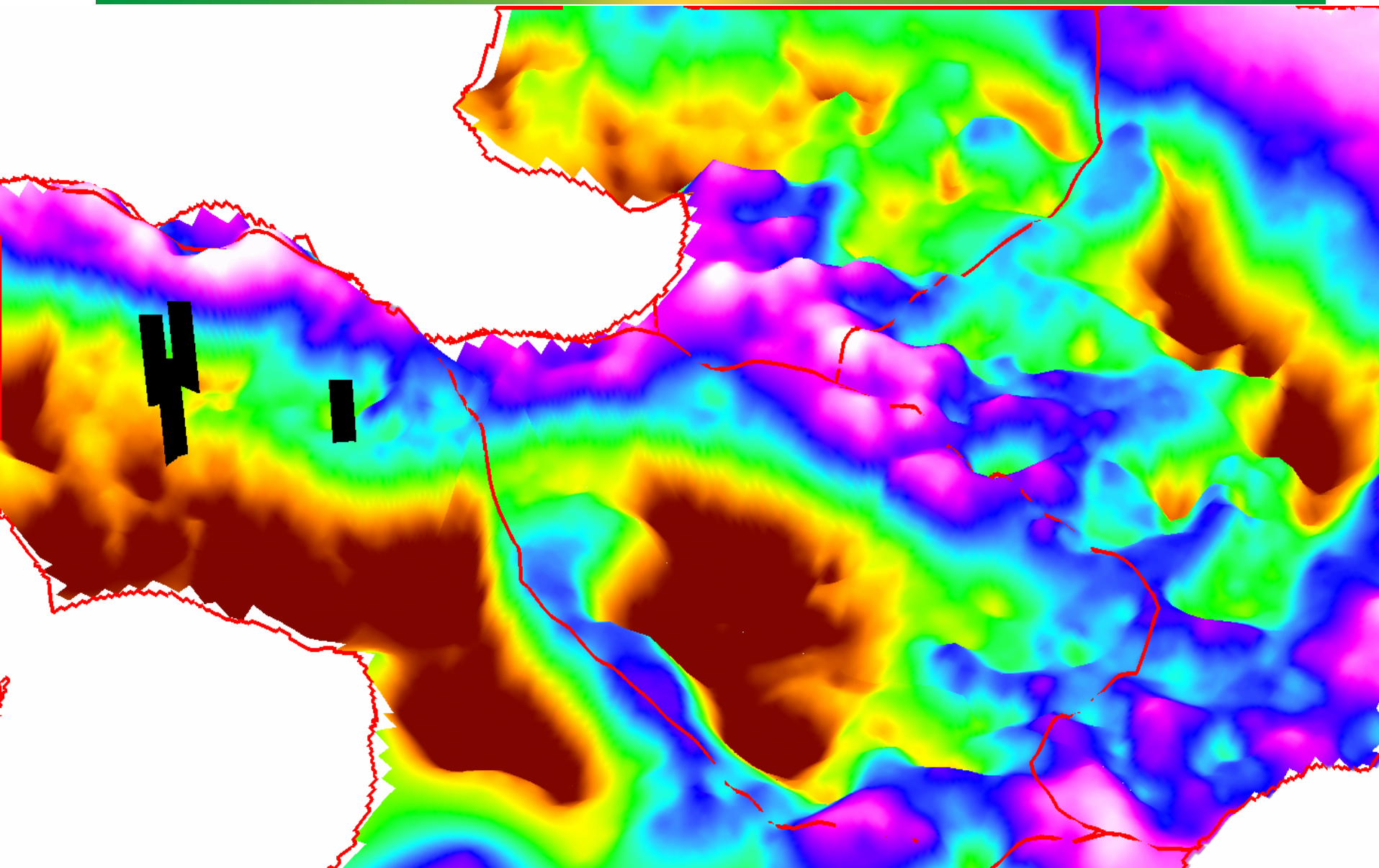


- ✓ Integration: combining diverse data sources
 - Internal interpretation
 - Russian government & Data Vendors
 - Public domain images, aerial photos, etc.
- ✓ Seismic Interpretation
 - Gridding & Contouring
 - Geologic features: faults, depositional environment
 - Grid Manipulation: thickness, risk, etc.
 - Prospects: size, volume, attributes
- ✓ Data Analysis
 - Inventory seismic navigation
 - Statistics from seasonal ice measurements



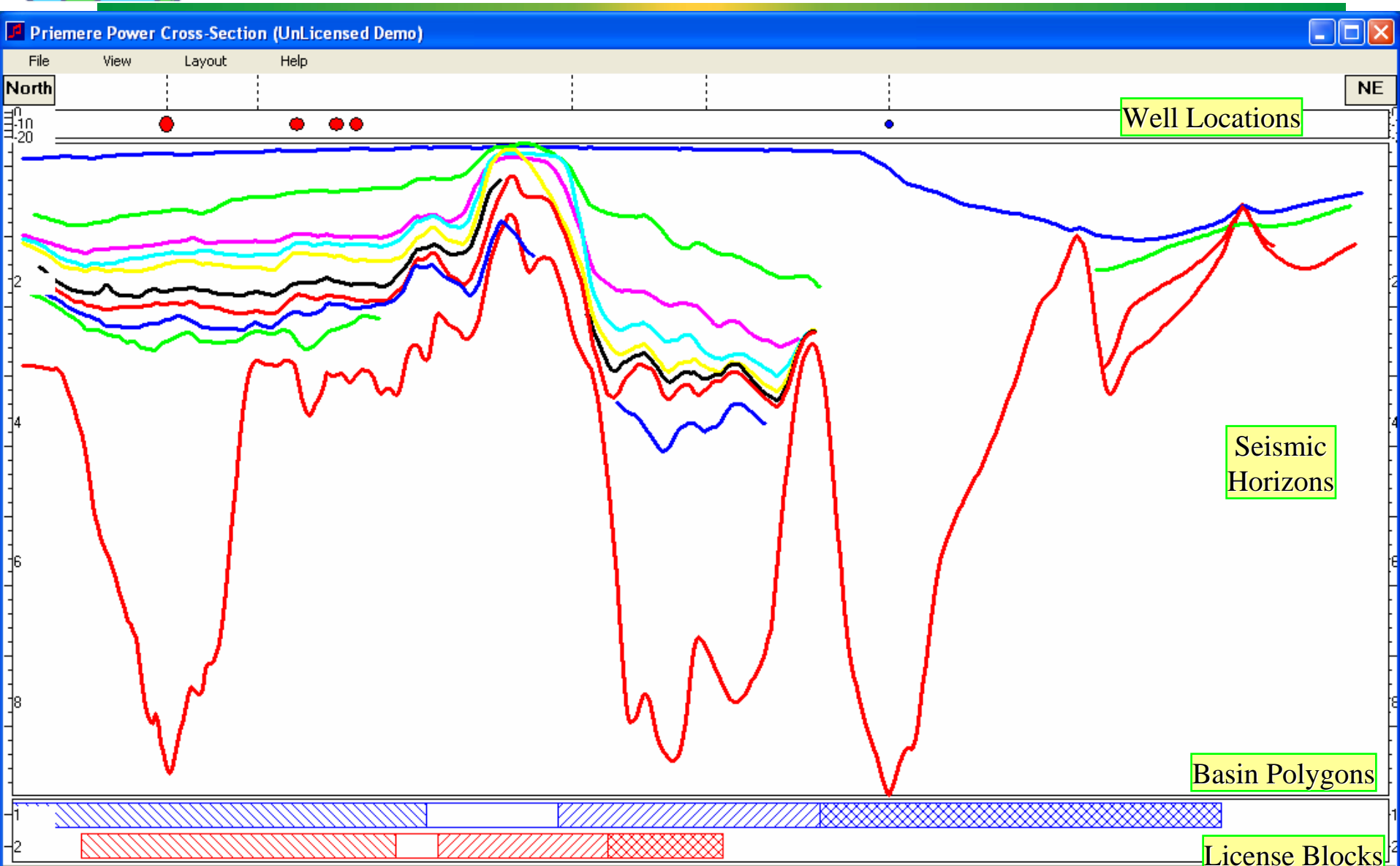


ArcScene 3D View of Basins



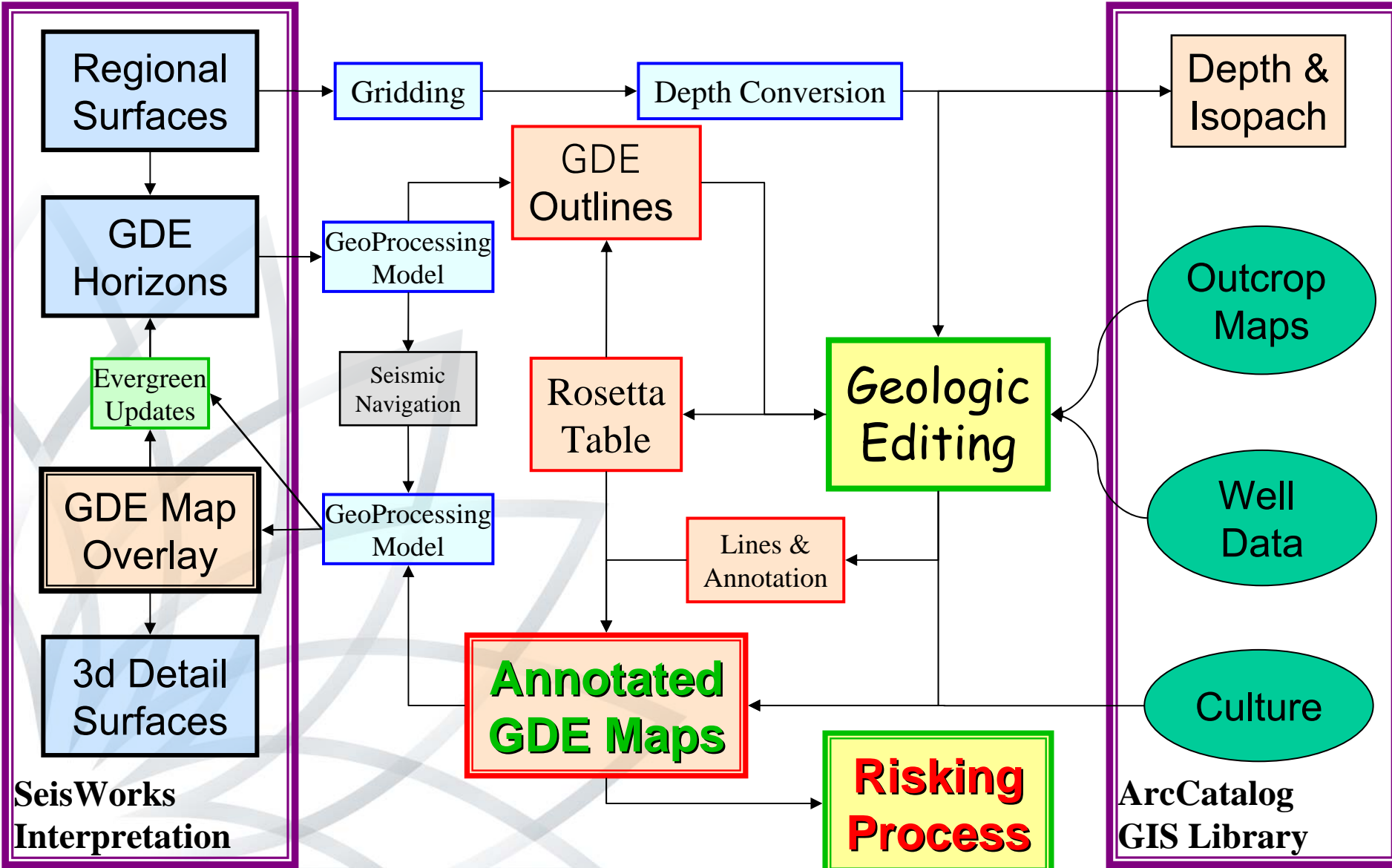


Basin Cross-Section





Integration Workflow



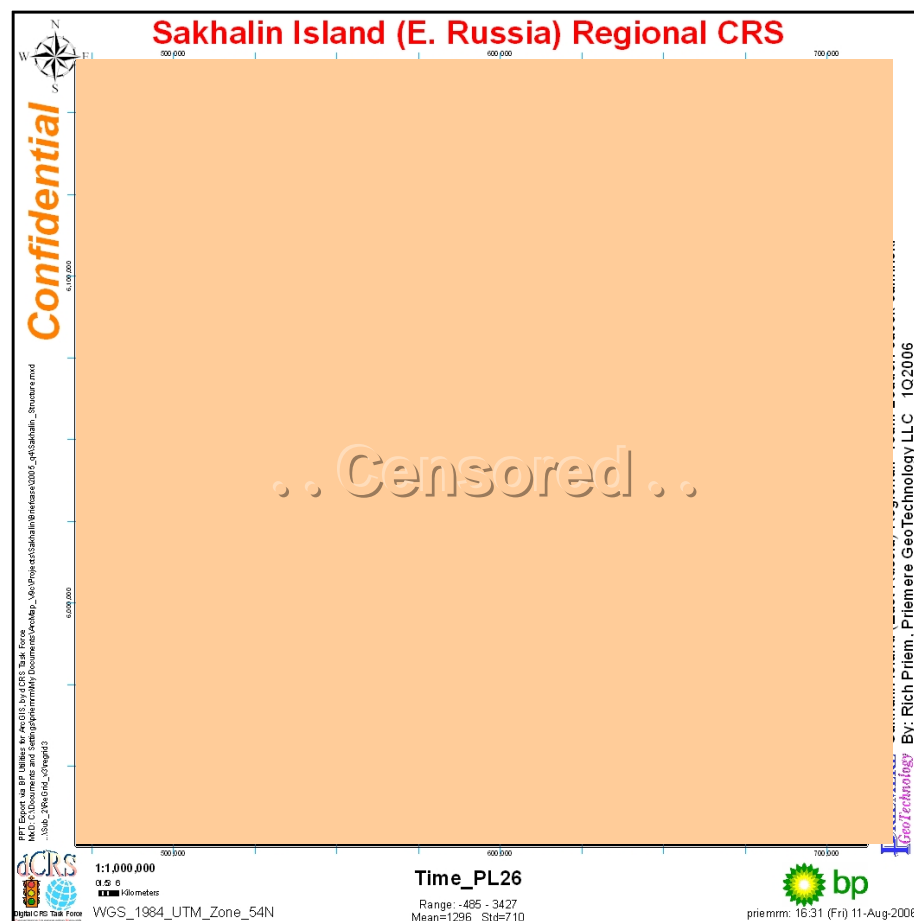
SeisWorks Interpretation

ArcCatalog GIS Library



Structure Maps

- ✓ From regional 2d seismic interpretation
- ✓ Stack of 5-10 horizons
- ✓ Processed 1-2 hours
- ✓ Load from Seisworks
- ✓ Grid & Contour
- ✓ Compute Thicknesses
- ✓ Derive Trap Polygons
- ✓ Export to PPT
- ✓ Slide pack to Present





Regional GDE Maps

Gross Depositional Environment



.. Censored ..



Confidential



- Legend -**
- Non-Depositional
 - High Land
 - Eroded
 - Syn-Depositional Erosion
 - Non-Marine
 - Non-Marine (High)
 - Fluvial Sands
 - Fluvial Sands (High)
 - Marginal Marine/Marine Shoreface
 - Marginal Marine/Marine Shoreface (High)
 - Sandstone-prone Slope
 - Sandstone-prone Slope (High)
 - Basin Floor Sands
 - Basin Floor Sands (High)
 - Shelf (Neritic/Offshore) Mudstones
 - Shelf (Neritic/Offshore) Mudstones (High)
 - Depositional slope
 - Depositional slope (High)
 - Slope (Bathyal) Mudstones
 - Slope (Bathyal) Mudstones (High)
 - Basinal (Abyssal) Mudstones
 - Basinal (Abyssal) Mudstones (High)
 - Basinal (Abyssal) Mudstones A
 - MTC

Sakhalin Island (E.Russia)

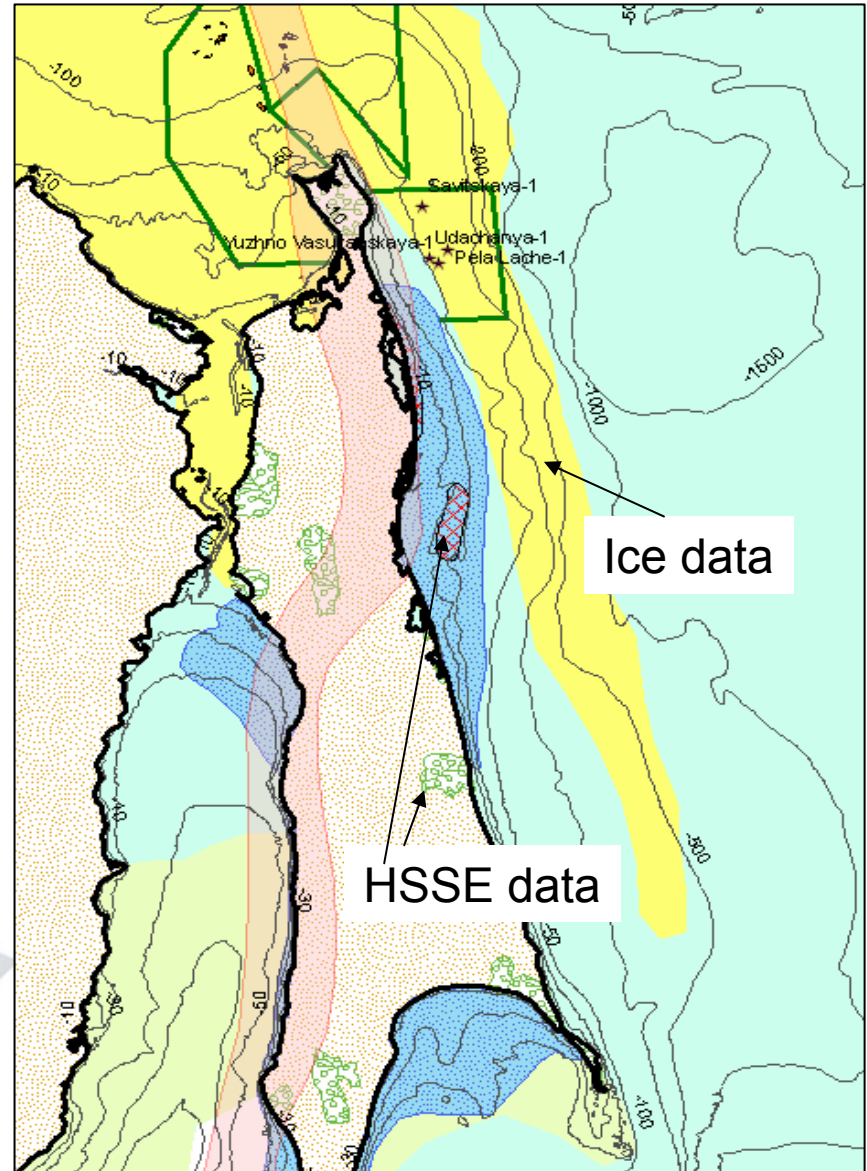




Engineering Data

✓ Manage & Integrate Data from Engineering and HSSE studies

- Ice Engineering Program.
- Geotechnical Program.
- Metocean Program.
- HSSE systems.
- Coastal and Seabed Processes Study.
- Seismicity Program.
- Geophysical & Well positioning program.





ArcSDE Initiative

✓ DCT Project

- Currently in scoping phase

✓ Objectives

- Data Management Strategy
- Upgrade hardware and/or software

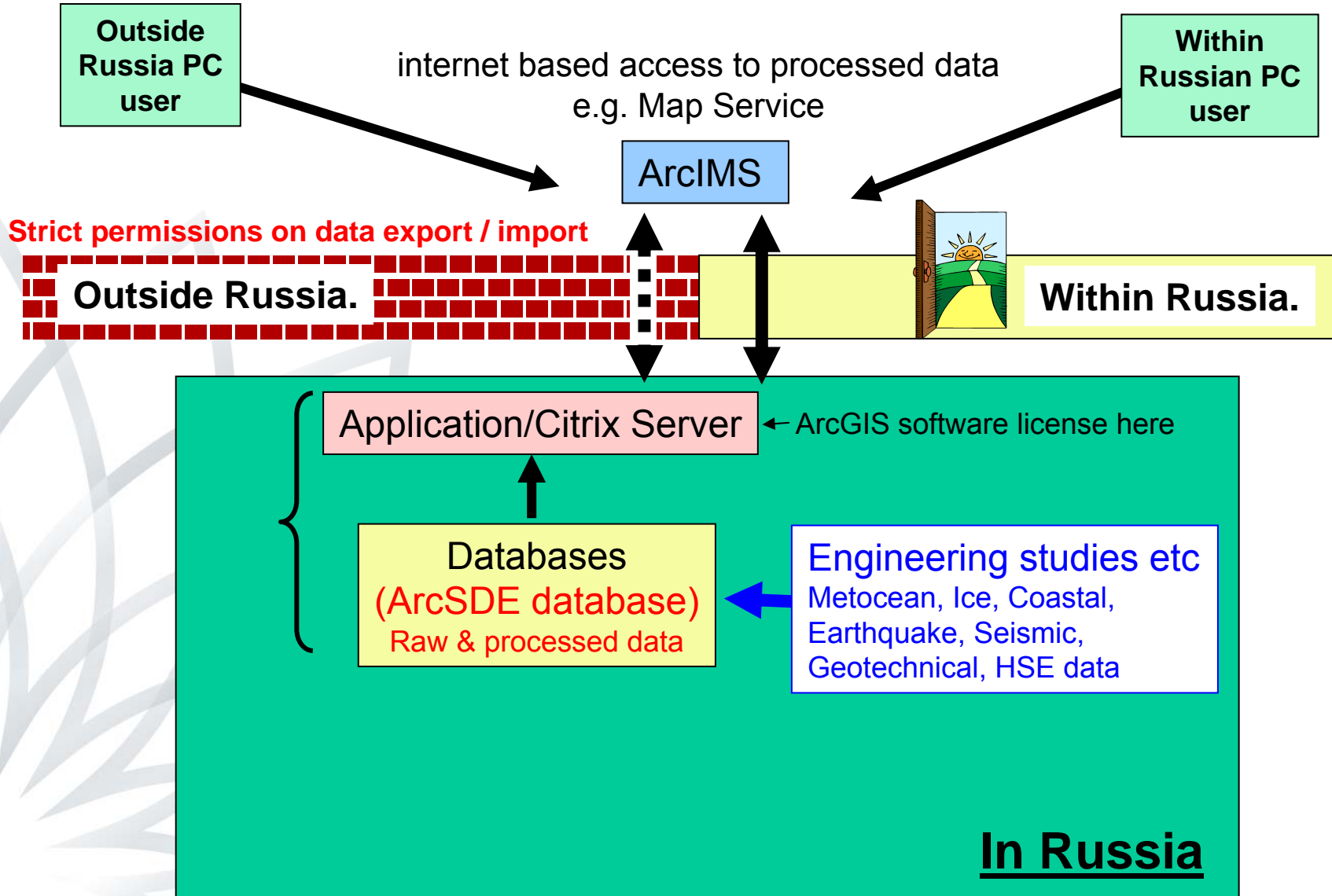
✓ Requirements

- Sharing with Russian Partners
- Partition Data Subsets
 - Government proprietary, stay in Russia
 - BP Proprietary, stay in Houston
 - Shared: synchronize at both sites





GIS Database Options





Challenges . . .



✓ Functionality

- Complexity
 - Too much to learn
- Editing
 - Not intuitive
- GeoProcessing
 - Still too immature for widespread usage
 - Not Repeatable or Portable

✓ Performance

- Stability: crashing too often
- Network Access
 - Overloaded MxD files
- CPU: way too slow
 - Unnecessary processing

✓ Data Management

- Metadata
 - Too much trouble
- Broken Links
 - Moving folders/servers
 - Updating files
- Corrupted Files

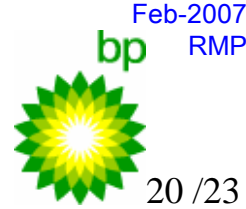
✓ Software Distribution

- ESRI Releases & Patches
- Internal Developments
- Internal bottleneck
 - Year lag time

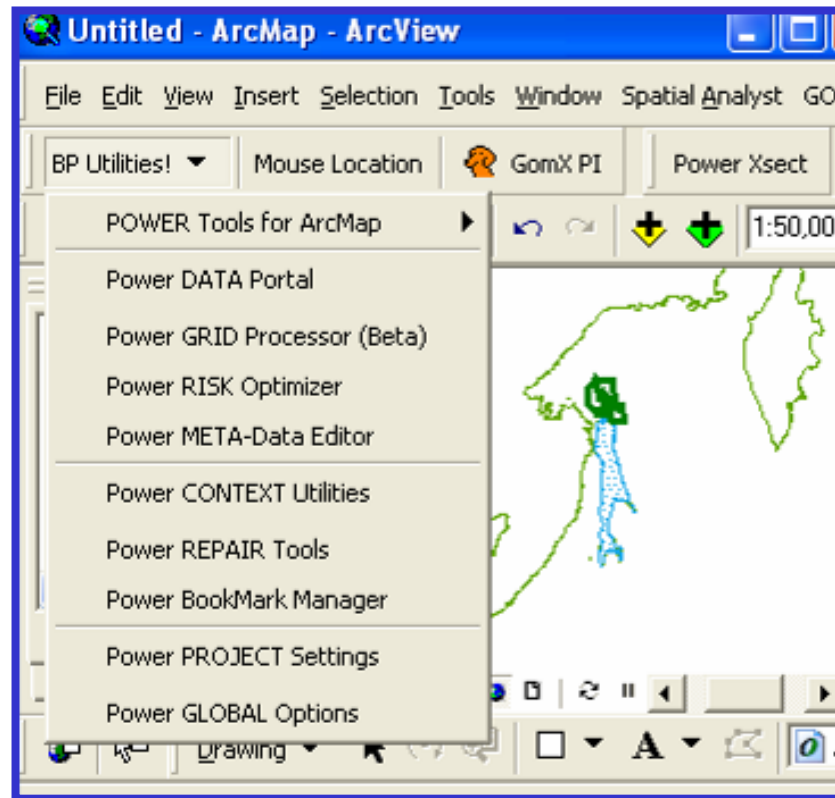




Power Tools for ArcGIS



- ✓ Custom **Extensions** for E&P Environment: powerful automation
- ✓ **Data Portal**: load from/to OpenWorks, SeisWorks, Zmap, EarthVision, GoCad, ascii, etc. . .
- ✓ **Grid Processor**: automate gridding, contour maps, trap analysis, reconstruction, . . .
- ✓ **Risk Analysis**
- ✓ **Context Utilities**: batch symbology, export to PPT
- ✓ **Repair**: broken links bad/missing projection
- ✓ **Bookmarks**: import, edit
- ✓ **Project**: remember paths, etc
- ✓ **Catalog**: scan tool





Sharepoint Collaboration



Home - GIS at BP - Microsoft Internet Explorer provided by BP Group Digital Business

File Edit View Favorites Tools Help

Address <https://wss2.bp.com/EP/GIS/default.aspx> Go

Home Documents and Lists Create Site Settings Help Up to E&P Top-Level Website

GIS at BP Home Modify My Page

Documents

- Shared Documents
- Enterprise GIS for Pipeline Systems
- Geodetic and Cartographic Information
- Survey and Site Investigation Network Meeting
- GISNetwork
- Remediation_Management
- Shared Layout Templates
- dCRS_Global_Deployment

Pictures

- General GIS Images
- GIS Day 2006 - BpTT

Lists

- GIS Tools Shared Library
- GIS Magazines, Journals & Newsletters
- GISdata
- Interesting_Places
- Products_Services
- MapDataIndex

Discussions

- General Discussion
- CRS with ArcGIS
- Prospect Inventory & GIS
- ArcIMS
- ArcGIS 9.0 Issues
- GoogleEarth

Collaboration on the application of GIS within BP, especially, but not limited to Exploration and Production applications like common risk segments (CRS). Direct questions about this site to Charles Fried, NAX BU, Houston. Phone +1-281-366-3445, email friedcc@bp.com

GIS Day at BP - November 15, 2006

Trinidad and Tobago



Houston



GIS Day @ BP

November 15, 2006

Announcements

Upcoming ArcGIS workshops 2/1/2007 10:30 AM
 by Fried, Charles C
 Planned are four workshop series for the rest of the year. They are all going to be on Thursdays, and I think mornings.

- March 22, 29 and April 5
- June 7, 14, & 21
- Aug 23, 30, and Sept 6
- Nov 1, 8, and 15

Email "Training, Houston"...

New update to Houston Culture SDE 1/26/2007 9:06 AM
 by Grimmer, David G (SAIC)
 New data updates from P2 (Tobin) to be added to the SDE Cultural Instance and will be visible February 12, 2007 See



Links

- slashgeo
- Google Earth Community
- OneBP
- planet bp Texas
- ESRI Support Site
- HouDME website
- NADCON
- Geographic Calculator FAQ
- Scale, Accuracy, and Resolution in a GIS
- Your Internet guide to Geographic Information Systems
- Texas General Land Office Geographic Information Systems Data
- Texas Natural Resources Information System
- Bathymetry, Topography, and Relief from National Geophysical Data Center (NGDC)
- Atlas: The Louisiana Statewide GIS



Vendor Engagement

- ✓ Beta Test Site, version 9+
 - 9.0 (2004), 9.1 (2005), 9.2 (2006)
 - Support from San Antonio Office (Danny)

- ✓ Discussion forums on the Web
- ✓ Input to PUG List

- ✓ Moving faster than other Vendors
 - But progress still requires patience





Adventures with ArcGIS at BP Sakhalin



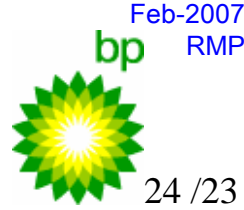
By: Rich Priem, consultant
Priemere GeoTechnology, L.L.C
onsite @ **BP**: 281-366-7658

PriemRM@bp.com





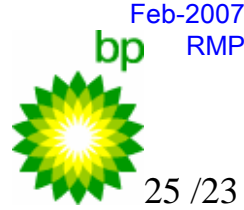
Abstract



- ✓ BP Sakhalin has made a commitment to ArcGIS for integration of spatial information from diverse data sources beyond the traditional Interpretation Workstation.
- ✓ And we've come to appreciate the depth & breadth of functionality as a viable replacement for more traditional "mapping" products, especially with the addition of the Toolbox, GeoProcessing, and Spatial Analysis tools delivered with ArcGIS version 9.
- ✓ Since the Sakhalin Business Unit moved to Houston late in 2005, we have leveraged experience from Gulf of Mexico teams to make significant progress. Yet the journey is still evolving as we continue to refine our Workflows to exploit these powerful tools for E&P specific applications.
- ✓ This presentation will highlight some of our progress, problems, solutions, and suggestions to make ArcGIS work for GeoScientists in the upstream sector.



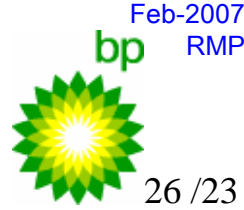
Bio: Rich Priem



- ✓ Rich is a GeoScience Consultant contracting with BP/Amoco for more than a dozen years. He has been in business as The Priemere Consulting Group for over twenty years, with Exxon as another major client.
- ✓ His degrees are in Engineering, Mathematics, and Computer Science. Rich has been programming & using software applications for 35 years, with 28 years in the Petroleum Industry, mostly on the Exploration side.
- ✓ This is his 5th PUG, and he has been heavily using ArcGIS Desktop for Mapping & Modeling - as well as ArcObjects for developing custom extensions to address specific needs of his clients.
- ✓ This presentation is dedicated to his 2nd son, expected to be born any day now. . .



Bio: Lorraine & Dimitra



- ✓ Lorraine works on the Sakhalin Development team, and has 9 years of experience with BP. Last year she transferred from London, where she worked on Caspian Sea projects. She has a PhD in Structural Geology. This is her first PUG conference, since she just recently got hooked on ArcGIS.
- ✓ Dimitra is a Petro-Technologist with BP for just over a year. She graduated from Moscow Institute of Oil and Gas with a master degree in Geology. GIS is her software of choice. She provides GIS support for BP-Russia Offshore business unit.