

Neuralog, Inc.

Organization and Access of Legacy Data at PDVSA

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Outline

- Venezuela & PDVSA
- Disposition and Categories of data
- Organization of Data Management personnel
- Implementation Strategies
- Technologies and standards employed
- Before and after comparison : user data access

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Venezuela Overview

- PDVSA is one of the largest NOC
- Oil Companies are giving back the fields to PDVSA and will be operated in a joint venture with PDVSA as majority share owner
- Companies that didn't accept the joint venture offer from PDVSA returned their data in various formats including a large volume of paper data

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PDVSA E&P Documents

Data spanning 70+ of activity

- ~1,000,000 Well Logs
 - 70% Scanned (rasterized)
 - Only 30% Digital log curves validated
- ~1,000,000 Well Reports
- ~20,000 Maps
- 1,000's Seismic Sections

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PDVSA & Neuralog

- PDVSA : Neuralog customer since 1996 for software and more recently, services
- In 2004 Neuralog embarked on a project with PDVSA to address the management of the historical well log data

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Project Drivers

- Maintainable by PDVSA Personnel
- Interoperability with new/existing systems/formats/web services/GIS
- Track conversion of historical data to digital
- Track certification processes employed and data status
- Proper Data Security
- Ease of Data Access

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PDVSA Organization

- Project Team composed of Data Management and IT personnel
- Teams setup to champion solution across the organization
- Internally maintain to the greatest extent possible.



PDVSA Organization

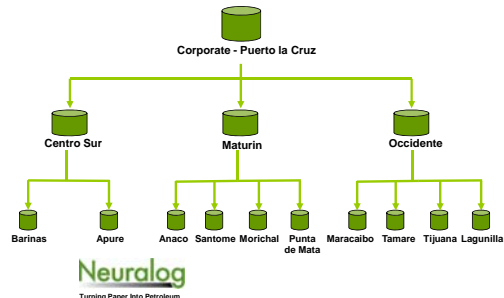
- Primary Data Management Department is the "Gerencia de Operaciones de Datos" or "GODD"
- GODD functions include data management, corporate memory and related application support
- Separate organization from IT
- Located throughout Venezuela.



Implementation Plan

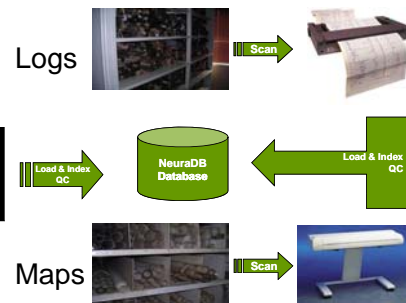


Implementation Plan



Well Log Project Flow

- Assess
- Physically catalog and clean
- Load and Index
- Scan
- Load
- Digitize, edit, QC
- Certify



Existing Well Log Access

- Digital well logs stored in Finder/LogDB (validated and un-validated)
- Well log images stored on web-based index – files accessed via FTP
- Many images stored on local PCs or CDROMs
- Remainder in warehouse storage on paper/film

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New Solution

- Relational DB based approach.
- Well/field data stored
- Documents/Logs indexed
- PPDM Based
- Windows/Web Services/Browser Access

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Technologies and Standards

- PPDM
- Oracle
- ESRI ArcGIS
- Web Services
- Microsoft Windows



ORACLE



WSC



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PPDM

- Public Petroleum Data Model – open standard
- International Data Modeling consortium
- Members include Oil&Gas as well as Technology Companies
- Model refined over 15 years.

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PPDM Modules

Major modules within PPDM used in the implementation include:

Wells

Projects

Records Management

Fields

Work Orders

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PPDM Wells

- Synchronized with well master from Finder
- Wells organized by field
- Well GIS Data generated from Database

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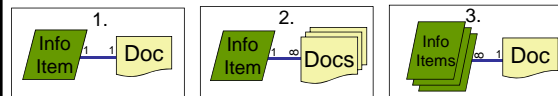
PPDM Records Management

- Designed around 'information item' concept.
- Module tracks how Info. Items relate to E&P entities – such as wells, logs and fields
- Multiple physical renderings of the same info item can exist



Information Items/Renderings

1. One Information Item with One Rendering
2. One Information Item with Many Renderings
3. One Rendering with Many Information Items



PPDM Records Management

- Physical renderings for an information item are documents
- Document version/change history maintained
- Well log image depth registration stored in database



PPDM Projects

- Used to track data certification
- Includes storing certification plan steps.
- Stores what items certified and who completed the step.
- Encrypted Digital Signature with CRC ensures data integrity



PPDM Work Orders

- Used to track parameters and status of the digitization process
- Work Order template created then files assigned to the work order
- Tracks who is assigned to each step, due date, expected date and completion date.



Oracle

- File content stored in database as BLOB's.
- Role based security used to control access to data
- Enterprise-level performance



Oracle BLOB Storage

- Advantages
 - Content secure in DB
 - No path links to break
- Disadvantages
 - Slower inserts
 - Large tablespace(s)



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User Role based security

| Activities | Browser | Specialist | Super User | Admin |
|---------------------------------------|---------|------------|------------|-------|
| Browse/Query/Export | X | X | X | X |
| Load/Edit Wells, Fields... | | | X | X |
| Load/Edit Documents | | X | X | X |
| Delete Wells, Fields and Documents | | | | X |
| GIS Query | X | X | X | X |
| Reference Value Management | | | X | X |
| Add/Edit Users | | | | X |
| Creating Work Order Type | | | X | X |
| Create, Modify and Assign Work Orders | | | X | X |
| Updating Work Order Status | | X | X | X |
| Viewing Work Order Status | X | X | X | X |
| Define Certification | | | X | X |
| View Certification Status | X | X | X | X |
| Updating Certification Steps | | X | X | X |



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Web Services

- Used to make data available to middle-ware applications
- Exposes well, field and log information and document access
- Query capabilities published (i.e. find resistivity log files for a well)



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Microsoft Windows

- Employed an easy-to-use Windows based client application for user access.
- For enabled roles, same application facilitates loading and editing.



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ESRI Technology

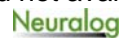
- Employed Extension framework available in the ArcGIS Environment
- Adds GIS capabilities to the PPDM based data.
- Allows direct document access.



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User Experience Comparison Before

- Some raster logs available in an un-maintained 'flat' website organized by field or well
- Slow 'one at a time' file access
- Many logs warehoused/locally stored and not available electronically



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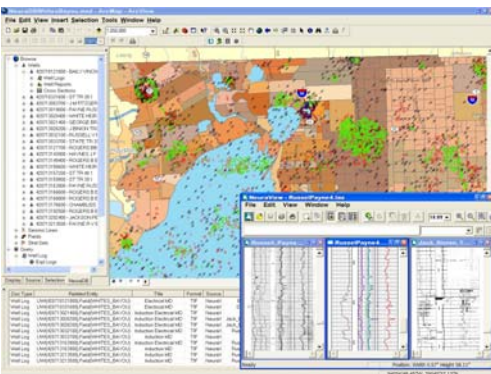
Raster Log Access

| Well ID | Well Name | Status | Type | Well Profile | Date of Review |
|------------|------------|--------|------|--------------|----------------|
| 2007110001 | 2007110001 | Active | Oil | 2007110001 | 2007110001 |
| 2007110002 | 2007110002 | Active | Oil | 2007110002 | 2007110002 |
| 2007110003 | 2007110003 | Active | Oil | 2007110003 | 2007110003 |
| 2007110004 | 2007110004 | Active | Oil | 2007110004 | 2007110004 |
| 2007110005 | 2007110005 | Active | Oil | 2007110005 | 2007110005 |
| 2007110006 | 2007110006 | Active | Oil | 2007110006 | 2007110006 |
| 2007110007 | 2007110007 | Active | Oil | 2007110007 | 2007110007 |
| 2007110008 | 2007110008 | Active | Oil | 2007110008 | 2007110008 |
| 2007110009 | 2007110009 | Active | Oil | 2007110009 | 2007110009 |
| 2007110010 | 2007110010 | Active | Oil | 2007110010 | 2007110010 |

User Experience Comparison After

- Quick access using Windows, GIS and Web Services
- Documents available in open database – PPDM
- Data quality documented and tracked

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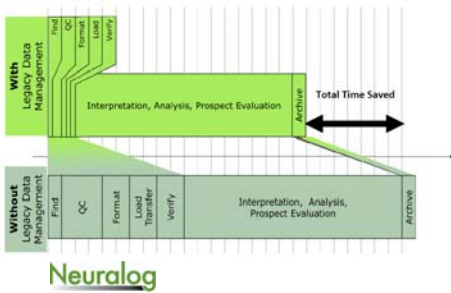


Value Added

- Improved physical and logical data security
- Improved data access and usability
- Easy integration / interoperability with other repositories and applications
- Standards are implemented in process including data capture, quality control and certification

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E&P Value Proposition



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Thank You!

We appreciate your spending time with us today.

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