Overview of Data Management for Ghana’s Oil Industry

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Presentation Outline

i. Presentation of the petroleum activity in Ghana
   - Brief history of Oil activities in Ghana and the role of GNPC

ii. Resource Management in Ghana from a national perspective
   - Brief History of Data Management Activities in Ghana

iii. DM Project
   - The Databank Project and the Reference Database Project.
Ghana

Democratic

Rule of Law

Freedom & Justice

Stable & Growing Economy
Exploration History

• Limited success chasing seepages

1. 1896-1903 West African Oil and Co Ltd

2. 1909-1913 Societe Francaise de Petrole, now Elf/Total

3. 1923 – 1925 African and Eastern Trading Corp

4. 1956 – 1957 Gulf Oil Co
1. 1957 Independence from UK – then first oil and gas field discoveries
5. 1973 - Zapata discovers first offshore gas with Cape Three Points-1X
6. 1978 -1980 Phillips discover oil & gas in North and South Tano
7. 1985 - PetroCanada International Assistance Corp (PCIAC)
8. 1985 to date – GNPC became fully operational.
Regulatory Frameworks

• GNPC Law (PNDCL 64) of 1983

• Exploration & Production Law (PNDCL 84)

• Petroleum Income Tax Law (PNDCL 188)

• Model Petroleum Agreement for Exploration and Production (not a law) Drafted for GNPC Operations.
GNPC Mandate

Exploration
Development & Production
Transportation & Disposal

Technology Transfer
Training/Capacity Building
Since becoming fully operational in 1985 as a NOC, GNPC has had the following responsibilities:

- Custodian of national data assets
  - Safe and secure storage of data on behalf of the nation
  - Deriving value from these data
  - Encouraging new investments into Ghana by making this information available to partners and potential bidders through promotional tours and presentations.
OTHERS INCLUDE:

- Management of national hydrocarbon assets:
  - Ensure that existing and future operators provide all relevant exploration and production data
  - Ensure that operators are functioning efficiently and in line with national policy

- Act as operator, exploring and developing new plays.

Hence GNPC’s Roles are as:

1. Advisor To Government In Policy Formulation;
2. Assisting In Regulatory Functions;
3. And A Commercial Operator.
• The above functions 1 and 2 have been taken over by the Petroleum Commission which was established during 2011 by an act of Parliament.

• The objective of the Commission is to manage and regulate the utilization of petroleum resources and to coordinate the policies in relation to them.

• GNPC still has a role to play due to lack of capacity of the PCG.
• GNPC will ensure the completeness of all datasets delivered to the PCG and in accordance with agreed quality standards and procedures

• GNPC will ensure that analogue data will be correctly converted to digital formats according to set specifications and procedures.
The Petroleum Resources Of Ghana
Sedimentary Basins

<table>
<thead>
<tr>
<th>Basin</th>
<th>Age of Sediments</th>
<th>Wells Drilled</th>
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<tr>
<td>Tano-Cape Three Points</td>
<td>Cretaceous</td>
<td>103</td>
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<tr>
<td>Saltpond</td>
<td>Paleozoic</td>
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<td>Accra-Keta</td>
<td>Cretaceous</td>
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<td>Voltaian</td>
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<td></td>
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<td><strong>143 total wells</strong></td>
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</table>
Concessions

• Currently, there are over eighteen (18) offshore licences with various companies operating in the basins.
As early as 1896, wells were drilled in and around Half-Assini as a result of oil seeps found onshore Tano basin. Today one can still see some of these seeps at bokakere. Between 1978 and 1985 oil was produced from the Saltpond field.

A number of oil, oil/gas and gas fields have been found in the tano basin. In all over 143 wells have been drilled in the country and over 13 discoveries have been made. It is also worth mentioning that 75% of 50 exploratory wells drilled encountered varying degrees of hydrocarbon shows.

<table>
<thead>
<tr>
<th>Field</th>
<th>Basin</th>
<th>Year</th>
<th>Fluid type</th>
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<tr>
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<td>Saltpond</td>
<td>1970</td>
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<td>Cape Three Points</td>
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<td>Gas</td>
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<td>1978</td>
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<tr>
<td>South Tano 3-AX Block</td>
<td>Tano</td>
<td>1979</td>
<td>Gas</td>
</tr>
<tr>
<td>North Tano</td>
<td>Tano</td>
<td>1980</td>
<td>Oil &amp; Gas</td>
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<td>Tano</td>
<td>1989</td>
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<td>Jubilee</td>
<td>Tano / West CTP</td>
<td>2007</td>
<td>Oil &amp; Gas</td>
</tr>
<tr>
<td>Sankofa</td>
<td>Cape Three Points</td>
<td>2008</td>
<td>Oil &amp; Gas</td>
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<tr>
<td>Odum-1</td>
<td>Cape Three Points</td>
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<td>2009</td>
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<td>Dzata 1</td>
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<td>2010</td>
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Data Management Practices
1986 - GNPC managed to bring in about the first 4000 ½ - inch 9-track seismic tapes for storage in an air-conditioned room provided it by the Volta River Authority in Akuse.

1989 GNPC’s own custom-built Data Storage Warehouse was completed in Accra, several other exploration data were moved into Ghana for storage. These initiatives quickly brought up the number of seismic tapes in different media and formats in storage in GNPC locally up to over 20,000.

2011 All these have now been transcribed onto IBM 3590 and DLT media.
The ISDM&C

• The Information Systems, Data Management and Communication Department (ISDM&C) is the Department responsible for all Information and Communications Technology Deployment and Policy Implementation within the Ghana National Petroleum Corporation.

• The Department has two main sections; namely the Information and Communication Technology (ICT) Section and the Data Management Section.
The responsibilities of the (ISDM&C) are as follows

• To ensure the effective transfer and use in GNPC of appropriate advanced Information Systems Technology relating to petroleum operations including exploration and production;

• To establish and operate an Exploration and Production Data Management Center, including the maintenance of a technical and archival library for the provision of technical and administrative documentation services;

• To promote and co-ordinate the utilization of the Corporation’s laboratory facilities to provide routine analysis, technical services and training as part of development activities within the technical departments in support of petroleum operations of GNPC and its partners as well as twinning institutions.
The Data Storage Center

- The Center comprises of a **4,000 square feet** data warehouse, located in Accra. This provides the local storage infrastructure for GNPC.

- The Center has a **Geophysical Data Management Unit** for storage of all geophysical data tapes and a **Geological Data Management Unit** for the storage of all geological data, including well cores and sampling data. The Geological Unit also has a **Laboratory Facility** for **Geochemical, Petrographic and Paleontological Data Analysis**.
New Data

• Formats, technology and mode of transfer is clearly stated in current PAs (Petroleum Agreements)

• These are up to date with current technology, ie. 3592, 3592E, DVDs, and Hard Drives.
General challenges

- Seismic section films not digitized
- Reliability/Readability of some new Data (QA/QC)
- Metadata missing
- Personnel (numbers, training etc.)
- ICT and Data Center in two separate locations.
DM Projects
A Data Bank System has been proposed by GNPC for World Bank funding with support and technical assistance provided under a Norwegian OfD/NORAD collaboration.

The Data Bank would constitute a three tier data integration layer made up of a cluster of data storage platforms and associated software.
• **Integration Layer 1**: Loaded Exploration and Engineering data currently in storage on tapes into electronic storage.

• **Integration Layer 2**: Scanning and storage of all hardcopy data including Library Reports, Maps, Image Captures of Cores and Sections, and other Bibliographic Materials, in agreed archival formats.

• **Integration Layer 3**: Production Database System, storing all Primary Aggregated Data to be received from GNPC’s producing fields for secure secondary storage after validation.

The Data Bank Common Data Administrator is to provide a fully integrated management of the Data Bank through a GIS Interface.
DATA CENTER
VIEW OF RE-MODELED LABORATORY/ DATA CENTRE
The Reference Database Project

- The RDB is a repository of all metadata (cultural data) of data in storage in GNPC. The Database is developed and will be linked to a portal to provide open access to the general public and prospective investors on information to the data in storage.
DATABASE STRUCTURE

- Tables created and Normalized
- Good relationships between tables - Referential integrity
- Reference Tables and Lookups for easy data entry.
The login screen welcomes the user.

Three (3) levels of access:

1. Administrator;
   i. Information Maintenance
   ii. Query & Report
   iii. User Account

2. Co-Administrator;
   I. Information Maintenance
   II. Query & Report

3. Guest;
   Only Query & Report
MAIN INTERFACE

The former name of the reference database, “PETRO-PORT”, has been replaced with a more suitable name, “GNPC PUBLIC DATA PORTAL” (GNPC-PDP).

This screen welcomes the user after successfully logging into the database.
INTERFACE FOR INFORMATION MAINTENANCE
By clicking the “Information Maintenance” button on the Main Interface, this Interface is displayed.

The Information Maintenance interface gives you a menu that helps you to Add, Edit and, if necessary, Delete data.
 INTERFACE FOR LICENSES

The License Interface also displays the following sub-forms: License Contractor, License Partner (Both in a Tab Control) and License Area.
# Seismic Survey Report

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ONGOING WORKS & OUTSTANDING ISSUES

ONGOING WORKS:

- Data Entry for **Wells** is ongoing.
- Loading of **Seismic data** is also ongoing.
  - A “Runlist” had been developed to load data.
  - Documenting the seismic data loading procedure using “Runlist”.

OUTSTANDING ISSUES:

- Interfacing the Reference database with GIS. The GIS implementation is to enable information from the RDB to be presented in map form over the portal.
GIS
Other Projects

GNPC through its alignment with the Jubilee Field Partners (Tullow et al) are implementing an infrastructural outlays for a Production Data Management System:
Meda mo ase
THANK YOU !!