INDUSTRY PERSPECTIVE

PETROBRAS APPROACH TO ASPECTS OF ASSET INTEGRITY / PROCESS SAFETY

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The presentation may contain forecasts about future events. Such forecasts merely reflect the expectations of the Company’s management. Such terms as "anticipate", "believe", "expect", "forecast", "intend", "plan", "project", "seek", "should", along with similar or analogous expressions, are used to identify such forecasts. These predictions evidently involve risks and uncertainties, whether foreseen or not by the Company. Therefore, the future results of operations may differ from current expectations, and readers must not base their expectations exclusively on the information presented herein. The Company is not obliged to update the presentation/such forecasts in light of new information or future developments. All projects forecasted herein are subject to approval by the appropriate stakeholders.

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CAUTIONARY STATEMENT FOR US INVESTORS

The United States Securities and Exchange Commission permits oil and gas companies, in their filings with the SEC, to disclose only proved reserves that a company has demonstrated by actual production or conclusive formation tests to be economically and legally producible under existing economic and operating conditions. We use certain terms in this presentation, such as oil and gas resources, that the SEC’s guidelines strictly prohibit us from including in filings with the SEC.
AGENDA

- PETROBRAS IN NUMBERS
- PROCESS SAFETY
- ASSET MANAGEMENT
- PROCESS SAFETY X INTEGRITY
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PETROBRAS IN NUMBERS

- PROCESS SAFETY
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Oil and Gas Production: 2.4 million boe/d
Oil Fields: 293
96% of Brazilian production
34% of total production in deep and ultra-deep water

12 refinery in Brazil
Capacity: 2.0 million bpd
Oil Production in Brazil: 1,997 thousand bpd
7,642 service stations
38.1% share in Brazilian market
20% of gas stations in Brazil
9,190 km of gas pipeline
Natural Gas: 74.9 million m³/d
3 LNG plant of total capacity of 41 million m³/d
7,028 MW of Power Generation

17 countries
Proven reserves: 0.7 Bi boe (SPE)
Oil and Gas Production: 235 mil boed
Refinery capacity: 231 mil bpd

3 Biodiesel plants
Alcohol – New markets
Largest producer of biodiesel in Brazil
3rd largest producer of ethanol in Brazil
Long History of implementing offshore projects in Brazil

191 offshore units (45 floating) • 68 offshore rigs • 63 onshore rigs

Onshore Rig
Onshore Facilities
Fixed Platform
Shallow Water
FPSO Deep Water
FPSO Ultra Deep Water
PETROBRAS IN BRAZIL
E&P information

Reserves
- Proven reserves 12.3 billion boe (SEC)
- Internal Reserve Replacement >100% in the last 21 years

Production
- 2,355 thousand boed

Exploratory Area
- 168 Exploration Blocks
- 21 sedimentary basins

Human Resources
- 27,000

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Manaus-AM (OU-AM)
Natal-RN (OU-RN)
Aracaju-SE (OU-SAL)
Salvador-BA (OU-BA)
Vitória-ES (OU-ES)
Macaé-RJ (OU-BC)
Rio de Janeiro-RJ (OU-RI)
Santos-SP (OU-BS)
Itajaí-SC (OU-Sul)
**E&P Installations**

- **9** Operations Units
- **9,689** wells
- **262** Onshore Production Facilities
- **8** GPP (Gas Processing Plant)
- **114** Platforms
- **28** FPSO
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PROCESS SAFETY
Petrobras’ HSE Policy and 15 Guidelines

HEALTH, SAFETY AND ENVIRONMENTAL POLICY

Educate, train and commit employees on questions of HSE, involving suppliers, communities, regulatory authorities, unions and other interested parties;

Promote reporting and investigation of HSE issues, and consider HSE performance into consequence and recognition systems;

Promote health, the protection of human life and the environment, through risk identification, control and monitoring, bringing safety procedures into line with the best international practices and maintain a permanent state of readiness for emergencies;

Ensure the sustainability of projects, undertakings and products over their life cycle, considering the impacts and benefits from an economic, environmental and social viewpoint;

Consider the ecoefficiency of operations, minimizing the local adverse impacts inherent in the activities of the industry.

GUIDELINES

1 Leadership and Accountability
2 Regulatory Compliance
3 Risk Evaluation and Management
4 New Projects
5 Operations and Maintenance
6 Management of Change
7 Acquisition of Goods and Services
8 Training, Education and Awareness
9 Information Management
10 Communication
11 Contingency
12 Community Relations
13 Accident and Incident Analysis
14 Product Stewardship
15 Assessment and Continuous Improvement
PROCESS SAFETY
Petrobras’ HSE Results

PEGASO
HSE Policy and 15 Guidelines

PAG- HSE
Management System Evaluation

PSP
Process Safety Program

HSE Safety Manual

HSE Excellence Project

HSE New Projects

Process Safety

Continuous Improvement Program

Oil Spill Over one Barrel

LTIF - Lost Time Injury Frequency
HSE Police and Management System and its guidelines or elements

- As built Documents
- Safety Studies
- Management of Recommendations from Studies
- Safety Critical Elements, operational Procedures, equipment & Systems
- CONTINGENCY: Planning and Management of Emergencies
- TRAINING and Communication
- Management of Change (MOC)
- Accidents and incidents analysis
- Critical Analysis
- Audits
- Assessment and continuous improvement

COMMIT TO PROCESS SAFETY

UNDERSTAND HAZARDS & RISKS

MANAGE RISK

LEARN FROM EXPERIENCE

Source: www.aiche.org/cep
PROCESS SAFETY

**PROCESS**
- PROCESS PLANT
  - Engineering and Design
- EQUIPMENT INSTALLATION
  - Risk Analyzes
- TRANSPORT
  - Management of Change
  - Maintenance and Inspection
  - Alarms and Process Control
  - Operational Procedures
  - Human Factor

**PEOPLE**
- Procedures
- Safety analyze of tasks
- Qualification/ Training
- Behavior
- Workplaces
- Organizational factor
PROCESS SAFETY
Petrobras’ risk management process

Process Safety Guidelines and Policies

Safety Studies
- Hazards Identification
- Risk Evaluation

5 years

Maintenance Plans
- Procedures
- Safety Critical Elements (SCE)

Safety Critical Elements Management
Operate safely

Identify and Manage changes

Temporary

Permanent

Incidents /Accidents Extension Analysis

Permanent
**Process Safety Indicators**

- **FATALITY**
  - Without lost time accident
  - Incident
  - Behavioral deviation Management

- **CATASTROPHE**
  - Deviations of risk control barriers (Project and Operation)
  - Loss Of Primary Containment
  - Process accident

- **OCCUPATIONAL HEALTH AND SAFETY**
  - Leading Indicators
  - Laggard Indicators

- **PROCESS SAFETY**
  - Process Safety Accident
  - Process Safety Incident
  - Assessment and regulatory compliance indicators
  - Maintenance of mechanical integrity indicators
  - Reliability indicators
    - Process safety training and competency indicator
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The Petrobras’s Asset Integrity management strategy, for the present days and for the future, is supported by two initiatives:

1. **E&P Asset Integrity Management**

2. **GIOp (IO) Integrated Operations Program**
E&P Asset Integrity Management

Management and Technical Projects:

- Strategy
- Governance
- SAP Standardization
- Human Resources

- New Projects
- Life Extension

- Learning Phase
- Steady state Phase
- Aging Phase

- Routine
- Monitoring and Control
- Cost Management
- Material & Services
- Corrosion Management
- Turnaround
- Floatel Management

Installation's Life Time
Reservoirs Monitoring
Critical Equipment Monitoring
Operational Support
Wells Surveillance
Integrated Planning
Integrated Decisions Process
Plant Surveillance
Integrity Monitoring
Integrated Operations Management
Petrobras
GIOp (IO)
Integrated Operations Program
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PROCESS SAFETY x ASSET INTEGRITY

ACCEPTABLE

EFFORT/TECHNOLOGY

PROEF

Plan

Act

Check

Do

DEGRADATION

RISK

NOT TOLERABLE
INDUSTRY PERSPECTIVE

Thank you!

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