Sandia-1X, Offshore Spain (Canary Islands): “Repsol’s Management from a Sensitive Project into a Safe & Uneventful Operation”
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**Sandia-1X, Offshore Spain (Canary Islands)**

**Summary**

- Canarias 1-9 Block Permits awarded to Repsol on January 23rd 2002 for a 6 year period.
- Repsol Farmed out participation on the Blocks to Woodside (30 %) and RWE (20 %) remaining as Operator of the Permits with 50 % of interest.
- The Permits were partially anulled and exploration activities were suspended due to a decision from the Supreme Court on 24th February 2004 pleading that the Permits lacked Environmental Protection Measures.
- Final permits obtained on March 16th 2012.
- Repsol resumed exploration activities assuming the following contractual commitments:
  - Drill 2 exploration wells to a total depth (TD) of 3,500 m.
  - Perform the necessary Geological & Geophysical studies.
As a result of the Technical Evaluation a complete Portfolio of Opportunities was generated and the decision to drill Sandia-1X well was adopted.

The Objectives of the Sandia-1X well were to evaluate the hydrocarbon potential of the frontier Tertiary Tarfaya Basin in Deep Offshore Canary Islands.

Prior to any drilling operation, the local opinion (Canarias institutions, local population and NGOs) strongly opposed the project, objecting potential threats jeopardizing the main economic activity in the area: Tourism.

The Spanish Administration approved the go ahead for the project and hence approved the operational start up for Repsol.

The partners did not support the project and Sandía 1-X well was drilled in “sole risk”.

Sandia-1X, Offshore Spain (Canary Islands)
Regional studies concluded that following the conjugated margins theory in continental margings, Canary Islands & Morocco could have a counterpart in the prolific Sable & Jean D’Arc Basins in Eastern Canada.

Repsol decided to enter the licenses based on existing 2D seismic data and the mentioned analogy.

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Offshore Spain. Exploration Activity in the Area

Why Exploring in this Area?

Repso is not the only player in the area; many companies have been / are involved in the exploration of the Moroccan side since the 70´s (Shell, Chevron, Esso, Cairn, Kosmos, Genel, Galp, etc).
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Ministerial Approvals

Industry
*Hydrocarbon Law 34/1998*

General Direction of Energetic & Mining Policy
*Sea Bottom Study:*
Submitted: 17/10/2012
Approved: 27/03/2013

*Authorization to Drill:*
Submitted: 26/07/2013
Approved: 13/08/2014

Agriculture, Food & Environment (MAGRAMA)
*Environmental Evaluation Law 21/2013*
*Marine Environment Protection Law 41/2012*

General Direction of Quality & Environmental Evaluation
*EIA Study Submitted: 26/07/2013*
*DEI-DIA Published: 01/08/2014*

General Direction of Sea & Shoreline Sustainability
*Report of Compatibility with the Marine Environment*
*Approved: 01/07/2014*

Fomento
*Coastline Law 2/2013*

General Direction of Merchant Navy
*Interior Maritime Plan (PIM):*
Submitted: 10/07/2014
Approved: 29/07/2014

*Exclusion Zone to Navigation:*
Submitted: 31/10/2014
Approved: 12/11/2014
Sandia-1X, Offshore Spain (Canary Islands)

Necessary Permits

Real Decree
January 23rd, 2002

Spud-In
November 18th, 2014

Almost 12 years to get the “Final Approval to Drill Sandia-1X”
The Canary Islands Project has been executed following the best standards in the industry, applied by Repsol in all its operations.

Given the Sensitive nature of the area (Touristic Spot) and the initial social reluctance to oil operations, the project has been open to public by all means at all time in order to keep the public opinion duly informed.

"Repsol’s Management from a Sensitive Project into a Safe & Uneventful Operation"
Sandia-1X, Offshore Spain (Canary Islands)
Communication & Relation with Stakeholders

- Repsol promoted internal and external communication roadshows to explain the project to the local entrepreneurs: tourism and fishermen’s associations; organized lectures to introduce the economic and environmental details of the project in non-political associations: local universities and college of engineers; bring the industry to the society and had active participations in local and national TV and radio programs.

Most Remarkable Actions

- Repsol CEO Antonio Brufau press conference in La Palmas after the meeting with Gran Canarias’s CEOE Nov. 2013.

- Journalist visit to Rowan Renaissance drillship during drilling operations Nov. 2014.

- Repsol Foundation brought its “Aula Móvil” to Gran Canarias and Tenerife. This is a theme bus about energy which travels cities explaining the energy industry to schools and high schools 2014.

- Repsol web page showing the project scope and activities during drilling execution 2014-2015.
Sandia-1X, Offshore Spain (Canary Islands)

Pre-Drill PESTLE Risk Matrix

Political, Economic, Social, Technological, Legal & Environmental (PESTLE) Risk Matrix

Legend:

<table>
<thead>
<tr>
<th>Code</th>
<th>Risk description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Local and regional elections effects on project progress</td>
</tr>
<tr>
<td>P2</td>
<td>Results in referendum against exploration activities</td>
</tr>
<tr>
<td>P3</td>
<td>Political unpredictability, change of government, regulatory framework unreliable</td>
</tr>
<tr>
<td>E1</td>
<td>Legal change to economic terms (Royalty/Change in taxes)</td>
</tr>
<tr>
<td>E2</td>
<td>Development economic estimations Class V</td>
</tr>
<tr>
<td>E3</td>
<td>Condiected Sandia-1X not-drilling</td>
</tr>
<tr>
<td>E4</td>
<td>Conditioned to Sandia-1X drilling negative results</td>
</tr>
<tr>
<td>E5</td>
<td>Conditioned to Sandia-1X drilling partial success</td>
</tr>
<tr>
<td>S1</td>
<td>Social sabotage</td>
</tr>
<tr>
<td>S2</td>
<td>Social reaction towards earthquakes risk and data wih public access</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>S3</td>
<td>Social pressure against Repsol</td>
</tr>
<tr>
<td>T1</td>
<td>Complications in drilling hazards</td>
</tr>
<tr>
<td>T2</td>
<td>Rouse's performance</td>
</tr>
<tr>
<td>L1</td>
<td>Admissibility on appeals against Resolution DISPEM</td>
</tr>
<tr>
<td>L2</td>
<td>Precautionary suspension of resolution DISPEM while the appeal is pending</td>
</tr>
<tr>
<td>EN1</td>
<td>Conditioned Sandia-1X not-drilling</td>
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<td>Conditioned to Sandia-1X drilling partial success</td>
</tr>
<tr>
<td>EN4</td>
<td>Social sabotage</td>
</tr>
</tbody>
</table>

High-Very High Political & Legal Risk
Low-Very Low Environmental Risk

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Monitoring of Marine Mamals and **Passive Acoustic Monitoring** of the hydrocarbon spill response vessel.

Waste Management Plan: water discharge, hazardous and non waste.

**Seismicity Protocol**

Daily Environmental Reports including water, diesel and electricity consumption.

Pre-selection of additives in drilling muds and cement slurries according to OCNS classification


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Environmental Issues

- Sea-Bottom study within the 6 months after drilling operations.
- Inclusion of natural radioactivity analysis of sea-water.
- Interior Maritime Plan: conducted with the support of SASEMAR and DGMM
- Marine Contingency Equipment: for the first time, one vessel fully dedicated to emergencies on site (24x7): Oil Spill Response Vessel.
- Validation of noise and cutting disposal modelling.
Since the Macondo well blowout, improvements have been made in management and safety systems and in regulatory regimes, affecting all offshore operations and all operators around the world.

Commercial deep-water drilling involves highly complex operations.

Companies must coordinate the operation of sophisticated equipment to construct wells in uncertain geologic formations, often under challenging environmental conditions.

Repsol holds track record of good practices on a number of offshore operations around the world, from offshore north and south Atlantic, to the Barents, Norwegian and North Seas in Norway, Caribbean and Mediterranean Seas.

In the Sandia-1X Drilling Operations, Repsol has followed Norwegian Regulations for Offshore Drilling which are among the most strict ones in the world.

Repsol, has additionally kept a spill response vessel on site during the whole drilling operations.
Sandia-1X, Offshore Spain (Canary Islands):
Repsol-Track Record in Offshore Drilling

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Rowan Renaissance: Brand New vessel exclusively dedicated to Repsol offshore operations.

- Drilling Capacity: Up to 3,000 m water depth.
- Capacity to drill over 10,000 m below sea bottom.
- Dynamic Positioning System.
- Redundant BOP's.
- Dual Derrick (2 masts).

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Sandia-1X, Offshore Spain (Canary Islands)
BOP’s & Submarine Robots

- Security Oversized
- Certification for 15,000 psi.
- Redundant BOP’s.
- Nine (9) closing valves.
- Three (3) Shear valves with cutting capacity up to 13 5/8”.

- Redundant sub-sea Robots.
- Remote BOP drive.

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Shallow Hazards

- Shallow Hazards: Geological and environmental conditions at the sea bottom or close to it that may lead to widespread damage or risk in drilling operations.

- If geo-hazards exist, they must be identified & ranked early in the well planning process. Three main concerns:
  1. Site specific selection, for lowest risk.
  2. Surface and subsurface geo-hazard avoidance,

- Given that some Sea-Bottom Faults (pockmark) were present at the Sandia-1X original well Site, Repsol decided to take “Extreme" safety actions leading into a change in Location and directional trajectory.
Sandia-1X, Offshore Spain (Canary Islands)

Shallow Hazards

- Given that the well was intended to intercept several sandy reservoir units, its design focussed on minimizing any potential risk.
- For the previous reason, the well was designed with a redundant casing set-up in order to cover for any potential risk episode during drilling operations.
- Drilling Operations strictly honored the well design in order to avoid any contingency and hence drilling operations proceed smoothly.
- The well was drilled to TD (Total Depth) @ 3,093 m without any major incident: uneventful operation.

Final Location

- Change in Location & Deviated trajectory implemented to avoid pockmarks.
Respecting the well program was of paramount importance.

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Sandia-1X, Offshore Spain (Canary Islands)
A “Safe Well Design”: Drilling & Abandonment

1. Well Design oriented to any potential contingency while drilling.

2. A simple casing design could have been chosen for drilling the well, BUT an “Oversized” Casing Design was adopted instead, assuring that any “non-prognosed” sand package would be covered.

3. Well abandonment following industry standards:
   - Abandonment Anticorrosion Plug: 1 to isolate well head from seabottom.
At the moment, Repsol is conducting the Final Technical Assessment of Sandia-1X well in order to understand the causes of failure and re-focus exploration efforts, according to the data obtained from the drilled well.

Repsol has partially fulfilled its obligations, having drilled 1 out of 2 wells.

Big part of the area has now been declared LIC or ACI (Area of Communitary Interest), which means that any permitting onwards will be much more complicated than before.

The Permit Expires on March 20th 2016.

Legal and environmental framework is given for a second twin well (Chirimoya), BUT if a change in prospect decision is adopted, over 2 years would be necessary to count on all permissions.
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