

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

Exploration Regional Direction
Europe & Middle East



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1. Sandia-1X, Offshore Spain (Canary Islands)

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- Shallow Hazards
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- What's Next ??

Sandia-1X, Offshore Spain (Canary Islands)

Summary



- REPSOL initiated Regional Deepwater Geological Studies between Morocco and Canary Islands back in 1998.
- 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 annulled 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.

Sandia-1X, Offshore Spain (Canary Islands)

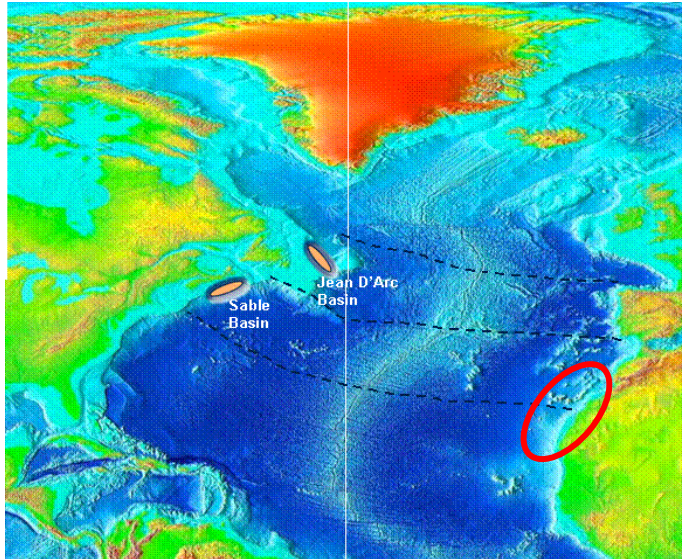
Summary



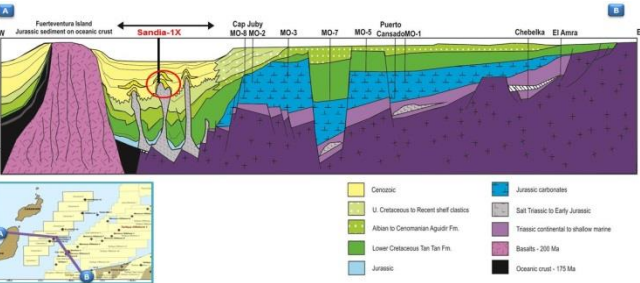
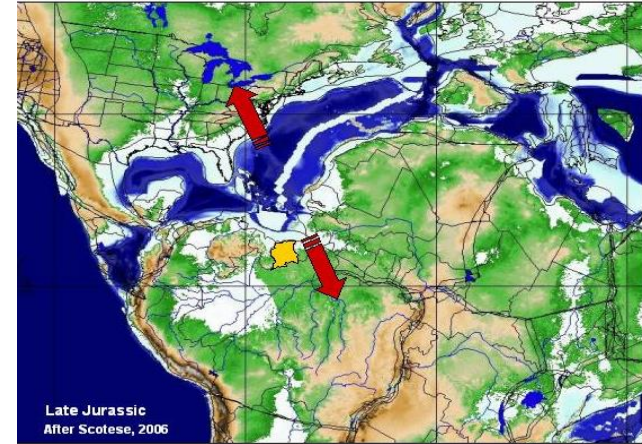
- As a result of the Technical Evaluation a complete Portfolio of Opportunities was generated and the decision to drill Sandia-1X well was adopted.
- The Objectives of the Sandia-1X well were to evaluate the hydrocarbon potential of the frontier Tertiary Tarfaya Basin in Deep Offshore Canary Islands.
- 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”.

Offshore Spain (Canary Islands)

Why Exploring in this Area?



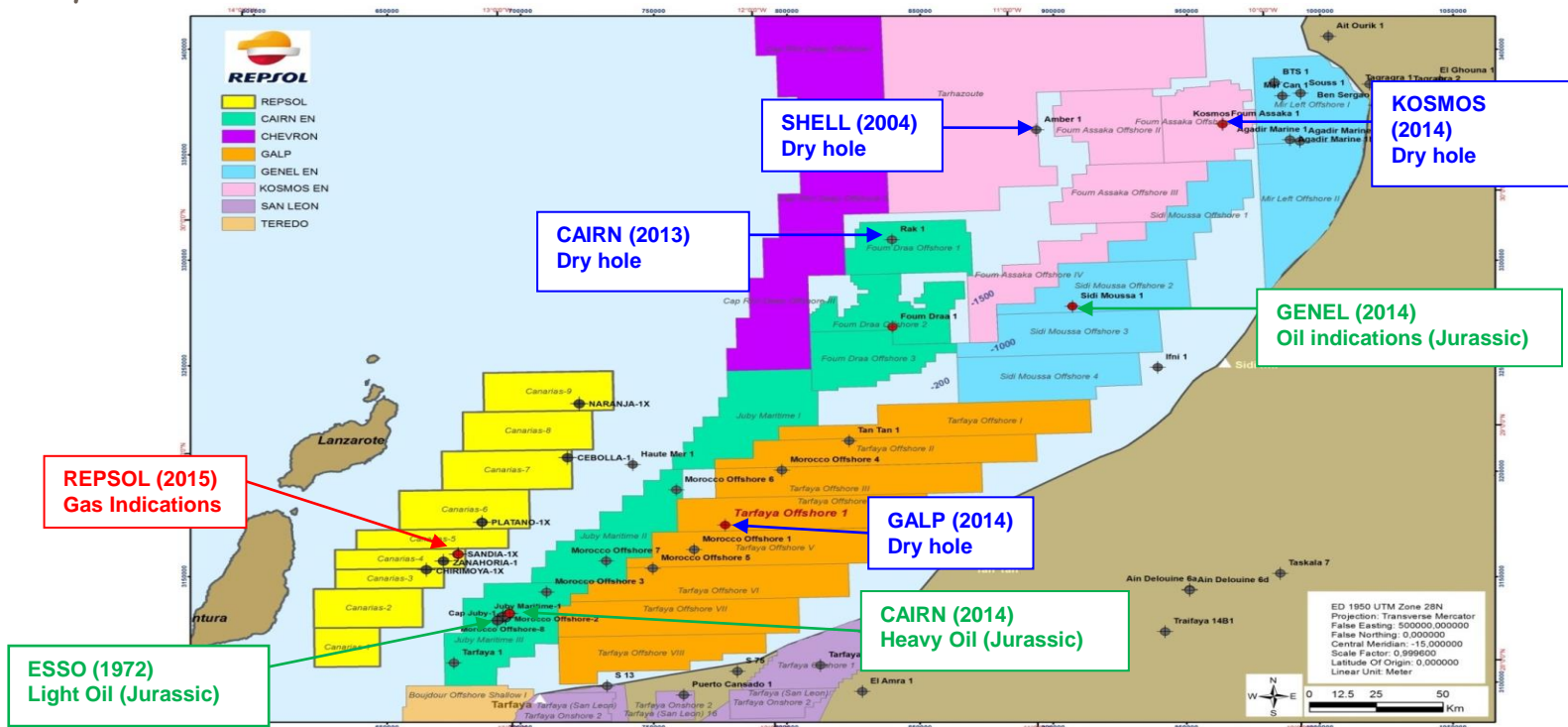
Late Jurassic Plate Reconstruction



- Regional studies concluded that following the conjugated margins theory in continental margins, 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.

Offshore Spain. Exploration Activity in the Area

Why Exploring in this Area?



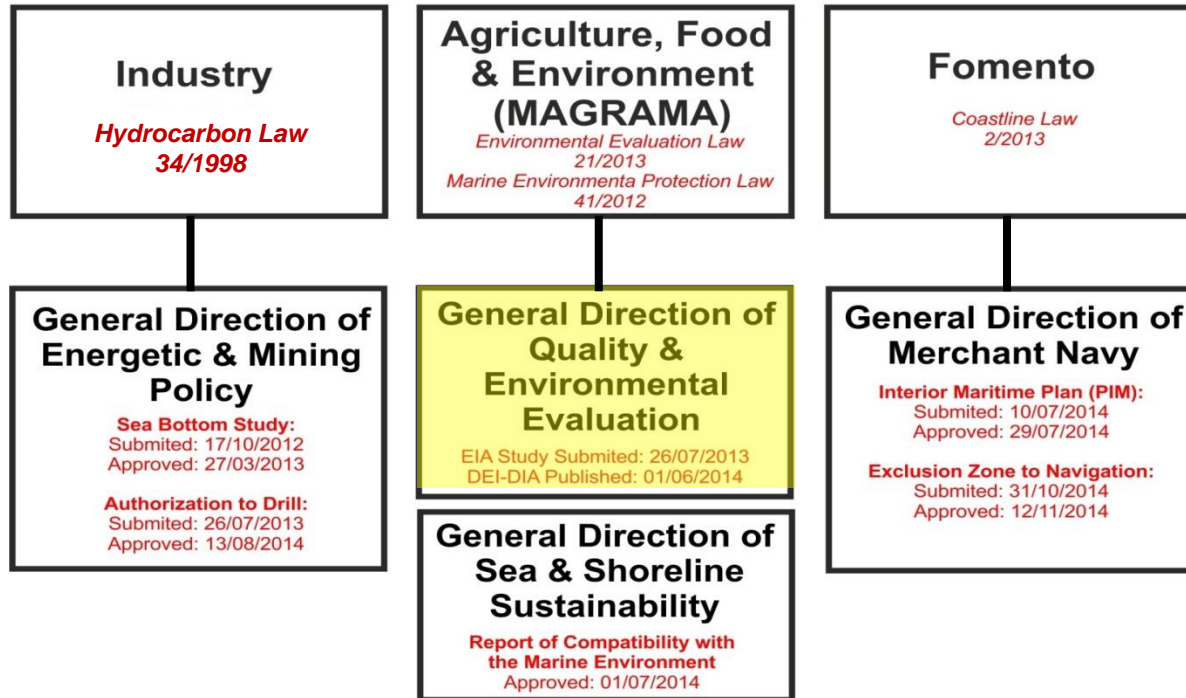
Repsol is not the only player in the area; many companies have been / are involved in the exploration of the Moroccan side since the 70's (Shell, Chevron, Esso, Cairn, Kosmos, Genel, Galp, etc).

Sandia-1X, Offshore Spain (Canary Islands)

Necessary Permits



Ministerial Approvals



Sandia-1X, Offshore Spain (Canary Islands)

Necessary Permits



Real Decree
January 23rd, 2002

Spud-In
November 18th, 2014

BOE núm. 20 Miércoles 23 enero 2002 2945

2.3 Precios y tipos efectivos de interés:

Precio mínimo aceptado: 95,150 por 100.
 Precio medio ponderado redondeado: 95,162 por 100.
 Tipo de interés efectivo correspondiente al precio mínimo: 3,421 por 100.
 Tipo de interés efectivo correspondiente al precio medio ponderado redondeado: 3,412 por 100.

2.4 Importes a ingresar para las peticiones aceptadas:

Precio ofrecido Porcentaje	Importe nominal Millones de euros	Precio de adjudicación Porcentaje
95,150	300,000	95,150
95,165 y superiores	273,927	95,162

3. Las peticiones no competitivas se adjudican en su totalidad al precio medio ponderado redondeado resultante en la subasta, por lo que se desembolsarán el 97,149 y 95,162 por 100, respectivamente, del importe nominal adjudicado de Letras del Tesoro a doce y a dieciocho meses.

Madrid, 4 de enero de 2002.-La Directora general, Gloria Hernández García.

1363 REAL DECRETO 1468/2001, de 21 de diciembre, por el que se otorgan los permisos de investigación de hidrocarburos denominados «CANARIAS-1», «CANARIAS-2», «CANARIAS-3», «CANARIAS-4», «CANARIAS-5», «CANARIAS-6», «CANARIAS-7», «CANARIAS-8» y «CANARIAS-9», situados en el Océano Atlántico frente a las costas de las Islas de Puertoventura y Lanzarote.

Marítima del Estado por el Ministerio de Agricultura, Pesca y Alimentación.
 En su virtud, a propuesta del Ministro de Economía y previa deliberación del Consejo de Ministros en su reunión del día 21 de diciembre de 2001,

DISPONGO:

Artículo 1. *Definición de los permisos de investigación.*

Se otorgan a Repsol Investigaciones Petrolíferas, Sociedad Anónima, por un periodo de seis años, los permisos de investigación de hidrocarburos cuyas áreas se definen por los vértices cuyas coordenadas geográficas con las longitudes referidas al meridiano de Greenwich, se describen a continuación:

a) Expediente número mil quinientos cuarenta y seis. Permiso «CANARIAS-1», de 45.204 hectáreas y cuyos límites son:

Vértice	Latitud N	Longitud O
1	28° 15'	13° 45'
2	28° 15'	13° 30'
3	28° 05'	13° 30'
4	28° 05'	13° 45'

b) Expediente número mil quinientos cuarenta y siete. Permiso «CANARIAS-2», de 75.340 hectáreas y cuyos límites son:

Vértice	Latitud N	Longitud O
1	28° 25'	13° 45'
2	28° 25'	13° 20'
3	28° 15'	13° 20'
4	28° 15'	13° 45'



Almost 12 years to get the “Final Approval to Drill Sandia-1X”

Sandia-1X, Offshore Spain (Canary Islands)

Canaries, Sensitive Spot: Transparent Project



- 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.



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.



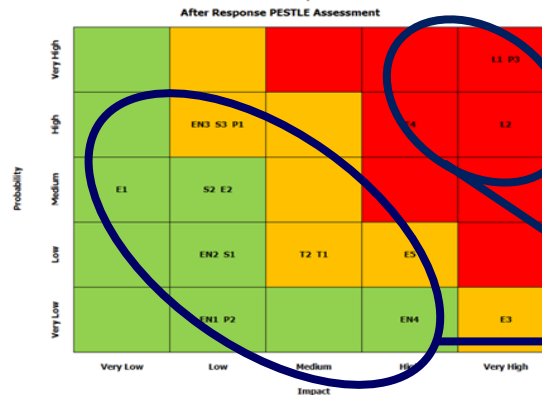
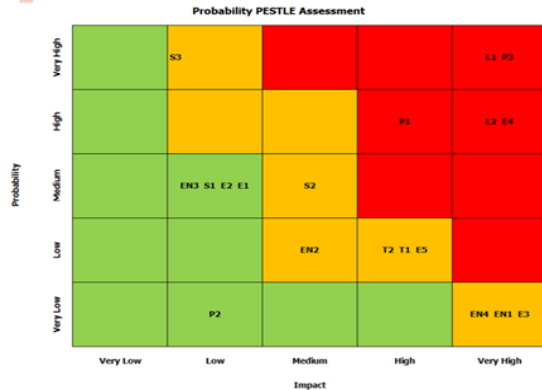
Repsol web page showing the project scope and activities during drilling execution 2014-2015.

Sandia-1X, Offshore Spain (Canary Islands)

Pre-Drill PESTLE Risk Matrix



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



Legend:

	Code	Risk description		Code	Risk description
Political	P1	Local and regional elections effects on project progress	Social	S3	Social pressure against Repsol
	P2	Results in referendum against exploration activities		Technological	T1
	P3	Political unpredictability, change of government, regulatory framework unreliable		T2	Rowan's performance
Economic	E1	Legal change to economic terms (Royalty/Change in taxes)	Legal	L1	Admissibility on appeals against Resolution DGPEM
	E2	Development economic estimations Class V			L2
	E3	Conditioned Sandia-1X not-drilling	Environmental	EN1	Conditioned Sandia-1X not-drilling
	E4	Conditioned to Sandia-1X drilling negative results		EN2	Conditioned to Sandia-1X drilling negative results
	E5	Conditioned to Sandia-1X drilling partial success		EN3	Conditioned to Sandia-1X drilling partial success
Social	S1	Social sabotage		EN4	Social sabotage
	S2	Social reaction towards earthquakes risk and data with public access			







High-Very High Political & Legal Risk

Low-Very Low Environmental Risk

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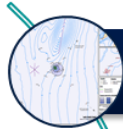
Environmental Issues



-  Monitoring of Marine Mammals 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
-  Contracts: Emergency Plans, Well Capping and relief well.

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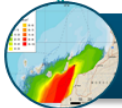
Environmental Issues



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.

Sandia-1X, Offshore Spain (Canary Islands)

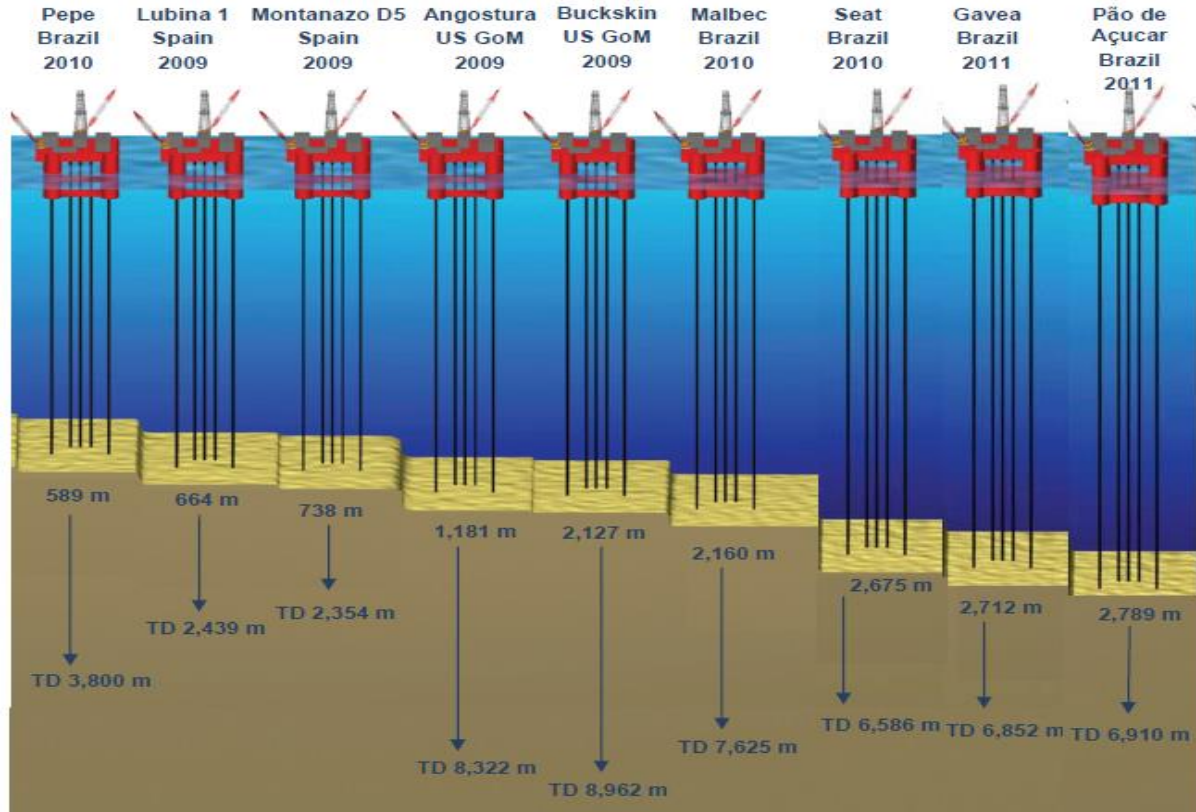
Best Offshore Drilling Standards



- 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



Sandia-1X, Offshore Spain (Canary Islands)

Rowan Renaissance: State of the Art in Drillships



- 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).

Sandia-1X, Offshore Spain (Canary Islands)

BOP's & Submarine Robots



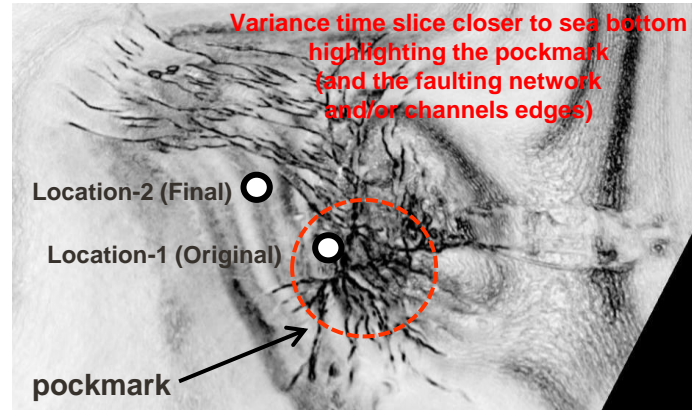
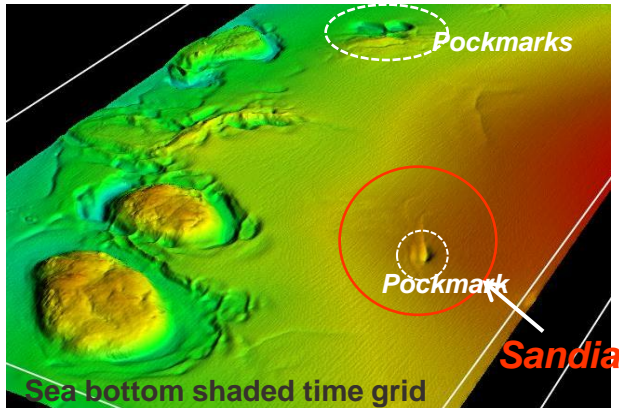
- Redundant sub-sea Robots.
- Remote BOP drive.

- 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”.



Sandia-1X, Offshore Spain (Canary Islands)

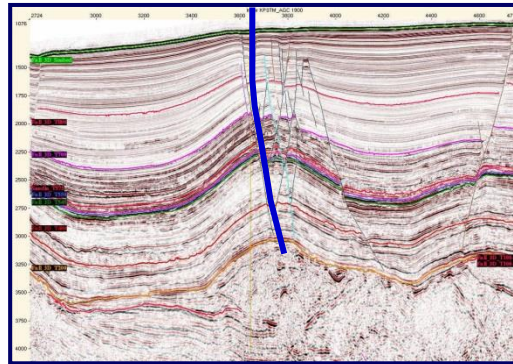
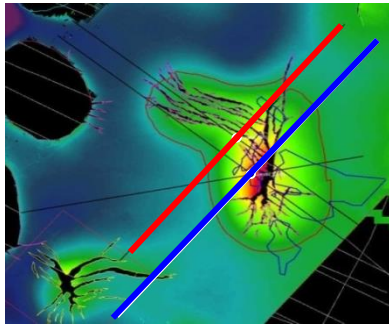
Shallow Hazards



- 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,
 3. Geo-hazard mitigation.
- 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.

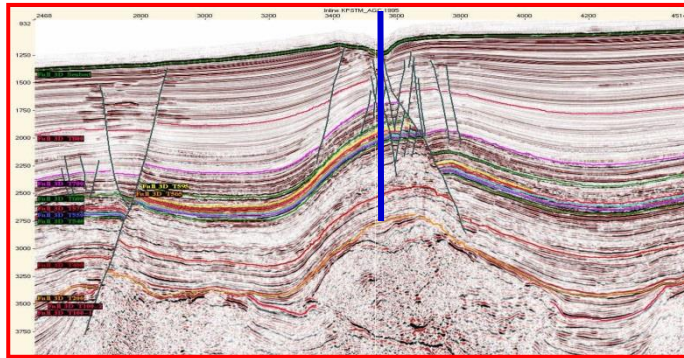
Sandia-1X, Offshore Spain (Canary Islands)

Shallow Hazards



Final Location

- ✓ Change in Location & Deviated trajectory implemented to avoid pockmarks.

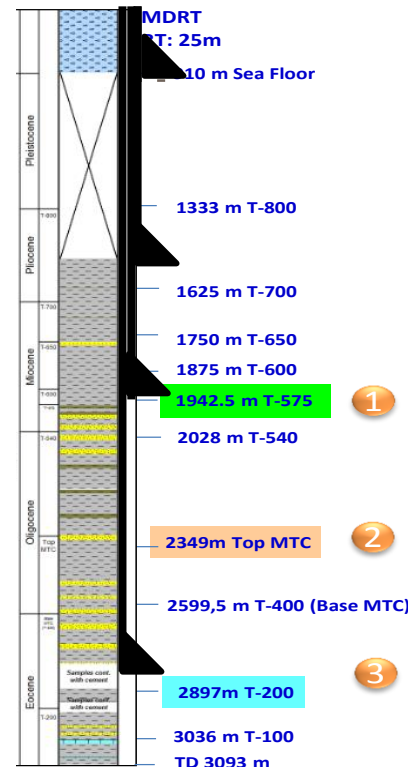
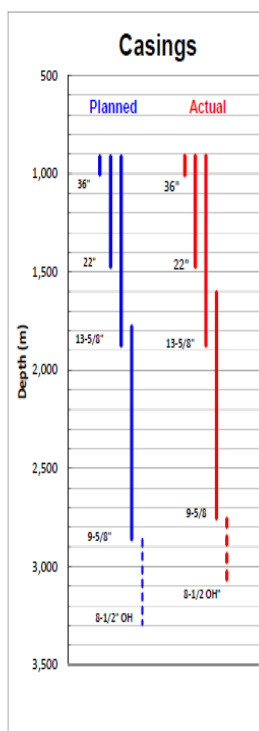
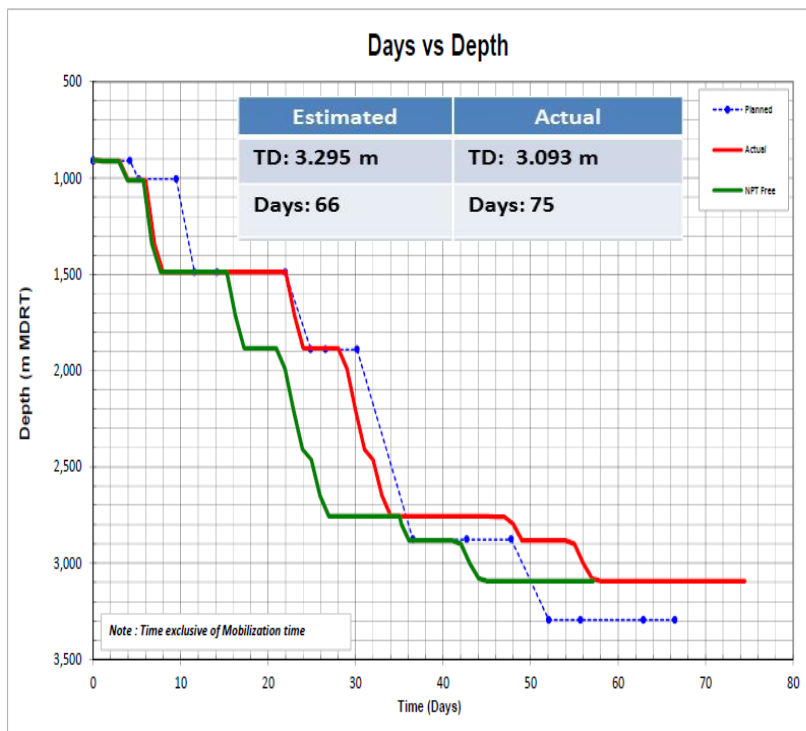


Initial Location

- 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.

Sandia-1X, Offshore Spain (Canary Islands)

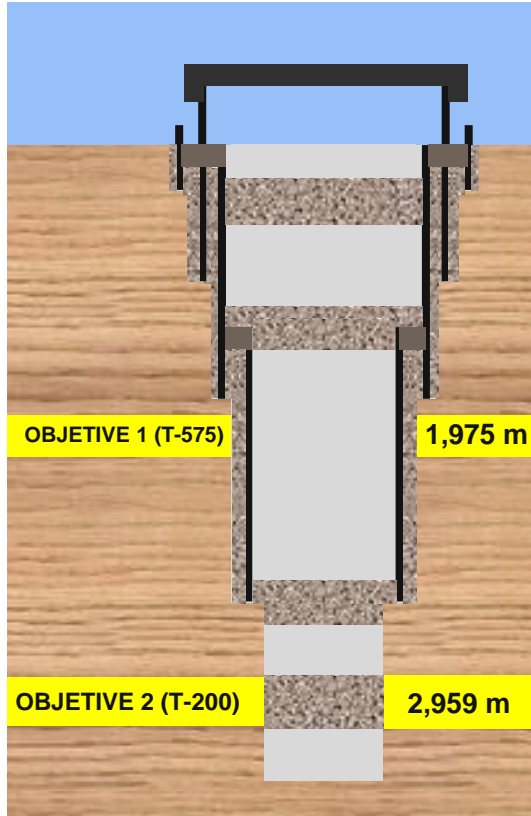
Program Execution respecting Well Planning



✓ Respecting the well program was of paramount importance.

Sandia-1X, Offshore Spain (Canary Islands)

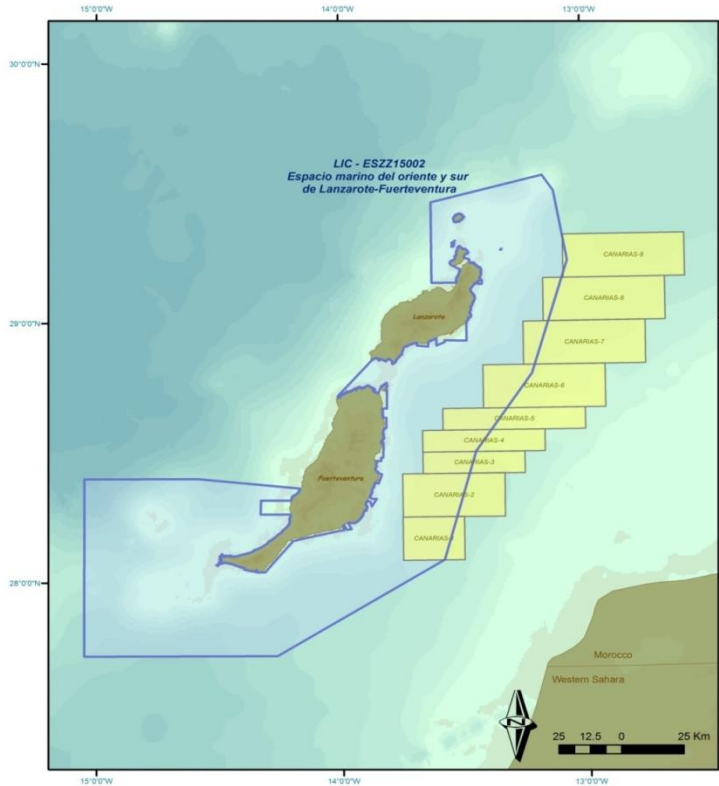
A “Safe Well Design”: Drilling & Abandonment



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 Cement Plugs: 4.
 - Abandonment Anticorrosion Plug: 1 to isolate well head from seabottom.

Sandia-1X, Offshore Spain (Canary Islands)

What's Next ??



- 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 Community 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.

THANK YOU



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

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