G-1-9 A Subsea Blow Out in KG offshore

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G-1-9 Subsea Blowout

Brief History of Well G-1-9

- G-1-9 is located at a distance of 15 km from the Amalapuram Coast in KG Offshore Basin at water depth of 252m.

- The well was drilled in the year 1999 to target depth of 2517m and production testing was carried out.

- Subsequently, the well was temporarily abandoned on 19/09/1999 as a non-expendable well.

- During November 2010, rig Energy Driller was deployed to carry out lower sub-sea completion and subsequently rig Sagar Bhushan was deployed to carry out upper completion job.

- During upper completion job in the last week of December 2011, a cyclonic storm in East Coast resulted in well complication and the well was temporarily abandoned on 17th March 2012.
On 31.08.2012 Drill Ship Sagar Vijay reported White sea horse in the south west direction of Rig Nobel Duchess.

Immediately Offshore Supply Vessel “Vimla” sent for initial survey of the site and reported gas bubbles coming from under the sea creating a bubble plume of approximate diameter of 500 m.
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- To locate leakage location, ROV Vessel “Olympic Canyon” was hired from M/s RIL for Surveying of wells of G-1 field.

- Olympic Canyon could not go inside 500m radius of centre of bubble plume due to possibility of fire and gas Hazards.

- Rig DDKG 1, which was on Voyage from Andaman location to KG Block on the way was deployed to carryout ROV survey and found well G-1-9 is Blowing Gas from well head hub of subsea X-Mas tree
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ROV Survey Findings by rig DDKG 1 on 08/09/2012

1. Well G-1-9 is **blowing** gas from well head hub of subsea X-mas tree
2. **Tubing** is laying next to X-Mas tree and both the ends of tubing is inside mud only 4 joints could be seen
3. Retrievable 95/8” Bridge Plug used for Temporary Abandonment could not be seen.
4. No oil seen nearby bubble plume and nearby blowing well.
5. Visibility was clear at X-Mas tree area reveals no suction effect may be due to less flowing pressure at well mouth.
6. No bouncy effect observed by ROV as well as DDKG-1.
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Action Taken to Control G-1-9 Subsea Blowout

- Mobilized Boots & Coots well control expert, reached Mumbai on 12/09/2012

- Sent all the information to WWCI and Cudd well control to sought information on available resources for capping of well at the earliest.

- Boots & Coots personated basic procedure for Capping operations utilizing resources available within ONGC on 13/09/2012
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Boots & Coots Suggested Following Option to Control Well G-1-9

- Well Capping by modified subsea/surface BOP stack
- Relief Well
- Snubbing Operation
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Action Taken on Relief well operations

- ONGC in-house team along with consultant finalised Relief well planning
- Rig Actinia identified to drill relief well and basic relief well planning done.
- Location selected for relief well 600m from G-1-9,
- Hiring of Services and Equipment for drilling relief well Finalized.
- Start of Relief well on Hold due to SIMOPS restriction of Capping of well by MCSS
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Action Taken on ROV survey of well condition

- Olympic Canyon mobilized to G-1 Field on 27/09/2012 after taking all clearances.

- Olympic Canyon did not go inside 500m radius of gas plume due to safety concern. Started arrangements to install Gas Detection system and Spark arrester for engines.

- Samudra Sevak Started trying to do subsea survey with subsea camera and crane.

- Action on Sourcing of Second ROV Vessel
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Lowering Subsea Camera with crane
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Action Taken on Capping operations

- Identified Various equipment required for capping work.
- Additional equipment to make capping stack listed and fabrication workshop identified.
- DP-II Vessel GS Vimla, GS Vidya and Lewik Swan available with ONGC identified by B&C
- KMOC yard at Kakinada identified and started mobilizing equipments for making modified Surface BOP Capping Stack.
- Preparation Started to Air lift Sub Sea BOP stack from NOV Houston
- MSV Samudra Sevek sailed from Mumbai for Kakinada on 24/09/2012
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- MSV Samudra Sevek was identified and sailed to Kakinada for handling and securing the capping stack.
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Action Taken on Capping operations

- CMT designed modified sub-sea capping stack using 13-5/8”x10M BOP.
- Frame was fabricated to take full load of stack and facilitate guide to lower on X-Mas tree guide posts.
- To avoid damage to well head, soft landing jacks were installed on capping stack.
- For operating BOP, H4 connector and choke kill hot stab panels were installed.
- Modified BOP stack was pressure tested with all hot stab connections.
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Hub and flange cross overs fabricated
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Fabrication of Frame and hot stab pannels
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Assembly of Capping Stack
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Assembly of Capping Stack
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Action Taken on Capping operations

- Sub sea capping stack was assembled and function tested.
- Continuous monitoring of well G-1-9 was done by MSVs Vimala, Vidhya, Malviya and Olympic Canyon.
- Capping stack was taken on board Samudra Sewak and secured on deck.
- All support vessels, toe vessels, guard vessels, ROV vessels were mobilized to the location for capping operation.
- VX ring was placed on blowing well head mandrel by ROV
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Placing Modified Sub Sea Stack on Deck of Samudra Sevak
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Capping Stack on Samudra Sevak
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Action Taken on Capping operations

- During survey of well G 1-9 it was observed that there is only one guide post on X-Mass tree.
- It was decided to put one more guide post to facilitate smooth lowering of capping stack on blowing well.
- Lot of debris were observed on and around X-Mass tree.
- Debris cleaning job was taken up by ROV to fix another guide post.
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Debris coming out from well
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Debris coming out from well
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Junk recovered by ROV
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Cleaned debris and fixed another guide post
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Action Taken on Capping operations

- VX ring was placed on blowing well head mandrel by ROV
- Dummy ran was done by lowering float boxes & PGB to check & confirm minor technical details while lowering BOP stack on well.
- It was planned to lower capping stack using two OSVs taking help of two ROV vessels.
- First attempt to cap the well tried on 13.11.12 but well could not be capped due to adverse weather conditions.
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Action Taken on Capping operations

- Plan was made to try and cap the well by lowering BOP stack using single OSV and ROV vessel.
- Well was capped on 18.11.12
- Hydraulic lines for locking H4 connector were found leaking.
- By innovative ideas hydraulic lines for H4 connector were replaced.
- H4 connector was latched successfully on 29.11.12
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Capping operations

- Rig Sagar Vijay was deployed on location
- Well was found to be bridged at 975 m
- Bridge was set and bottom and top cement plug were placed to secure and abandon the well.
Thank You