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| EVENT REPORT: | | | | | | | | | | | | | | | | |
| 1. WHAT IS THE PROBLEM? | | | | | | | | | | | | | | | | |
| Title: BNAG Trip on the 15th of February 2021 | | | | | | | | | | | | | | | | |
| Date Occurred: 15.02.2021 | | | Time: 04:37 am | | | | Location: BNAG | | | | | | | | | |
| Date Reported: 15.02.2021 | | | Time: 04:37 am | | | | Reported by: BNAG Operator | | | | | | | | | |
| **Event Type** | | Potential Threat (not yet occurred)  Reliability/integrity – Trip  Reliability/integrity – Equipment failure  Reliability/integrity – Others | | | | | | |  | | | | | | | |
| Equipment Tag Number: | | | | | | | | | | | | | | | | |
| Threat Description:  During a thunderstorm on the 15th February 2021, BNAG tripped and was down for around 12.5 hours causing a deferment of 63.5 MMScf of gas production.  Sequence of Events:  15.02.2021 @ 04: 07 am – Power outage at BNAG. Black start generator came on but couldn’t load.  15.02.2021 @ 04:37 am – BNAG tripped.  15.02.2021 @ 04:54 am – Fuel gas plant trip. Terminal loses power.  15.02.2021 @ 07:06 am– Power restored to the terminal. BNAG could not be started due to active ESD on certain valves that could not be cleared.  15.02.2021 @ 4:30 pm – ESDs were cleared.  15.02.2021 @ 5:00 pm – Normal operation resumed. | | | | | | | | | | | | | | | | |
| Consequences: Deferment | | | |  | Risk Assessment: (People, Asset, Environment, Reputation) | | | | | | | | | | | |
| No deferment / outage  Oil:  Gas: 63.5 MMScf  Water:  Flare:  Other:  Downtime: | | | |  | A | | B | | C | | D | E | Actual: A1 Potential: A2  Consequence Scenario  Actual: Deferment of circa 63.5 mmscf which is over $80,000  Potential: Prolonged trip (unable to restart) leading to deferment over days. | | |
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| Immediate Corrective Actions Taken: | | | | | | | | | | | | | | | | |
| # | Immediate action | | | | | | | | | | Date | | | | By | Notification / WO # |
| 1 | Investigated cause of trip | | | | | | | | | | 15.02.2021 | | | | PACO |  |
| 2 | Rectified the ESD faults | | | | | | | | | | 15.02.2021 | | | | PACO |  |
| 3 | Reset the system | | | | | | | | | | 15.02.2021 | | | | PACO |  |
| 4 | Started up BNAG plant | | | | | | | | | | 15.02.2021 | | | | Operations |  |
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| 2. WHAT DO WE THINK CAUSED THE PROBLEM? | | | | | | |
| **Investigation Team** | | 1. Okoro Bernard 2. Essienton Victor 3. Atabor Henry 4. Ero, Osahon 5. Emetulu, Raymond 6. Uchejim, Ezemmor 7. Ikuru, Edemuvi 8. Odukoya, Ibrahim 9. Nwaugo, Edwin 10. Abure Ehizogie 11. Abdulmalik, Theresa 12. Dominic, Emmanuel 13. Omonokhua, Augustine 14. Etire Azibanato 15. Anighoro Philip 16. Ibeneme Onyebuchi 17. Obozua Dorothy | | | | |
| **Problem (Primary Effect)** | | 1. Expected: BNAG process gas for export/ blanketing/ flare pilot. 2. **Actua**l: BNAG tripped and was down for some hours. 3. Impact: Deferment of about 63.5 MMScf of gas. | | | | |
|  | | **Why? / Immediate cause** | **Answer/Root Cause** | | 3. EVIDENCE? | |
| Why 1 | | Why did BNAG trip? | * UPS battery drained after more than 40 minutes. * BNAG trip on ESD. * BNAG trip on OSD. * Equipment failure. | | * Field operator observation. * Historian download from SIS showed control devices went off. * Autonomous runtime for UPS about 30 minutes to 1 hour. * Devices on UPS power shutdown | |
| Why 2 | | Why did the UPS battery drain? | * Lost mains power and back-up emergency generator started but failed to load. * Faulty battery | | * Field operator observation * Generator breakers were open. * No utility power in BNAG | |
| Why 3a  Why 3b | | Why did we lose mains?  Why did emergency generator fail to load? | * Over-voltage trip on mains circuit breaker * Faulty generator breaker | | * Breakers were open. * Breakers have over-voltage protection * BNAG lost power before the terminal lost power. * Emergency generator breakers failed to close. | |
| Why 4 | | Why did we have over-voltage trip? | * Lightning storm * Over-voltage supply from turbine | | * There was a storm same time as trip. * The breaker opening is a fail-safe in the event of over-voltage | |
| **Comments:**  The trip was caused by power loss to essential equipment. Mains supply was lost when the breakers opened due to over-voltage, and the backup generator, supposed to ensure continuous operation, failed to load due to faulty breaker. The UPS eventually drained and BNAG tripped. Start-up was delayed because of damaged cards. | | | | | | |
| **4. WHAT SOLUTIONS DO WE HAVE IN MIND?** | | | | | | |
| **#** | **Proposed Action** | | | **Action Party** | | **Target Date** |
| 1 | Engage TA and explore getting a 2nd layer of protection for instrument system in BNAG | | | Abure Ehizogie/Obozua Dorothy/Abdulmalik Theresa/Ruth Osunkoya | | 26/04/2021 |
| 2 | Inventory and order spare I/O and logic cards for the BNAG control system. | | | Okoro Bernard/Georgewill Sotonye | | 26/8/2021 |
| **5. HOW WILL THE PROPOSED SOLUTIONS ELIMINATE THE CAUSES OF THE PROBLEM?** | | | | | | |
| 1. Provide lasting solution to prevent future lightning related losses. 2. Ensure BNAG can be restarted in the event of card damage. | | | | | | |
| **LESSONS LEARNT** | | | | | | |
| **Incident Owner: Bob-Manuel, Iroloye D** | | | | | | |