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| **THREAT ID:** | | | | | | | | | | | | | | | |
| 1. WHAT IS THE PROBLEM? | | | | | | | | | | | | | | | |
| Title: Soku gas plant tripped on OSD-1 trip signal | | | | | | | | | | | | | | | |
| Date Occurred: 13/03/2021 | | | | | | Time: 1824hrs | | | | | Location: Soku Gas Plant | | | | |
| Date Reported: 14/03/2021 | | | | | | Time: 0700hrs | | | | | Reported by: Ifeanyi Anuku | | | | |
| **Event Type** | | Potential Threat (not yet occurred)  Reliability/integrity – Trip  Reliability/integrity – Equipment failure  Reliability/integrity – Others | | | | | | | |  | | | | | |
| Equipment Tag Number: SOKU GAS PLANT | | | | | | | | | | | | | | | |
| Background:  Soku Gas plant was operating in a steady state, exporting Gas and condensate to NLNG and Bonny terminal respectively. The plant was exporting circa 300mmscfd of gas and produced water evacuation of 26kbpd of water and a third-party AG gas supply of 35mmscfd. There was a heavy downpour with lightening and windy conditions causing spurious alarms from process control systems.  Suddenly, a plantwide power outage was observed. This led to entire facility trip on OSD-1 trip signal which escalated to ESD trip. This resulted to production outage for about 8 hours with increased flare of 3 mmscfd. This trip has the potential of tripping Gbaran export via Soku end of the EGGS-1/2 export manifold. The ESD signal was reset and plant was safely re-started up. Production was later resumed at about 0155Hrs (14.03.2021) and plant stabilized.  Threat description: Soku Gas plant Trip.  **Sequence of Events:**  - 17:55hrs- Heavy downpour with lightening and storms.  -18:24 hrs, 13/03/2021: Soku gas plant tripped on OSD-1 trip signal.  - 18:25 Operations Supervisor, Ops T/L, PUM and PMC notified.  - 18:35 hrs, Maintenance team mobilized to site.  -19:35 hrs, Plant ESD trip signal reset for plant start up.  -20:46 hrs Power restored to plant.  -20:48 hrs-Plant was re-started up and stabilized.  -01:55 hrs, Production resumed. | | | | | | | | | | | | | | | |
| Consequences: | | |  | Risk Assessment: (People, Asset, Environment, Reputation) | | | | | | | | | | | |
| No deferment / outage  Oil: 3,100 bbl  Gas: 82MMSCFD  Flare: 2.7MMSCFD  Other: Equipment failure  Downtime: | | |  | A | | B | C | D | | | E | Actual: A-??  Potential: P-0, A-2D, C-0, E-1.???  Consequence Scenario | | |
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| Immediate Corrective Actions Taken: | | | | | | | | | | | | | | | |
| # | Immediate action | | | | | | | | Date | | | | | By | Notification / WO # |
| 1 | Start up Black start Generator and power up the plant utilities. | | | | | | | | 13-03-2021 | | | | | Elect Team |  |
| 2 | Reset alarms, line up fuel gas and o/u HP wells | | | | | | | | 13-03-2021 | | | | | Ops Team |  |
| 3 | Restart Solar turbine G8101 and transfer power | | | | | | | | 13-03-2021 | | | | | Ops & Mtce Team |  |
| 4 | Restart LP NAG Compressor and AG 2 Compressor | | | | | | | | 14-03-2021 | | | | | PACO & AGG |  |
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| 2. WHAT DO WE THINK CAUSED THE PROBLEM? | | | | | | |
| **Investigation Team**(YES) | | | **Team Composition:**  Nsikak Ekpoh, Adesina Lukmon, Ifeanyi Anuku, Shodipo Ibrahim, Noble Uranta and Stephen Ejeba | | | |
| **Problem Statement (Primary Effect)** | | | SOKU GAS PLANT ESD TRIP   1. Expected: SOKU GAS PLANT to run uninterrupted. 2. Actual: Soku Gas Plant Trip on ESD as a result of Heavy thunder & Lightning strike   Impact: Production deferment and flare. | | | |
|  | | **Why? / Immediate cause** | | **Answer/Root Cause** | 3. EVIDENCE? | |
| Why 1 | | Why did Soku Gas Plant trip? | | 1. ESD signal was initiated (YES) | 1. HMI indication 2. DCS chronological log | |
| Why 2 | | Why ESD Trip Signal? | | 1. Fire detection alarm was activated (YES) | 1. HMI indication 2. DCS chronological log. 3. Cause & Effect Matrix | |
| Why 3 | | Why Fire Detection Alarm? | | UV/IR Flame detector activated (YES) | 1. DCS trend 2. Cause and Effects document | |
| Why 4 | | Why UV/IR detector activated? | | 1. Intense high thunder and lightning discharge (YES) | 1. Physical observation | |
| Why 5 | | Why thunder and lightning? | | 1.Expected (YES) | Observed during Heaving rain | |
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| **4. WHAT SOLUTIONS DO WE HAVE IN MIND?** | | | | | | |
| **#** | **Proposed Action** | | | | **Action Party** | **Target Date** |
| 1 | Carryout Servicing/Calibration of Soku Gas Plant Flame Detectors. | | | | Lukmon/Nsikak | Immediate |
| 2 | Perform Instrument Earth Checks on all UV/IR detectors. | | | | Lukmon/Nsikak | Immediate |
| 3 | Engage PACO Tas to review effect of Lightning on UV/IR detectors | | | | Oluseye/Chioma | April 2021. |
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| **5. HOW WILL THE PROPOSED SOLUTIONS ELIMINATE THE CAUSES OF THE PROBLEM?** | | | | | | |
| The functionality of UV/IR detectors will help to eliminate spurious trip from thunder and lightning. Using the appropriate detectors will also guide against unwanted trips as result of severe thunder and lightning. | | | | | | |
| **LESSONS LEARNT**  Since Soku is located within thunder prone area, there is need to use flame detectors that can function effectively in such severe environment. The functionality of these detectors must always be verified at all time. | | | | | | |
| **Incident Owner: Casmir Ojobor** | | | | | | |