Original Research Article

ASSESSMENT OF HAZARD AND RISK RELATED ACTIVITIES AT NPDC-OGINI OIL FIELD FLOW STATION, OKPAILE IN ISOKO NORTH, DELTA STATE, NIGERIA.

UNDER PEER REVIEW

ABSTRACT.

The activities of oil, Gas and energy contains numerous hazards which could lead to multiple disasters such as loss of capital, damage to reputation, and also degrading the environment. The Essence of job hazards analysis and risk assessment is to design a safe working environment and to control and reduced potential hazards. Both primary and secondary data sources were employed in this study. Topographic statistics were also obtained from goggle earth and STRM (30M x 30M resolution) download from the United State Geological Survey. Questionnaires were administered to 100 people from 3 different department at NPDC-Ogini flow station in a confidential manner. A descriptive statistics such as mean, mode, median and standard deviation were used through the Statistical Package for Social Sciences (SPSS) Version 20.2 and Microsoft Excel 2007 software to analyze the data generated. Inferential statistics were used to test the hypothesis. The hypothesis were tested using analysis of variance (ANOVA). The study has identified associated hazards and the risk level attached to the confirmed activities of Ogini field flow station. The analysis show that the F. calculated value was 0.759 and the F-table value was 0.471. Since the F- table value is less than the F-calculated value .The result of the hypothesis has also shown that there is no significant relationship between job hazards analysis and risk assessment of the flow station activities. Companies in this sector should have a proactive thinking and attitude towards all activities and also have a reasonable level of preparedness and preparedness plans in place in case of any incidence. If these hazards are properly managed and controlled with all measures in place and also adhering to all regulatory agencies both locally and internationally, the companies will achieve a zero goal in incidence and accidents.

Keyword: Assessment, Hazard, Risk, Activities, Oil, Flow Station.

1. INTRODUCTION.

Risk in ISO 31000 usage is “an effect of uncertainty on objectives” and risk factor has been defined as a fact or situation that increases the possibility of risk, according to Cambridge Dictionary. Factors that increase this risk are a growing number of stakeholders, long duration of a project and interface with a reaction between external and internal environment (Walewski *et al.,* 2003). Engagement with various participants, such as designers, owners,

suppliers, contractors and subcontractors are an additional reason for a high volume of fundamental risks (Tserng *et al*., 2009; Taylan *et al.,* 2014). In the body of knowledge of project risk management, there are a number of orderly and official methods for identifying, assessing, classifying, responding and managing risks during the life cycle of a project (Wang *et al.,* 2004 ; Rasool et al., 2012).

Activities in the upstream oil and gas sector can be divided into the following major operations: Exploration, Drilling, Well Servicing, and Production. The main operators that drive the upstream activities are the E&P (Exploration and Production) companies. They are the main investor and sponsor of all activities in the upstream while the Servicing Companies are contracted to carry out the actual activities. Exploration and production (E&P) companies focus on finding hydrocarbon reservoirs, drilling oil and gas wells, and producing and selling these materials to be later refined into products such as gasoline (Ayodele, 2019). Oil and gas activities are complex and risky because of their dynamic environment. Moreover, intensifying global energy demand has augmented the need for dependable risk hazard models for such projects that can provide adequate and exact policy planning. Traditional risk assessments in oil and gas related activities do not consider the interrelationships of factors in the best-fit models (Dehdasht *et al.,* 2017). Oil and Gas production is widely associated with a high degree of risk because of its nature, process, activities, technological complexity, organization and environment (Zou *et al*., 2007; Mani *et al*., 2017)

Risk management is one of the greatest significant parts of decision making because risk has serious effects on quality, productivity, performance and budget (Barber, 2005; Ling *et al*., 2006). Oil and gas activities are exposed to high levels of risk and insecurity because of their dynamic and complex nature (Baccarini *et al*., 2001; Adams, 2008). Project success is threatened by risks, and ignoring risk has been shown to be a source of time and cost overruns in construction projects (Barber, 2005). Risk management is the major part of project management because it involves predicting the occurrence of events that have a negative effect on the project objective and defining proper actions to minimize the impact of these events (Palomo *et al* ., 2007; Serpell *et al.,* 2015; Dehdasht *et al.,* 2017) .

Numerous studies have detect risk management, but the conclusion of their studies is mostly to minimize the risk impact and maximize the opportunities (Dick *et al*., 1996; Uher *et al.,* 1999; Dehdasht *et al.,* 2017). Risk management is a policy that can be described as a plan or principle to make decisions to obtain the desired consequences (Aven *et al.,* 2007; Zwikael *et al*., 2011). The ISO 31000:2009 standard recommends a risk management framework that uses policies, practices and procedures throughout the organization. Risk management is a method that functions to identify, classify and quantify all risks related to a project or business so that an informed decision can be made for managing the risks (Zou *et al.,* 2007). Risk management is an effective method that not only can help identify different types of risks but also assist in managing these risks in the oil and gas project life cycle (Wang *et al*.,2004; Taylan *et al* .,2014; Dehdasht *et al.,* 2017). It is against this background that this study is poised to asses' hazard and risk related activities at Npdc-Ogini Oil Field Flow Station, Okpaile in Isoko North, Delta State, Nigeria.

2. NPDC-OGINI FLOW STATION ACTIVITIES

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2.1 Associate Gas Gathering (AGG)

The flammable gas (related gas from well and blaze gas from compressor) delivered at the creation station is compacted and drawn into the fare gas pipeline. Amid the procedure the gas is dried out in drying out unit and dew pointed in refrigeration unit. One take off gas pipeline is sending out this gas from drawing station to social event station. The related gas created in control station has H2S level of around ~500 ppmv is packed and sent as fare gas through fare gas compressor, to control plant and different customers. The high H2S flashed gas contains H2S ~20,000 ppmv from capacity tanks is presently flared through Gas Recovery Compressor (GRC) to abstain from debasing the gas framework with high H2S gas (See Plate 1). Related gas from control station and blaze gas from gas recuperation compressor are gotten to the new promoter compressors at a weight of 280 kPa(g) and pack to 7500 kPa(g) weight. The gas is additionally got dried out and dew pointed in the glycol infusion and dew guiding unit before being sent toward social event station. There will be three new supporter compressors with one working and one standby in the underlying time frame. After two compressors will run and one will be remain by. So also, there will be two trains of gas lack of hydration and dew pointing units. One prepare will be under task amid beginning period after some period the two trains will be under activity. The molded gas will be directed by means of new pipeline to social occasion station**.**

Plate 1 GAS LIFT COMPRESSOR
Source: Author's field work, 2020

2.2 Crude Oil Processing

Oil repositories contain flammable gas shaped as a gas top caught between the oil and an impenetrable topping rock layer. Under the high weight conditions generally found in the supply, the gas is blended with or broken down in the raw petroleum (known as related

gas) and dependably go with oil generation as a result. Amid oil creation at the generation stage, the repository liquid (oil, gas, water and dregs) streams out into the well-bore and is diverted into creation separators situated at the stream station to evacuate high and low weight gases from the oil. On leaving the creation separators, the oil and the rest of the gas in arrangement is coordinated to the surge tank where the gas staying in oil is isolated close ocean level weight (Nwaichi *et al*, .2011). The isolated gas accumulated from the highest point of the surge vessel is a LP gas asset. To accomplish most extreme fluid recuperation and balanced out oil based commodities, and separate water, the gravity of the tank liquid is regularly lessened in a few division stages (high weight separator, low weight separator, and so on.) bringing about a low-threw gravity gases from the last phase of detachment (as a rule called surge vessel or low weight (LP) separator) (see plate 2), on the grounds that an extensive weight decrease in a singular divider will cause streak vaporization prompting insecurities and security dangers (Devold, 2006). In this way, the delivered gas from the separators for the most part at low weight close environmental requires pressure with a specific end goal to be transported to the purchaser by means of a social event line or liquefaction; else it is sent to the flare (Aven *et al.*, 2005).

Plate 2 SURGE VESSEL
Source: Author's field work, 2020

2.3 Natural Gas Compressing

Natural gas compression is essential for transporting natural gas. Compression is used several times during the natural gas production and transportation cycle. It is used to get natural gas from low-pressure wells to gathering systems, and then used during transport from gathering systems to storage or the end user. In addition, natural gas compression is also used in natural gas storage projects for injection and withdrawals during the normal operational cycles. Compression services are also used for compression applications in refineries and petrochemical plants (Frantzich, 1998)

2.4 Gas Flare Monitoring

Gas flaring is linked to petroleum production in the region and it's very unfavorable to usual ecologies and biodiversity. Gas flames holds an estimation of 250 toxins. Environmental Rights Action (ERA), Nigeria and The climate justice programme, UK, (ERA, 2005, Adegoke. 2013) helpfully acknowledged the ecological and commercial consequences of gas flaring in Nigeria. However, additional significant finding in the study of the effect of gas flaring on the immediate surroundings which was discovered that there was about 100% loss in yield in all agricultural produce of about 200 metres away from the Izombe station, 45% loss of those about 600 metres away and about 10% loss in yield for crops about one kilometre away from the flare (Oyinlola, 1995). Leakages and fire incidents are also connected with gas production and carriage. Recently, the Nigerian Liquefied Natural Gas (NLNG) pipeline crossing Kala-Akama, Okrika mangrove swamps leaked and caught fire which burned nonstop for three days. Local vegetation and animals living the affected environment were killed (Bjornson, 2002)

The Energetic Solution Conference (2004) in their estimation, the Niger Delta locale has around 123 gas consuming areas (Adegoke, 2013). Agbola and Olurin (2003) and around 45.8 billion kilo watts of high temperature is sold into the air from 1.8 billion cubic feet of gas on normal bases in the locale, prompting high warms that make the environment to a great degree helpless (See plate 3). Fruitful use of related gas, by lessening gas flaring and creation ozone harming substance is one of the tenets that oil multinationals ought to conform to, by putting a conclusion to gas flaring absolutely by 2004 or 2008. Still 84.60% of aggregate gas delivered is still flared with 14.86% just being utilized locally (Ukoli, 2005; Gervet, 2007).

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Plate 3 GAS FLARE MONITORING PIT
Source: Author's field work, 2020

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3. MATERIALS AND METHODS

Both primary and secondary data sources were employed in this study, the primary data source are field observation, key informer interview and questionnaire administration while secondary data source include published works such as text books , journals , magazine , newspapers, National Population Commission gazette, unpublished but (documented) thesis works ,university repository and internet material/search engines. Topographic statistics were also obtained from goggle earth and STRM (30M x 30M resolution) download from the United State Geological Survey website (www.usgs.org). Questionnaires were administered to 100 people from 3 different department at NPDC-Ogini flow station in a confidential manner. A descriptive statistics such as mean, mode, median and standard deviation were used through the Statistical Package for Social Sciences (SPSS) Version 20.2 and Microsoft Excel 2007 software to analyze the data generated. Descriptive and Inferential statistics were employed in the study. The descriptive analysis involved the use of pie chart, frequencies and percentages. Inferential statistics were used to test the hypothesis. The hypothesis were tested using analysis of variance (ANOVA).

Study Area

Location/ Extent

This study took place in the oil-delivering groups in Isoko arrive (Isoko North neighborhood government territories) of Delta state in the south-south geopolitical district of Nigeria. Isoko

is geologically found in the region of the Niger Delta of Nigeria that lies between 1,200 square kilometers, with a gauge populace that is over 750,000 individuals by last enumeration of 2006. The Land is a standout surrounded by the most jammed territories in the zone regarding individuals, with a 300 people possessing a kilometer square a deficiency likewise caused by oil exercises in Isoko is that of land due oil multinational. Isoko Land is named country with two semi-urban focuses and no urban focus Warri and Ughelli city.

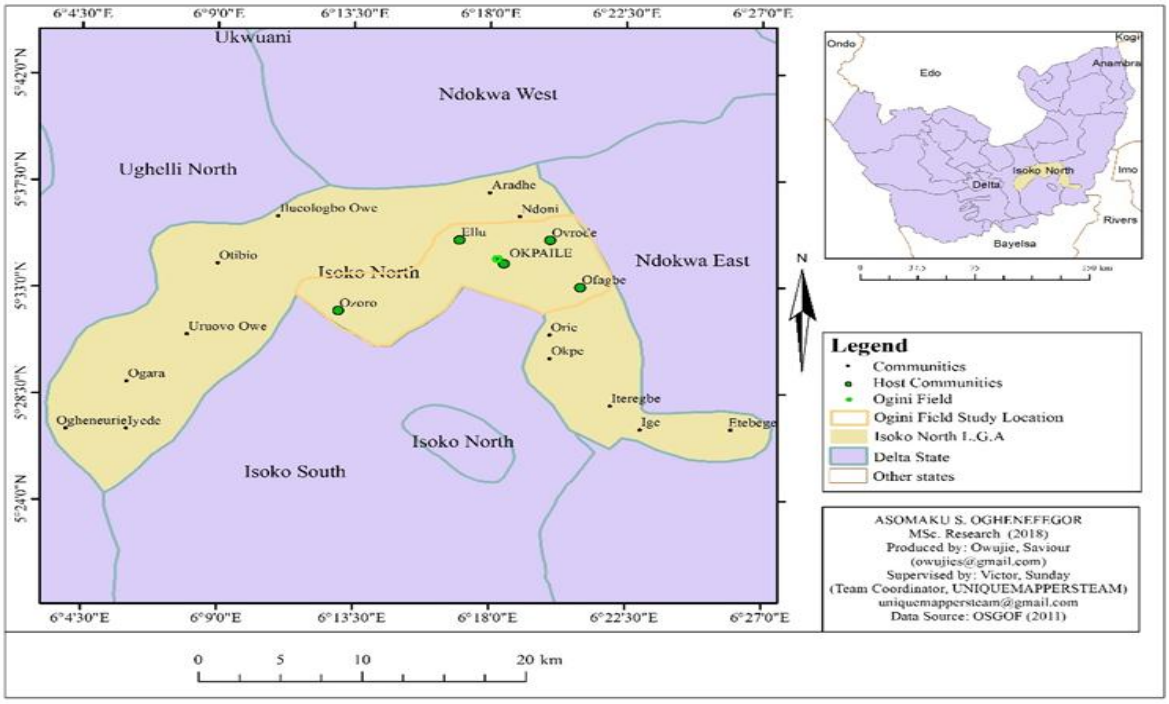

Fig.1 Ogini Oilfield study location in Isoko North L.G.A, Delta State.

Source: Author's field work, 2020

In Isoko threshold there are three stream stations in particular: Ogini which is our principle center, Uzere and Olomoro separately. The examination zone is situated inside the co-ordinates of scope N05^{o} 24' 0" - N05^{o} 37' 0" Longitude E006^{o} 30' 0"- E006^{o} 27' 0". The investigation territory has an expected land mass of 232.56 square kilometers plus a populace gauge of 142, 582 individuals (NPC 2006). Ozoro is the semi-urban group and Ellu people group but is a fast developing and turning into a semi-urban group, although the other groups, Ovrode, Ofagbe and Okpaile are provincial. The country occupants draw in themselves in cultivating, chasing, frivolous exchanging and provincial intra-transportation as of the openness of these groups by means of cleared and unpaved streets. The general population likewise participate in cassava handling, smoking of fishes, and their significant method for dissipate allocation is either by copying or unpredictable dumping of the loss in the bramble. The real methods for cooking is through consuming of non-renewable energy source (Fire wood or lamp fuel). Besides, as said prior each one of these groups are close to Ogini flow

station where related gas is being flared once a day. All these in advance of specified exercises are veritable generators of particulate concern in the earth.

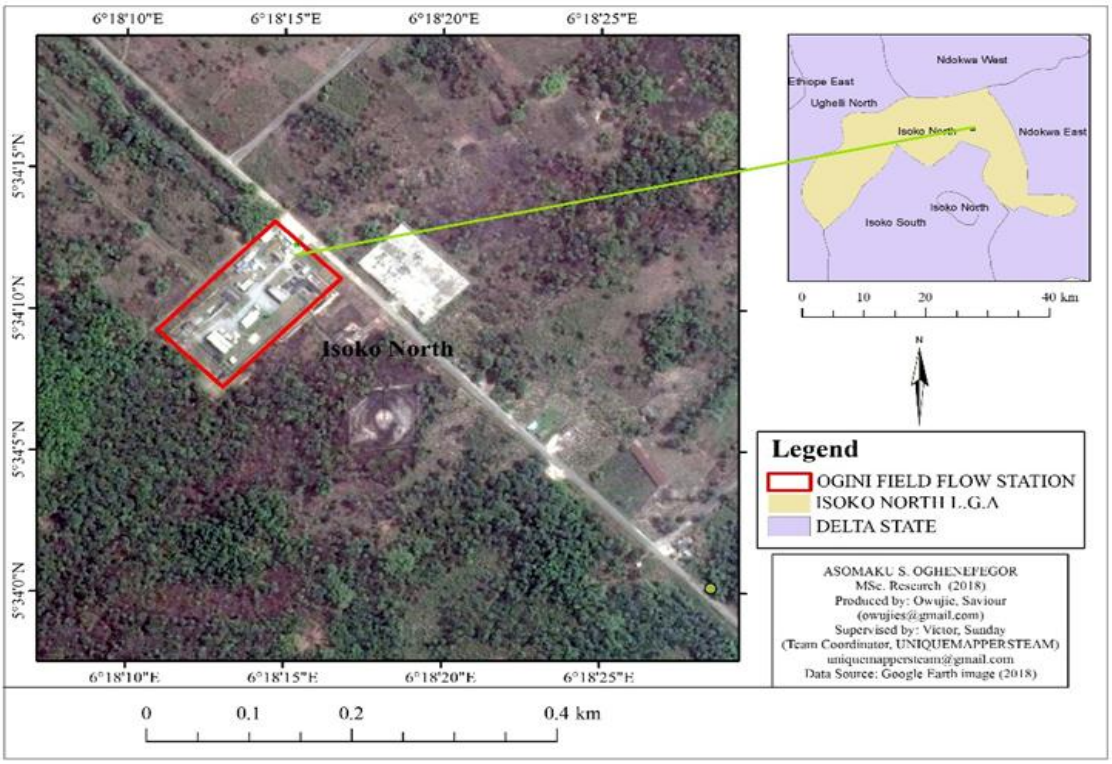

Fig 2: Satellite image view of Ogini Oilfield Flow station in Isoko North

Source: Google Earth Image,(2020)

The region of Isoko is tropically rain forest. The rainfall and high humidity most of the year is high. The climate is equatorial and is marked by two distinct seasons. There two major seasons. Dry season and rainy season .The dry season is November to April and ends with the cool dusty "harmarttan" The Rainy season starts from May to October respectively.

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4. RESULT AND DISCURSSIONS

Activities of Ogini flow station

In order to confirm the active activities of the flow station, the researcher list the following activities in a scale of: **A-Agreed, SA- Strongly agreed, UD-Undecided and SD-Strongly disagreed** respectively. The following details underneath are the outcomes:

Natural Gas Compressing.

From the questionnaires shared to confirm the activities of the flow station, 42.0% of the respondents agreed that natural gas compressing is one of their activity, 54.0% of the respondents strongly agree that natural gas compressing is one of their activity, why 4.0% of the respondents strongly disagree that natural gas compressing is not one of their activity respectively. See Fig 3 below.

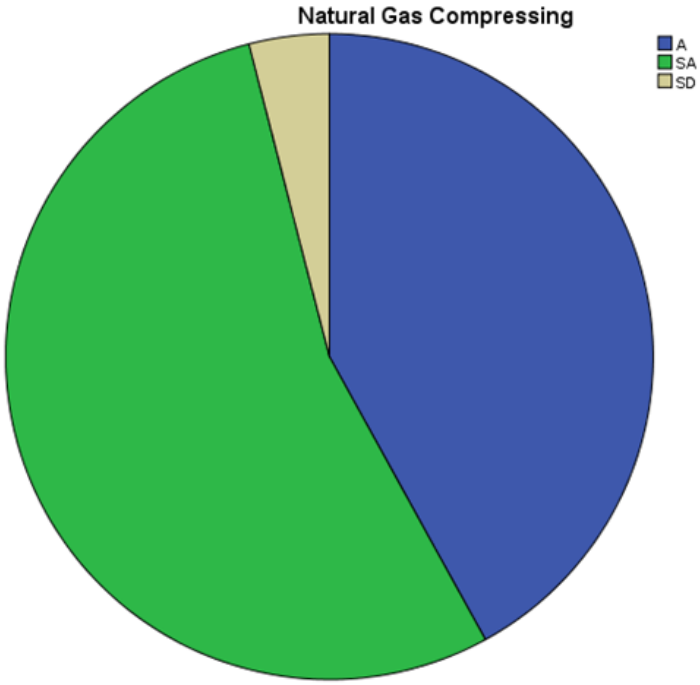

Fig 3: Pie chart showing Natural Gas Compressing as one of their activity in Ogini flow station.

Source: Author's Field Work, 2020

Crude oil Processing.

The respondents also show that Crude oil processing is one of their activity in Ogini flow station be demonstrating as follows; 31.0% agreed that crude oil processing is one of their activity , why 69.0% strongly agree by confirming that crude oil processing one of their major activity respectively. See Fig 4 below.

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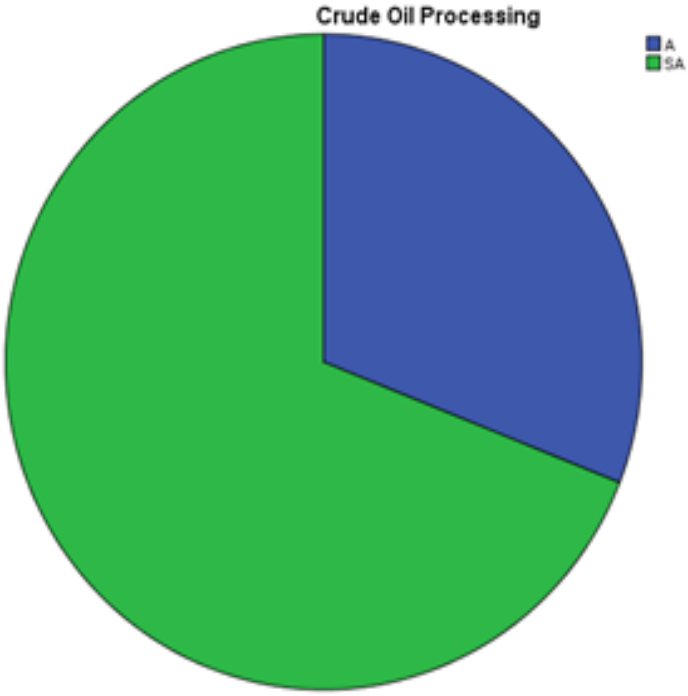

Fig 4: Pie chart showing Crude oil processing as one of their activity in Ogini flow station.

Source: Author's field work, 2020

Inflow of Crude oil and Gas Delivery line.

Inflow of crude oil and gas delivery pipeline as an activity was also confirm as follows; 12.0% of the respondents agreed, 76.0% strongly agreed , 8.0% were undecided while 4.0% strongly disagree that inflow of crude oil and Gas delivery line is one of their activity respectively. See Fig 5 below;

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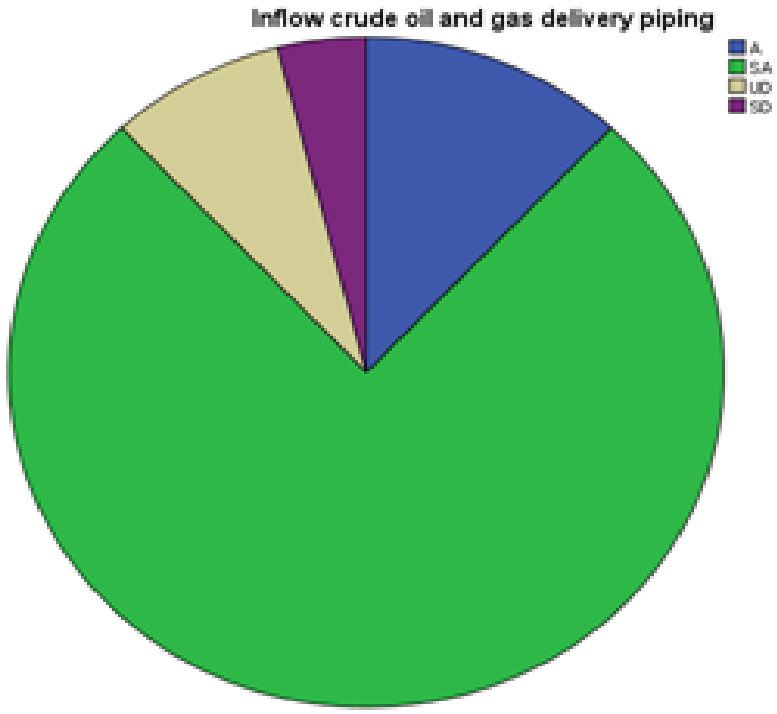

Fig 5: Pie chart showing Inflow of crude oil and gas delivery line as one of their activity in Ogini flow station.

Source: Author's field work, 2020

Associated Gas Gathering –AGG

The respondents also show that Associated Gas Gathering is one of their activity in the following manner, 31.5% Agreed, 42.5% Strongly agreed, 10.0% Undecided, 15.0% Strongly disagreed respectively. Statistically, over 70% of the respondents are aware of this activity in the flow station. See Fig 6 below;

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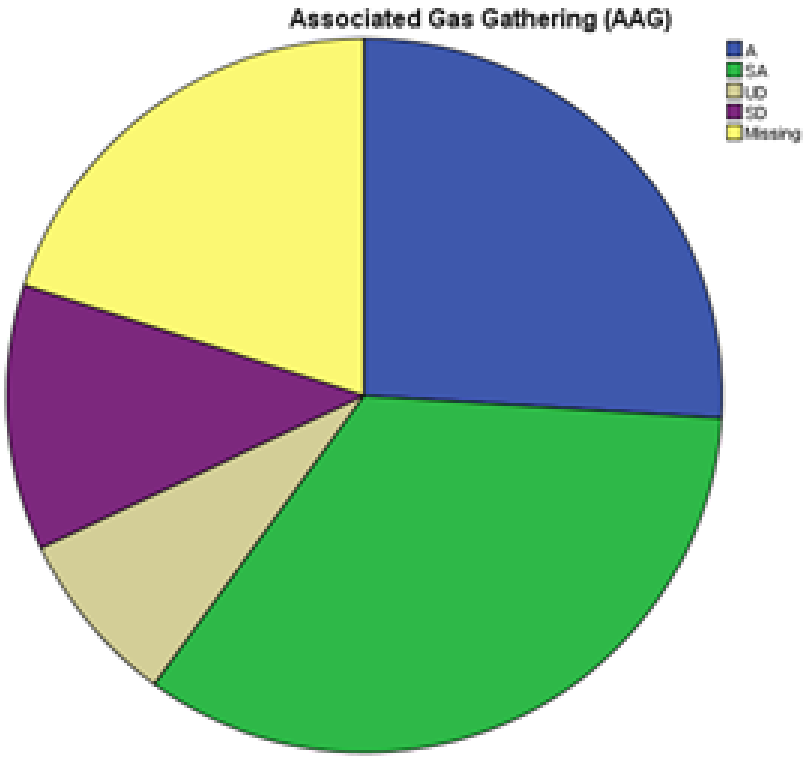

Fig 6: Pie chart showing Associated Gas Gathering as one of the activity in Ogini flow station.

Source: Author's field work, 2020

Gas and Crude oil Pipeline Transportation

The pipeline transportation of gas and crude oil as an activity of Ogini flow station was also confirm with the following aggregate; 17.5% Agreed, 75.3% Strongly agreed, 7.2% Undecided, while 3% got missing respectively. From the end result from the respondents, the researcher deduced that pipeline transportation of crude oil and gas is a major activity of the Ogini flow station. See Fig 7 below;

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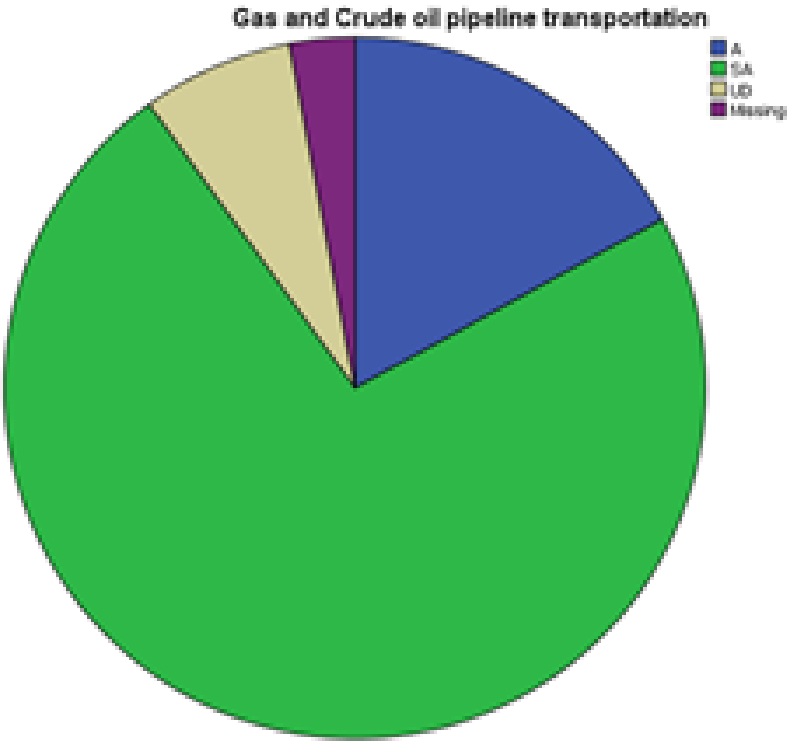

Fig 7: Pie chart showing Gas and crude oil pipeline transportation as one of the activity in Ogini flow station.

Source: Author's field work, 2020

Gas Flare Monitoring

The Gas flare monitoring as an activity of the flow station is so obvious that the flaring fire can be sighted from a distance, the following results in percentages is from the respondents; 50.0% Agreed, 38.5% strongly agreed, Undecided 7.3%, strongly disagreed 4.2% while 4.2% got missing respectively. From the ratio of the respondents that agreed to this activity and those that strongly agreed is over 80%, this implies that Gas flare monitoring is a key activity of Ogini flow station. Fig 8 below;

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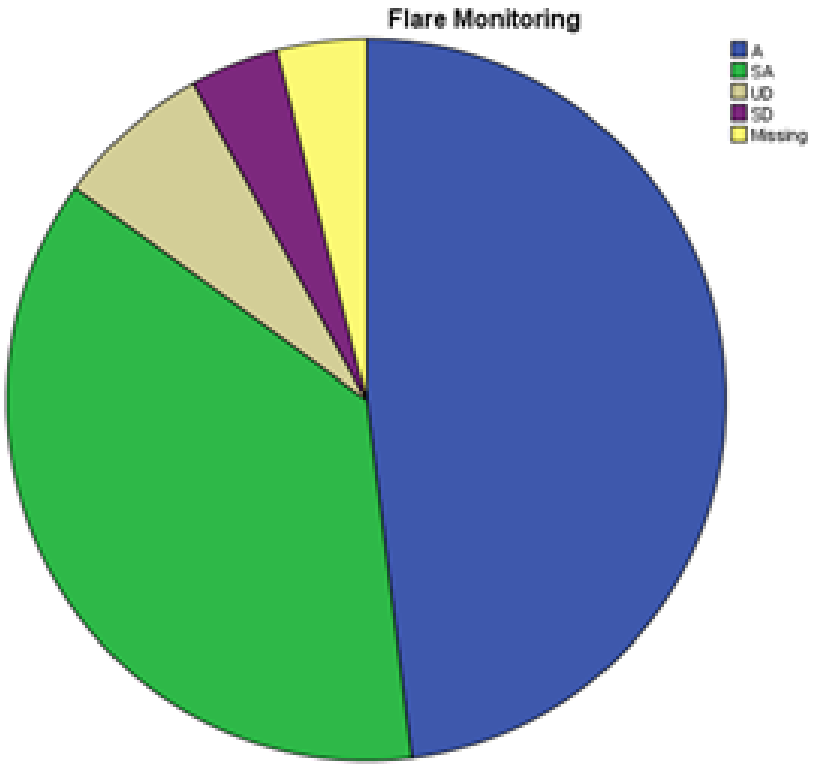

Fig 8: Pie chart showing Gas flare monitoring as one of the activity in Ogini flow station.

Source: Author's field work, 2020

JOB HAZARDS ANALYSIS OF THE ACTIVITIES OF OGINI FIELD FLOW STATION

S/N	Activities	Hazards	Threats	Consequences	who and what to be harmed	Risk level	Controls	Recovery Measure	Responsible persons
1	**Natural Gas Compressing**	- Volatile Organic Compounds (VOCS - Nitrogen Oxides - Leaks And Spills - Hydrocar	- Explosion -fire - injuries - sickness	Damage to life, property, environment, reputations	personnel, equipment, Environment, Reputation	H7	Adherence to Gov't Regulations, adherence Engineering control, Administrative control	First aid, medical emergency contingency plan	NPDC HSE Dept, Relevance Gov't Regulatory Agencies

		bon Gases -Noise							
2	**Crude oil and Natural Gas Processing**	- Drilling fluids - Hydrogen sulfide (H2S) -Silica -Mercury -Noise	Explosion -fire - injuries - sickness	Damage to life, property, environment, reputations	personnel, equipment, Environment, Reputation	ER 8	Adherence to Gov't Regulations, adherence Engineering control, Administrative control	First aid, medical emergency contingency plan	NPDC HSE Dept, Relevance Gov't Regulatory Agencies
3	**Inflow of Crude oil and Gas Delivery line**	- hydrocarbons -faulty equipment - Hydrogen sulfide (H2S) - untrained personnel - Ruptured pipeline	Explosion -fire - injuries - sickness	Damage to life, property, environment, reputations	personnel, equipment, Environment, Reputation	ER 9	Adherence to Gov't Regulations, Engineering control, Administrative control	First aid, medical emergency contingency plan	NPDC HSE Dept, Relevance Gov't Regulatory Agencies
4	**Associated Gas Gathering**	-Gas Leakage -Fire - Explosion - Untrained personnel - Ruptured Gas line	Explosion -fire - injuries - sickness	Damage to life, property, environment, reputations	personnel, equipment, Environment, Reputation	M5	Adherence to Gov't Regulations, Engineering control, Administrative control	First aid, medical emergency contingency plan	NPDC HSE Dept, Relevance Gov't Regulatory Agencies

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		-fumes							
5	**Gas and Crude oil Pipeline Transportation**	- Ruptured pipeline -leakage and spill - Hydrogen Sulphide Gas (H2S) -	- damage to crops, Biodiversity, environment, properties	-Lack of food -poverty - Environmental degradation - Reputations	personnel, equipment, Environment, Reputation	M5	Ensure Cathodic protection of pipelines.	First aid, medical emergency contingency plan	NPDC HSE Dept, Relevance Gov't Regulatory Agencies
6	**Gas Flare Monitoring**	- Nitrogen oxides NO2, - Hydrogen sulphide (H2S)s -Carbon-monoxide CO2	- Green house effect -Air pollution - Health challenges	-Severe sickness -lack of food -death	personnel, equipment, Environment, Reputation	H8	Adherence to Gov't Regulatory agencies	First aid, medical emergency contingency plan	NPDC HSE Dept, Relevance Gov't Agencies

Table 1 Job Hazards Analysis of the Activities of Ogini Flow Station

Source: Author's field work, 2018

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Table 2 Risk Assessment Matrix

Potential Severity	Probability of Occurrence			
	Frequent	Occasional	Remote	Unlikely
Catastrophic	Extreme Risk (9)	Extreme Risk (8)	High Risk (7)	* High Risk (6)
Critical	Extreme Risk (8)	High Risk (7)	Medium Risk (5)	Medium Risk (5)
Moderate	High Risk (7)	Medium Risk (5)	Medium Risk (4)	Low Risk (3)
Minor	Medium Risk (4)	Low Risk (3)	Low Risk (2)	Low Risk (1)

Notes:

* These high risks may be acceptable if the design, operations and management controls are consistent with industry practices. A more detailed score-based 'Risk Assessment Methodology' may be required.

If a risk falls between two or more categories, the selected risk ranking should reflect business sensitivity/priority and industry practice.

Numbers in brackets provide a method of rating risk on a 1-9 scale in order to prioritize mitigating activities/measures.

Risk assessment matrix

Source; B.B.Babatunde lecture Note, 2019

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Table .3: Ogini flow station Risk Assessment Ranking

S/N	Activities	Hazards	Related risk	Potential Consequences	Severity	Probability of Occurrences	Risk Grading
1	**Natural Gas Compressing**	- Volatile Organic Compounds (VOCS - Nitrogen Oxides - Leaks And Spills - Hydrocarbon Gases -Noise	Explosion -fire -injuries -sickness	-Fatality -Extensive asset damage - Extensive environmental Effect - Major reputation Impact	Catastrophic	Occasional	Extreme Risk (8)**
2	**Crude oil & Natural Gas Processing**	- Drilling fluids - Hydrogen sulfide (H_2S) -Silica -Mercury -Noise	Explosion -fire -injuries -sickness	-Major health -problem/ disability -Major damage to asset - Major damage to environment. - Major reputation Impact	Critical	Occasional	High Risk (7)**
3	**Inflow of Crude oil & Gas Delivery line**	hydrocarbons -faulty equipment - Hydrogen sulfide (H_2S) -untrained	Explosion -fire -injuries -sickness	Major health -problem/ disability -Major damage to asset - Major damage to	Critical	Remote	Medium Risk **(5)****

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		personnel -Ruptured pipeline		environment. - Major reputation Impact			
4	**Gas & Crude oil Pipeline Transportation**	-Ruptured pipeline - Hydrogen Sulphide Gas (H_2S)	leakage and spill	damage to crops, Biodiversity, environment, & properties, Considerable Impact on reputation	Moderate	Occasional	Medium Risk (5)**
5	**Gas Flare Monitoring**	- Nitrogen oxides NO_2, - Hydrogen sulphide (H2S)s -Carbon-dioxide CO_2	Greenhouse effect -Air pollution - Emission of Carbon-dioxide CO_2	-Severe sickness -lack of food -death	Critical	Frequency	Extreme Risk (8)**
6	**Associated Gas Gathering**	Gas Leakage -Fire - Explosion - Untrained personnel -Ruptured Gas line -fumes	Ruptured pipeline -leakage and spill - Hydrogen Sulphide Gas (H2S)	Explosion -fire -injuries -sickness	Moderate	Remote	Medium Risk (4)

**** Risk associated with Activities Statistically significant at P = 0.05**

Source: Author's field work, 2018

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Discussion

Assessment of hazards associated with the activities on Ogini flow station

The shows the activities of the flow station through the confirmation from the respondents in the questionnaires. In (table 1) six activities was confirmed and the hazards associated with these activities has been identified in the job hazards analysis in table 1. The risk grading of each activities was done using the risk assessment matrix in table 2 respectively.

The implication is that the hazards that is connected with these activities can lead to a serious health challenges to the workers or host communities if not control, the hazards can metamorphosing into a catastrophic situation, seeing the level of the risk that is related the hazards are high. It can also affect the reputation of the establishment.

Assessment of risks levels associated with activities at the Ogini flow Station using Risk Assessment Matrix.

The researcher used the risk assessment matrix in (table 2) to decide the risk level of each activities. The risk level of these activities are ranked according their level of risk. See table 3. For the researcher to determine the risk level associated with each activities, the hazards to each activities was identified, the threats that these identified hazards posed to personnel, assets, environment and reputation was also identified and the potential consequences. The probability and frequency of occurrences was determined from the respondents through the questionnaires. For example in question No 7 of section A of the questionnaires, 56% of the respondents agree that oil spill happen once every year during crude oil pipeline transportation. The probability of spill happening from Gas & Crude oil Pipeline transportation as an activity is occasional and the degree of severity is moderate. From the risk assessment matrix, occasional and moderate is equal to medium risk, therefore, the risk associated with spill from gas and crude oil pipeline transportation is a medium risk. (See table .3).

The implication of the risk level is that it can lead to a serious health challenges to the workers or host communities , company reputation if not control, the hazards can metamorphosing into a catastrophic situation, bearing in mind that the level of the risks in connection with the hazards are high.

To developed risk management standards, based on acceptable safe practices and legal requirements.

In developing risk management standards based on acceptable safe practices and legal requirement, the researcher recommends the adoption of the following international standards: The implication is that the developed standards and legal requirement if strictly adhere to can lead to an increase productively and a decrease in incidence at the flow station,

OHSAS Series, 18000, 18001, 18002

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BS OHSAS 18001 is a structure for an occupational health and safety (OHS) management system and is a part of the OHSAS 18000 (sometimes incorrectly identified as ISO 18000) series of standards, along with OHSAS 18002. It can help oil and gas companies to put in place the policies, procedures and controls needed for organization to realize the best conceivable operational environments and workplace fitness and well-being, aligned to internationally recognize best practice.

The OHSAS 18000 series are structure that is proven to allow the industry to be pro-active rather then re-active when approaching health and safety, therefore more effectively protecting the health and welfare of your workforce on an on-going basis. The OHSAS series of health and safety management provides a process driven approach to regulatory and checking risks that can arise from the industry's day to day activities. The system is proven to help industry owners and managers be more mindful of their lawful and governing accountabilities and support them in ascertaining and managing the related risks. The International Organization for Standardization (ISO 45001**)** standard is now the world's first occupational health and safety international standard is published in March 2018. It will help your organization offer a safe and healthy workplace for employees and other individuals, prevent deaths, work-related injury and ill-health as well as continually improve OH&S performance. Suitable for organizations large or small it will also rise your organizational resilience. (https://www.bsigroup.com)

This ISO 45001 is to replace OHSAS 18001. This new standard can also help deliver the following benefits: ISO 45001 benefits

- Increase organizational resilience through proactive risk prevention, innovation and continual improvement
- Strengthening of legal and regulatory compliance whilst reducing business losses
- Demonstrates brand responsibility by committing to safe, healthy and sustainable work
- One global occupational health and safety system for all businesses, of all sizes

ISO 14001 Environmental Management

ISO 14001 standard provides leadership on how to consider multiple facets of your business procurement, storage, distribution, product development, so that it reduces its effect on the surroundings. It also drives you to evaluate how you manage emergency response, customer expectations, stakeholders and your relationships with your local community. The ISO 14001 certification can deliver more than supervisory submission and the capability to meet supplier requirements. (https://www.bsigroup.com)

Testing of Hypothesis

Hypothesis 1

1.) Ho: There is no significant relationship between Job Hazards Analysis and Risk Assessment of the activities of Ogini flow station

2.) H_1: There is significant relationship between Job Hazards Analysis and Risk Assessment of the activities of Ogini flow

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Analysis of variance (ANOVA) result shows the level of significant relationship between job hazards analysis and risk assessment in the activities of the flow station as shown in table 4. The analysis show that the F. calculated value was 0.759 and the F-table value was 0.471. Since the F- table value is less than the F-calculated value, the null hypothesis which says, there is no significant relationship between job hazards analysis and risk assessment of the activities of the flow station is rejected and accept the alternate hypothesis which state that, there is significant relationship between job hazards analysis and risk assessment of the activities of the flow station.

Table 4. Have you experienced an Accident at the flow station

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.135	2	.067	.759	.471
Within Groups	8.615	97	.089		
Total	8.750	99			

Source: Researcher's field work, 2018

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5 CONCLUSION

The study has shown that from the activities of the flow station as seen from the job hazards analysis and the risk assessment, associated gas gathering, crude oil and gas pipeline transportation and Inflow of Crude oil & Gas Delivery line has medium risk and that is because the likelihood of happening is remote, remote and occasional but all other activities have extreme risk and high risk. This indicates that a high level of precautions and regulations should be a topmost priority to mitigate / prevent any kind of potential hazards that can lead to disaster.

Also the study has shown the level of risk that is associated with the activities of an oil and gas flow station was statistically significant at $p = 0.05$ for most of the activities. There is no low risk from the data provided by the respondents for the investigation based on the activities of the flow station even though we have medium risk based on occurrences, otherwise, we have extreme high and high risk in the activities of the flow station. All oil and gas flow stations ought take a proactive thinking and attitude towards all task activities and also have a high level of preparedness and preparedness plan in place in situation of any incidence, because if the hazards are successfully and professionally controlled with all measures and also adhering to all regulatory agencies both local and internationally, we will achieve a zero goal in incidence and accidents.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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