

National workshop on oil spill modelling
Abuja, Nigeria (25th-26th October 2016)



IPIECA

THE GLOBAL OIL AND GAS
INDUSTRY ASSOCIATION
FOR ENVIRONMENTAL
AND SOCIAL ISSUES

GIWACAF

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National Workshop on Oil Spill Modelling

Abuja, Nigeria
25th – 26th October 2016

Global Initiative for Western, Central and Southern Africa

Introduction P.5

Activities P.6

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Hosted by:

NOSDRA



NOTE

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Executive summary

An oil spill modelling workshop was held in Abuja, Nigeria on 25th and 26th October 2016. It gathered delegates from different ministries and agencies as well as representatives from the private sector. Over 100 participants attended the workshop. A list of participants is available in Annex 3.

The event was hosted by The National Oil Spill Detection and Response Agency (NOSDRA) and sponsored by Shell Petroleum Development Company within the framework of the Global Initiative for West, Central and Southern Africa (GI WACAF) Project. The workshop was supported by the International Maritime Organization (IMO) and IPIECA, the global oil and gas association for environmental and social issues.

The general aim of the workshop was to explore the possibilities of setting up an oil spill modelling response centre in Nigeria, which would serve the WACAF region. To achieve this aim the workshop was split into two key objectives:

- Introduce technical concepts of oil spill modelling; and
- Discuss what is needed to setup a regional response modelling centre.

To effectively address the objectives of the workshop, participants were guided through two days of technical presentations, group activities and discussions.

Discussions that took place showed that oil spill modelling is an important tool for monitoring and predicting the potential impact of an oil spill. An independent modelling capability in the region would provide useful data to support a response, especially considering the increasing number of offshore campaigns in the offshore environment – where modelling is most effective. Modelling is currently provided to NOSDRA by Operators and they wish to remove that dependency.

Recommended next steps are:

1. Decide on the equipment and human resources needed to setup the response centre
2. Detail the costs of setting up a response centre
3. Discuss possible financial streams to offset this cost¹
4. Gather key stakeholders from each country to discuss the Centre's setup

More detailed recommendations can be found on page 10

The active participation of all delegates, NOSDRA's organisation and Shell Petroleum Development Company's sponsorship were all vital to the success of this workshop and were greatly appreciated.

¹ The modelling centre will be 'not for profit' so any revenue generated will be used to improve the quality of the service.



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1. Presentation of the GI WACAF Project

Launched in 2006, the Global Initiative for West, Central and Southern Africa (GI WACAF Project) is a partnership between the International Maritime Organization (IMO) and IPIECA, the global oil and gas industry association for environmental and social issues, to enhance the capacity of countries to prepare for and respond to marine oil spills. A key innovative feature is to emphasise the promotion of public/private partnerships for effective oil spill response.

The mission is to strengthen the national oil spill response capability in 22 West, Central and Southern African countries through the establishment of a local partnership between the oil industry and the authorities in charge of oil spill preparedness and response at national level.

The Project is jointly funded by the IMO and 8 Oil Companies members (BP, Chevron, ConocoPhillips, ENI, ExxonMobil, Marathon, PERENCO, Shell and TOTAL) through IPIECA.



The scope is to organise workshops, training courses, seminars and deployment exercises in collaboration with the national authorities in charge of oil spill response and in partnership with local business units.

The GI WACAF Project is based on an effective management system comprising of six goals of preparedness to prepare for and respond to marine oil spills. These goals cover the requirements of the OPRC 90 Convention:

Goal 1 - Legislation: Promote the ratification of the relevant international Conventions

Goal 2 - Contingency plan: Develop National Contingency Plans for all the countries of the region

Goal 3 - Designation of authority: Obtain clarity on roles and responsibilities of all stakeholders

Goal 4 - Regional agreements: Promote the exchange of information and the provision of mutual assistance for oil spill incidents

Goal 5 - Training: Ensure that training and exercises are delivered in the participating countries on a regular basis

Goal 6 - National capabilities: Support participating countries in developing their own national response system

2. Introduction

The National Oil Spill Detection and Response Agency (NOSDRA), in collaboration with the International Maritime Organisation (IMO) and IPIECA under the Global Initiative for West, Central and Southern Africa (GI WACAF) hosted a two-day workshop on oil spill modelling. The workshop was sponsored by Shell Development Petroleum Company.

The Eleventh Meeting of Contracting Parties to the Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region (Abidjan Convention) adopted a Decision on the Implementation of the Decision COP 10/11 relating to the hosting of the Emergency Coordination Centre for Marine Pollution in the Abidjan Convention Zone. The Federal Republic of Nigeria has been chosen to host the headquarters of the said Emergency Coordination Centre.

Given the above, the 2015 GI WACAF Regional Conference, held in Accra, Ghana, recommended a workshop be convened in Nigeria. The workshop should discuss and explore the setup of the Emergency Coordination Centre for Marine Pollution under the Abidjan Convention framework.

3. Objectives of the workshop

The general aim of the workshop was to explore the possibilities of setting up an oil spill modelling response centre in Nigeria, which would serve the WACAF region. To achieve this aim the workshop was split into two key objectives:

- Introduce technical concepts of oil spill modelling; and
- Discuss what is needed to setup a regional response modelling centre.

4. Programme of the Workshop

The intended programme is available in Annex 1. The programme was adjusted due to unforeseen circumstances and feedback from delegates. The programme that was delivered is available in Annex 2.

An outline of the programme:

- **25th October 2016 – Introduce technical concepts of oil spill modelling**
 - Why we use oil spill models
 - Modelling tools
 - Setting up an oil spill model
 - Analysis and communication of oil spill modelling results
- **26th October 2016 – Setting up a regional response modelling centre**
 - Mini sessions on requested topics (summary and extra questions from Day 1)
 - Value of a response modelling centre
 - Examples of response modelling centres
 - Tailoring a the centre to regional needs



5. Location, dates, and participants

The workshop was held at the Rockview Hotel in Abuja, Nigeria on 25th and 26th October 2016. NOSDRA ensured the general organisation of the workshop and facilitated the hosting of the delegates.

The experts invited to facilitate this workshop were:

- Liam Harrington-Missin on the behalf of IPIECA from Oil Spill Response Ltd.
- Jonathan Griffiths on the behalf of IPIECA from Oil Spill Response Ltd.

Over 100 participants from oil companies (Shell, Chevron, Total, and ExxonMobil), government officials at State and Federal Levels as well as local responders took part in the event.

6. Activities and proceedings

6.1. Opening ceremony

The opening ceremony took place on 25th October. It was introduced by the Chief Executive, Director General of NOSDRA, Sir Peter Idabor on behalf of Mrs. Amina J. Mohammed, Honourable Minister of Environment who was unable to attend due to a last minute engagement. Following this the Director of NOSDRA, Mr. Idris O. Musa gave a welcoming speech on behalf of Sir Peter Idabor. The speeches are attached in Annex 4 and Annex 5 respectively.

6.2. Proceedings of the National Workshop

DAY 1 – A technical introduction to oil spill modelling

Session 1: Introduction to the workshop

Facilitators and participants introduced themselves before discussing the aims and objectives of the workshop. It was noted that the two objectives (introducing the technical concepts of oil spill modelling and discussing the needs to setup a regional response modelling centre) would be covered on day 1 and day 2 respectively.

The aim of day 1 was to introduce the key technical concepts of oil spill modelling and give participants a baseline of theoretical knowledge before discussing the practicalities of setting up a regional response centre on day 2. An example response modelling process was followed throughout day 1.



Figure 1. Example Response Modelling Process

Session 2: Why do we use oil spill models?

A fictional spill scenario was introduced with a modelling notification form, available in Annex 8. Delegates were split into four groups and each group was asked to think of themselves as a different stakeholder.

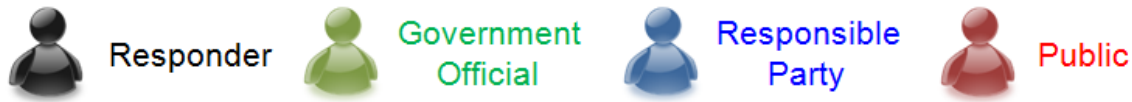


Figure 2. Key Stakeholders Groups Were Asked to Represent

The groups discussed what extra information they would obtain about the scenario and whether or not they think oil spill modelling can help answer these questions.

This exercise showed the value of oil spill modelling – particularly in estimating where oil could travel in the next few days. It was clear that there was some overlap between the various stakeholders e.g. all wanted to know where oil would go but that some required more in depth information than others e.g. responders were interested in the viscosity of oil but this was of less relevance to the public.

It was clear that oil spill modelling could help answer many of the questions posed by the different stakeholders whilst bearing in mind that modelling would need to be supplemented with monitoring techniques such as in field, aerial and satellite surveillance to provide a more complete picture of the spill.

Session 3: Oil spill modelling tools

A technical presentation was given on a number of oil spill modelling tools such as Oilmap, Oil Spill Contingency and Response (OSCAR), Adios/Gnome. For more information on the models discussed the providers can be contacted:

- Oilmap (asacontact@asascience.com)
- OSCAR (Jorgen.Skancke@sintef.no)
- ADIOS/GNOME (orr.adios@noaa.gov)

The consultants discussed the advantages and disadvantages of each model as each has its own strengths and weaknesses. The OSCAR model contains the most complete oil database and characterises oils with an impressive 25 sub-components so is particularly good at determining the physical fate of oil. Oilmap has an excellent built-in GIS system so is easy to use in a response. ADIOS/GNOME are open source and are fully customisable to those with the correct skillset. It is important to note that there are also other models available such as MIKE21 OS which are not covered in this report.

Session 4: Setting up an oil spill modelling during a response

The facilitators completed a live demo based on information provided in the notification form. Whilst setting up the model, the importance of good quality inputs was discussed. Metocean

(currents and winds) data is one such input. It determines where an oil spill is likely to travel. Oil characteristics (such as API and viscosity) are another input. These determine what will happen to the physical properties of the oil e.g. how much will evaporate?

Session 5: Analysing and communicating results

As a continuation from session 2 and 4, delegates were put back into four groups with each group being assigned as a particular stakeholder. Delegates were given an example oil spill modelling report and asked to analyse it from a particular stakeholder's point of view. The results were presented back to the room.

From this exercise it was clear that different stakeholders require different analysis oil spill modelling. Discussions took place on whether modelling should be shared with all stakeholders which was to be re-visited on day 2.

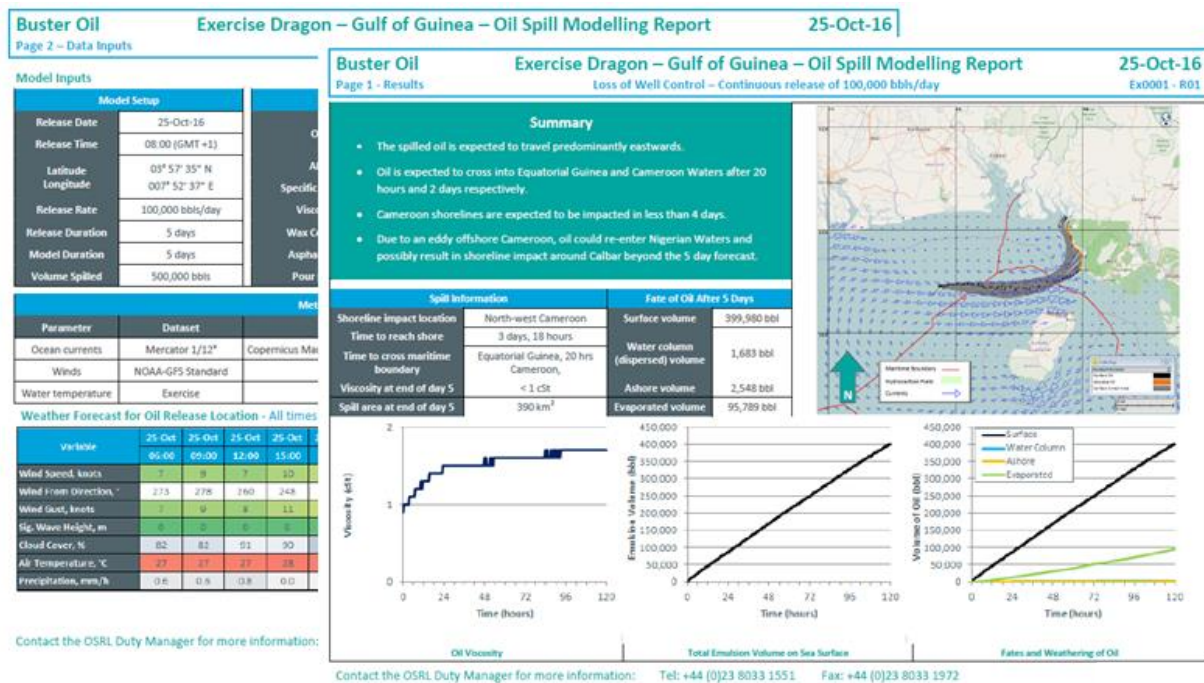


Figure 3. Example Oil Spill Modelling Report

Session 6: Summary of day 1 and look ahead to day 2

Participants gave feedback on what they had learnt throughout the day and what else they would like covered. The consultants asked the participants to rank their "top three things they learned during this first day". The results are:

1. Modelling is the only tool that can be used to provide predictions of the fate of oil in the next few days. Despite this it remains a basic tool.
2. The outcomes of the oil spill modelling should be communicated to all the stakeholders bearing in mind that different levels of detail will be needed for different stakeholders. Transparency is a key.



- Oil spill modelling is an interpretation of a complex event. It should be used alongside other tools such as aerial and satellite surveillance which can be used to cross-check the modelling results.

The facilitators explained that day 2 would focus on how to setup a regional response modelling centre.

DAY 2 – Setting up a regional modelling centre for oil spill response

Session 1: Recap of day 1 and introduction to day 2

The facilitators and participants briefly revisited the technical content discussed on day 1 of the workshop together. The plan for day 2 was described.

Session 2: Mini sessions on delegates chosen topics

Based on feedback from the first day, mini-sessions on a variety of topics were held to conclude the theoretical part of the workshop. Discussions took place on:

- Running a model in an on-going response
- Modelling and GIS
- Nearshore modelling
- Incident Management System (IMS)
- Waste Management

Nearshore modelling discussions were particularly interesting given the aim of the workshop. Concerns were raised over the costs of performing effective nearshore modelling and whether or not these costs outweighed the benefits. It was loosely agreed that the modelling centre should focus on offshore incidents. The consultants advised that a nearshore modelling capability would need significantly more investment than offshore modelling and that it would be more practical to gain experience in the offshore environment first.

Session 3: Value of a regional oil spill modelling centre

In groups, delegates discussed the value of a regional modelling centre. The benefits, features and customer requirements were covered. End user requirements (both essential and desirable) were discussed. The concerns end users have were also covered. This built on what was covered in day 1 with regards to the four key stakeholders: government officials; the responsible party; responders and the public.

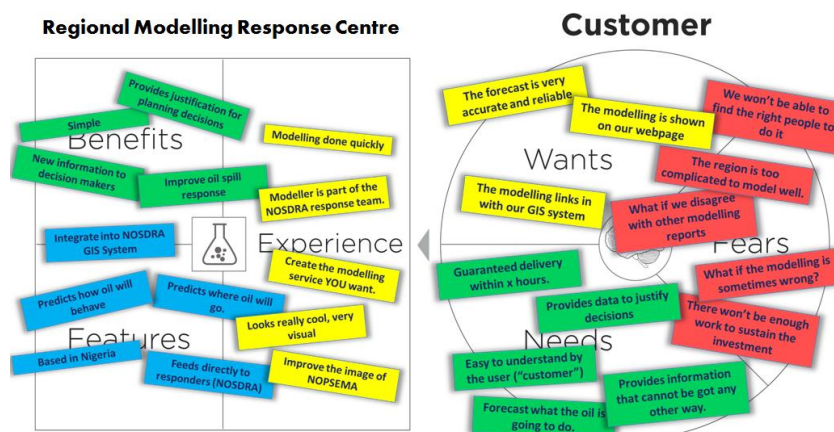


Figure 4. Value Proposition Canvas used to define the regional modelling Centre

Session 4: Example oil spill modelling centres

The facilitators gave their opinions of three response modelling centres and described their technical ability, lines of communication and costs.



Figure 5. Example modelling response centers

Session 4: Tailoring the response modelling centre

Following the example oil spill modelling centres session, groups of delegates were asked to choose which type of modelling centre was most appropriate for the WACAF region. In addition to chosen the most appropriate example centre delegates suggested changes to tailor it to their needs. A mixture of the Marine Coast Guard Agency (MCA) and Oil Spill Response Ltd.'s (OSRL) modelling centres was proposed as the best solution. From the discussions it was established that the centre should:

- Report to governments of the Contracting Parties to the Abidjan Convention
- Serve the public bearing in mind the sensitivity and relevance of the data to be shared
- Have full time modellers rather than responders trained in modelling if budget is available
- Purchase 'off the shelf' oil spill modelling software such as those presented during today's workshop rather than develop specific software
- Be capable of 2D (surface) and 3D (subsurface) modelling
- Work with regional Navys, universities and research institute to access regional specific metocean data
- Be funded by the Contracting Parties to the Abidjan Convention

6.3. Closing ceremony

The closing ceremony took place on 26th October. Closing remarks were provided by Mr Clément Chazot (GI WACAF Project Manager), reproduced in Annex 6 of the present report, as well as by Sir. Peter Idabor, Director General/Chief Executive of NOSDRA and Idris O. Musa, NOSDRA Director, before the meeting was officially closed.

7. Recommendations

Discussions that took place showed that oil spill modelling is an important tool for monitoring and predicting the impact of an oil spill. A modelling capability in the region would give useful data to support a response, especially considering the increasing number of drilling campaigns in the offshore environment – where modelling is most effective. Recommended next steps are:

Decide on the resources needed to setup and operate the response centre

A number of options were presented for equipment, software and human resources needed to setup a modelling centre. These options should be formalised for presentation to the key decision makers from member countries.

Further discussions are required regarding the general functioning of the Centre, may it be pertaining to the working language, the coverage, the considerations of the ESI index, the supply of transboundary data and infrastructure etc.

Detail the costs of setting up a response centre

Due to time restrictions, costs of setting up a response modelling centre were not discussed in detail. Costs of setting up a response modelling centre include:

- Facilities such as office and meeting rooms
- Hardware such as laptops, specialist servers etc.
- Modelling software
- Staffing costs based on 4/5 full time modellers

The cost of setting up a modelling centre will vary significantly depending on the requirements of the centre. Two examples are shown below:

	Example 1	Example 2
Software	<i>OSCAR</i>	<i>ADIOS/GNOME</i>
Hardware	<i>High Spec Server</i>	<i>Laptops (x5)</i>
Staff Costs	<i>Specialist Modellers (x5)</i>	<i>Trained Responders (x5)</i>
Facilities	<i>Specialist Office</i>	<i>Use of Existing Office</i>
	~\$25,000 per year	Free
	~\$100,000	~\$10,000
	Annual Salary	~\$20,000 + man days
	Unknown	Low Cost

It was generally suggested that the costs of the modelling centre would need to be covered by the Contracting Parties to the Abidjan Convention after the necessary consultations have been made. The costs of different phases should be looked at e.g. initiation vs running.

Determine the potential financial streams to offset this cost²

The modelling centre will be 'not for profit' but revenue could be raised to cover the costs detailed above. There are a number of ways the centre could generate revenue such as charging users for spills/exercises and completing contingency planning/environmental impact assessments. Revenue generated could be used to further improve the response modelling service by increasing software, hardware and personnel capability.

² The modelling centre will be 'not for profit' so any revenue generated will be used to improve the quality of the service.

It has not been decided if the modelling centre will raise revenue in this way or if it will simply be a subscription service.

Gather key stakeholders from each country to discuss the business case

This workshop helped understand the requirements of an oil spill modelling capability in a regional response centre and began to look at actually putting it in place. To move forward, it is recommended that key decision makers from the member countries meet to complete the following objectives:

- Agree on the requirements of the modelling centre
- Discuss the viability of the Centre through the agreement on the conditions and requirements of a potential funding mechanism

Such consultative approach will ensure a tailored-approach for the WACAF region, whilst preventing any conflict of interests.

8. Conclusion

The feedback received was positive overall. The delegates were glad to have attended the workshop and stated they would share the acquired experience with their colleagues back at their offices. The activity was, according to them, “well thought”, “educating” and “impactful”. Moreover, it seems that the oil spill modelling is crucial considering that the industry in Nigeria is moving offshore in the open sea, where modelling proves most relevant. However, some delegates regretted the workshop was “too short” and a few thought it lacked “real life demonstration of oil spill modelling”.

Annex 1 – Intended Programme

Day 1. 25 th -Oct-2016		Day 2. 26 th -Oct-2016	
08h30	Arrival and Registration of the participants		Day 1 Recap and Introduction to Day 2
	Opening Ceremony	09h00	Welcome and recap Mr Jonathan Griffiths, IPIECA Consultant
09h00	<ul style="list-style-type: none"> Welcome Address by Director General/Chief Executive (NOSDRA) Keynote Address by Honourable Minister, Federal Ministry of Environment, Nigeria Goodwill Messages by Oil Companies 		<ul style="list-style-type: none"> Recap of Day 1 Live Backtrack Demo
	Introduction to the Workshop	10h00	Introduction to day 2 Mr Liam Harrington-Missin, IPIECA Consultant
10h10	Mr Liam Harrington-Missin, IPIECA Consultant <ul style="list-style-type: none"> Introduction of the facilitators Introduction of the participants Objective of workshop and programme Oil spill modelling process during a response 	10h10	Coffee Break
10h30	Group Photograph and Coffee Break		Resources
	Setting up an Oil Spill Model	10h40	Who do we need to run a regional response modelling centre? Mr Liam Harrington-Missin, IPIECA Consultant
11h00	Why do we use oil spill models? Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Introduction to oil spill scenario Group activity 		<ul style="list-style-type: none"> Group activity
11h45	Modelling tools Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Discussion on modelling software (commercial, open source and research models) 	11h30	Hardware /Resources Mr Liam Harrington-Missin, IPIECA Consultant <ul style="list-style-type: none"> Servers/Computers Room setup Data storage
12h00	Model setup (Live demo) Mr Liam Harrington-Missin & Mr Jonathan Griffiths, IPIECA Consultants	12h00	Lunch Break
13h00	Lunch Break		Regional Issues
	Model Results	13h00	Regional issues when setting up a response modelling centre Mr Jonathan Griffiths, IPIECA Consultant
14h00	Analysing and communicating results Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Group activity 		<ul style="list-style-type: none"> Group activity: <ul style="list-style-type: none"> Facilities Costs Stakeholders Capability requirements
15h00	When do we update results? Mr Liam Harrington-Missin, IPIECA Consultant <ul style="list-style-type: none"> Trigger points for re-modelling (surveillance, metocean data update etc.) 	14h30	Coffee Break
15h30	Coffee Break		Case Study
	Preparedness Modelling	15h00	Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Group activity
16h00	Modelling for planning Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Modelling for Oil Spill Contingency Plans Modelling for Environmental Impact Assessment Modelling response techniques 		Closing Ceremony
	Closing Day 1	16h00	<ul style="list-style-type: none"> Host IPIECA
16h30	Summary of day 1 and planning for day 2 Mr Liam Harrington-Missin, IPIECA Consultant		End of Day 2 and Workshop
	End of Day 1		

Annex 2 – Amended Programme

Day 1. 25 th -Oct-2016		Day 2. 26 th -Oct-2016	
08h30	Arrival and Registration of the participants		Day 1 Recap and Introduction to Day 2
	Opening Ceremony	09h00	Welcome and recap Mr Jonathan Griffiths, IPIECA Consultant
09h00	<ul style="list-style-type: none"> Welcome Address by Director General/Chief Executive (NOSDRA) Keynote Address by Honourable Minister, Federal Ministry of Environment, Nigeria Goodwill Messages by Oil Companies 		<ul style="list-style-type: none"> Recap of Day 1
	Introduction to the Workshop	09h30	Mini-Sessions Mr Jonathan Griffiths, IPIECA Consultant
10h10	Mr Liam Harrington-Missin, IPIECA Consultant <ul style="list-style-type: none"> Introduction of the facilitators Introduction of the participants Objective of workshop and programme Oil spill modelling process during a response 		<ul style="list-style-type: none"> Running a model in an on-going response Modelling and GIS Nearshore Modelling Incident Management System (IMS) Waste Management
10h30	Group Photograph and Coffee Break	11h00	Coffee Break
	Setting up an Oil Spill Model	11h30	The value of a regional oil spill modelling centre Mr Liam Harrington-Missin, IPIECA Consultant
11h00	Why do we use oil spill models? Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Introduction to oil spill scenario Group activity 		<ul style="list-style-type: none"> Group activity
11h45	Modelling tools Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Discussion on modelling software (commercial, open source and research models) 	12h30	Example response modelling centres Mr Liam Harrington-Missin, IPIECA Consultant
12h00	Model setup (Live demo) Mr Liam Harrington-Missin & Mr Jonathan Griffiths, IPIECA Consultants		<ul style="list-style-type: none"> UK Maritime Coast Guard Agency (MCA) Oil Spill Response Ltd. (OSRL) National Oceanographic Atmospheric Administration (NOAA)
13h00	Lunch Break	13h00	Lunch Break
	Model Results	14h00	Tailoring the response modelling centre to fit regional needs Mr Liam Harrington-Missin, IPIECA Consultant
14h00	Analysing and communicating results Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Group activity 		<ul style="list-style-type: none"> Group activity
15h00	When do we update results? Mr Liam Harrington-Missin, IPIECA Consultant <ul style="list-style-type: none"> Trigger points for re-modelling (surveillance, metocean data update etc.) 	15h30	Coffee Break
15h30	Coffee Break	16h00	Closing Ceremony
	Preparedness Modelling		<ul style="list-style-type: none"> Host IPIECA
16h00	Modelling for planning Mr Jonathan Griffiths, IPIECA Consultant <ul style="list-style-type: none"> Modelling for Oil Spill Contingency Plans Modelling for Environmental Impact Assessment Modelling response techniques 		End of Day 2 and Workshop
	Closing Day 1		
16h30	Summary of day 1 and planning for day 2 Mr Liam Harrington-Missin, IPIECA Consultant		
	End of Day 1		

Annex 3 – List of Participants

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*National workshop on oil spill modelling
Abuja, Nigeria (25th-26th October 2016)*

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Annex 4 – Keynote address by Sir. Peter Idabor , Director General/Chief Executive of NOSDRA on behalf of Mrs. Amina J.Mohammed, Honourable Minister of Environment

I am delighted to welcome you all to the **National Workshop on Oil Spill Modelling** today, an event organised by the National Oil Spill Detection and Response Agency (NOSDRA), an Agency of the Federal Ministry of Environment, in collaboration with the Global Initiative for West, Central and Southern Africa (GI-WACAF).

The objective of this workshop is to exchange knowledge between facilitators and participants on the application of oil spill trajectory modeling in the rapid response to oil spill incidents in the marine environment in Nigeria, as a way of reducing or preventing the impact of oil spills on sensitive and vulnerable areas in the marine environment.

The devastating impacts of oil spills on the environment, health and livelihoods of our rural and urban communities have led to land degradation, loss of life, destruction of habitats, loss of biodiversity, incidence of diseases, poor sanitation as well as the depletion of national revenue base. The need to prevent and rapidly respond to oil spill incidents whenever they occur can therefore not be overemphasized.

The use of oil spill modelling techniques in predicting the direction of movement of spilled oil in the marine environment is quite a laudable innovation. Although it is difficult to accurately predict or simulate actual events, this tool presents a very valuable opportunity for both oil spill preparedness and response activities.

In Nigeria, there is a growing level of oil spill incidents caused majorly by the activities of illegal bunkering, artisanal refining, oil theft and armed militancy. These activities occur mostly in facilities located on land and swamp areas. However, some incidents do occur offshore, and with the increased interest of operators to pursue exploration and production in the deep offshore, there is the need for development of capacity to deal with the challenges that may be presented by oil spills in the marine environment. This workshop is therefore timely and a welcome development.

In addition to developing capacity to rapidly respond to oil spill incidents within the Nigerian environment, the Federal Government is committed to working with other stakeholders within the GI-WACAF framework to adequately prepare and rapidly respond to any eventual trans-boundary oil spill incident within the region, and also to offer support to any of the cooperating countries.

Ladies and gentlemen, as a demonstration of the commitment of this Administration to oil spill management in Nigeria, His Excellency President Muhammadu Buhari recently kick-started the implementation of the recommendations of the United Nations Environmental Programme (UNEP) Report on Ogoniland. This gesture will be extended to other parts of the Niger Delta region that have been devastated as a result of oil spillage, and indeed across the country to ensure protection and sustainable management of our environmental resources.

I wish to congratulate NOSDRA for its foresight and commitment to its statutory responsibilities by organizing this event. I also wish to appreciate GI-WACAF for working out a programme of

assistance to include this workshop in Nigeria. May I also appreciate other stakeholders who contributed in diverse ways to make this event a success.

Finally, I wish you all very fruitful discussions, and hope that your deliberations will contribute immensely to making our marine environment free from oil spills and environmental degradation.

Thank you for your attention.

Annex 5 – Opening remarks from Mr Idris O. Musa, NOSDRA Director on behalf of Sir. Peter Idabor, Director General/Chief Executive of NOSDRA

I have the great privilege to welcome you all to the 2016 GI WACAF National Workshop on Oil Spill Trajectory Modeling in Marine Environment in Nigeria. The Global Initiative for West and Central Africa (GI WACAF), was launched in 2006 as a partnership between the International Maritime Organization (IMO) and the International Petroleum Industry Environmental Conservation Association (IPIECA) with an objective to strengthen the oil spill response capability of the 22 member- countries. A key innovative feature of GI WACAF is the emphasis on the promotion of Industry/Government cooperation for effective oil spill response, making use of the existing industry expertise and resources. In this regard, the GI WACAF has organized a series of workshops, seminars and conferences. This year, we are proud to welcome you to the first of two projects conceived by the Agency as focal point for Nigeria. Apart from the oil spill trajectory modelling, the other project is the organization of a National Workshop on Civil Liability Convention (CLC) and International Convention for the Establishment of an International Fund for Compensation for oil Pollution Damage (Fund Convention). That workshop would hold in the first quarter of 2017 as the concluding part of our action plan for the 2015-2017 biennial project.

The lead Agency for oil spill response in Nigeria is the National Oil Spill Detection and Response Agency (NOSDRA), which was established by the NOSDRA Establishment Act No. 15 of October, 2006 by the Federal Government, in its bid to implement the National Oil Spill Contingency Plan (NOSCP) and constantly improve on monitoring the operations of oil companies to ensure compliance with international best oil-field practices. Coincidentally, both the GI WACAF and NOSDRA are ten years in existence.

At the 11th conference of parties of the convention for cooperation in the protection, management and development of the marine and coastal environment of the Atlantic coast of West, Central and Southern Africa region (Abidjan convention) held in March 2014, the Federal Republic of Nigeria won the bid to host the headquarters of the Regional Emergency Coordination Centre to combat marine pollution. This is part of the testimonial of our proactive nature in responding to environmental issues in the petroleum sector both at local and regional levels.

The Agency welcomes all our resource persons as well as our able participants to this very important workshop. I wish you a very fruitful deliberation.

Thank you for your attention.

Annex 6 – Closing remarks from Clément Chazot, GI WACAF Project Manager

Sir. Peter Idabor, Director General/Chief Executive, National Oil Spill Detection Agency,

Directors and staff of NOSDRA,

Other government officials,

Representatives of oil companies,

Workshop Participants,

We are approaching the end of our national workshop on oil spill modelling.

The activity gathered over 90 attendees from various backgrounds, may it be from oil companies, government officials at State and Federal Levels as well as local responders. Such diversity ensured dynamic exchange and discussions throughout the workshop, which started paving the way in defining the steps in setting up the Regional Co-ordination Centre (RCC) of the Abidjan Convention, as recommended by the 2015 Regional Conference in Accra, Ghana. Today, we are pleased to note that participants were provided with technical information which is essential to understand oil spill modelling, as well as discussed the necessary steps and requirements for the RCC through a collaborative approach. Whilst it was reiterated several times that oil spill modelling could not be used as the sole response tool and its proper use required specific trained personnel, hardware and funding, there was a general consensus on the benefit of using modelling as an integral element of any response operation.

A workshop report will be produced shortly after the workshop, and will reflect the knowledge shared by the consultants, as well as take into account the recommendations and questions from the participants.

On a personal note, it is with great pleasure for me to travel to Nigeria for this first exciting GI WACAF Activity as the new Project Manager. Joining the GI WACAF family in 2016 represents an incredible opportunity given that this year marks the 10th anniversary of this successful partnership between governments and industries, and please rest assured that both Mr Julien Favier, Project coordinator, and myself will continue to pursue the efforts undertaken up to present.

In concluding, I have the pleasure in conveying to all of you the very best wishes of the IMO Secretary-General, Mr. Kitack Lim, and Mr Brian Sullivan, Executive Director of IPIECA. Our heartfelt thanks go to Sir. Peter Idabor, Director General / Chief Executive, Mr Idris O Musa, other Directors and all staff of NOSDRA for hosting such an event, and the continuous efforts. Thank you also to group speakers who stepped up to present the content of the discussions of their respective working groups. We would like to thank the consultants for their energy and efforts into delivering this successful workshop. Finally, we would like to thank the participants for the commitments and active participation, without whom the meeting would not have been fruitful.

I thank you for your attention.

Annex 7 – Evaluation questionnaire

EVALUATION QUESTIONNAIRE

National workshop on Oil Spill Modelling

Abuja, Nigeria, 25-26th October 2016

Arrangements prior to the activity

- 1 Was the invitation received in good time? Yes No
- 2 Did you receive the information listed below about the event before your participation
- on its objective and scope Yes No
 - subject areas and programme Yes No
- 3 Were the instructions on the following clear and easy to understand?
- profile required of participant Yes No
 - completion and submission of the nomination form Yes No
- 4 Did you receive logistical information on
- venue Yes No
 - travel arrangements Yes No N/A
 - DSA payments Yes No N/A
 - accommodation Yes No N/A
- 5 If you were given any pre-event assignment, was it useful? Yes No N/A

During the activity

- 6 To cover the topics fully, was the event (*please check the appropriate box*)
(1) too long (2) just right (3) too short
- 7 How do you rate the event with regard to the following? (*tick one box in each case*)
- | | excellent | good | satisfactory | poor |
|------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Venue | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Facilities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- 8 How do you rate the following aspects of the materials? (*tick one box in each case*)
- | | excellent | good | satisfactory | poor |
|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Presentation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Clarity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Technical content | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Comprehensiveness | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Quantity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- 9 How would you rate the following aspects of the presentations? (*tick one box in each case*)
- | | excellent | good | satisfactory | poor |
|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Design and structure | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Clarity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Technical contents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comprehensiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10 How would you rate the use of the following? (tick one box in each case)

	excellent	good	satisfactory	poor
Course materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IMO reference materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other resource materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group and practical activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> N/A <input type="checkbox"/>
Field trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> N/A <input type="checkbox"/>

At the end of the activity

11 Please rate each lecturer with regard to the following (check one box in each case)

Name of lecturer excellent good satisfactory poor
(to be inserted)

.1 _____

content of lecture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
delivery of presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ability to transfer knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
effectiveness in:				
• answering questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• suggesting solutions to issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Name of lecturer excellent good satisfactory poor
(to be inserted)

.2 _____

content of lecture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
delivery of presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ability to transfer knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
effectiveness in:				
• answering questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• suggesting solutions to issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12 What topics were of most interest and relevance to you?

13 Are there any topics which should be added? Yes No
If yes, please list them:

-
- 14 Do you consider that the objective of the event was met? Yes No
- 15 Are you likely to use the information you gained on the course when you return to work? Yes No
- 16 Will you have the opportunity to transfer the knowledge gained to your colleagues at work? Yes No

Comments:

We greatly appreciate your time in completing this evaluation questionnaire. It contains important information that will assist IMO in determining the success and impact of the activity. Thank you.

Annex 8 – Example Spill Scenario

Section 1 - Contact Details				
Name of Person Notifying NOSDRA	Joe Bloggs			
Company/Organisation	Buster Oil			
Job Title	HSEQ Lead			
Direct Phone Number	Country code	+234	Number	22 123456
Mobile Number	Country code	+234	Number	22 235468
Fax Number	n/a			
Email Address	jbloggs@busteroil.com			
Date and Time of Notification	Date and Time	25-Oct-16, 12:00	Time Zone	UTC+1

Section 2 - Location	
Country/Region of Spill	Offshore Nigeria
Latitude of spill (north/south)	3°57'35"N
Longitude of spill (east/west)	7°52'36.5"E
Area Affected	<input checked="" type="checkbox"/> Offshore <input checked="" type="checkbox"/> Subsea <input type="checkbox"/> Shoreline <input type="checkbox"/> Estuary <input type="checkbox"/> Port <input type="checkbox"/> Harbour <input type="checkbox"/> Inland <input type="checkbox"/> River
Water Depth (if applicable)	92 metres

Section 3 – Spill Details			
Date and Time of Spill	25 th October 16, 08:00	Time Zone	UTC+1
Source of Spill	Well 1X		
Cause of Spill	Loss of well control		
Status of Spill	<input type="checkbox"/> Secured <input checked="" type="checkbox"/> Uncontrolled <input type="checkbox"/> Unknown		
Product Properties	Product Name/Type	Bonny Light	
	Specific Gravity/API	47.4	
	Pour Point	- 36°C	
	Wax Content	4.2 %	
	Asphaltene	0.1 %	
Viscosity			
Release Rate	~100,000 bbls/day		
Release Type	<input type="checkbox"/> Instantaneous <input checked="" type="checkbox"/> Continuous		
Description of Observed Spill	Estimated Quantity	Unknown	
	Size	Significant surface oiling	
	Appearance		
	Direction of Travel	Eastwards	

Section 4 – Weather and Modelling			
Weather forecast provided?	No please source		
Sea Temperature	25°C		
Sea State	Calm		
Visibility	Good		
Do you require 3D Modelling?	Not at this time		
Sub-surface 3D Modelling Information (If requested)	Gas to Oil Ratio		Release Hole Diameter

Annex 9- Photographs



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