

**A Revised Proposal for Establishment of Africa Centre of Excellence:  
Centre for Oilfield Chemicals Research (CEFOR)**

**By**

**University of Port Harcourt  
Port Harcourt, Nigeria**

**Submitted to**

**World Bank,  
Africa Region**

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**May, 2014**

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## **Executive Summary**

Oil drilling, well completion and production enhancement require the use of several chemicals known as **oilfield chemicals**. Most of the chemicals currently being used in Nigeria and other African countries where oil has been discovered are imported. The raw materials for these chemicals are available locally in large quantities and could be sourced, processed for use in oilfield operations. Despite huge investments made by the Federal Government of Nigeria in the oil and gas sector of the economy, an average of US\$10 billion per annum, its contribution to GDP growth had been very minimal. This is largely due to low research efforts in raw material development in-country. The abandonment of research in this area has robbed the nation of enormous opportunities to create jobs, generate new knowledge and develop skills. The International Oil Companies (IOCs) ignore Nigerian universities and rely on research centres in their home countries. This is an avoidable export of jobs and encourages capital flight from the country for oil and gas research activities. The aspiration of the Federal Government of Nigeria is to increase indigenous participation in the oil and gas industry, build local capacity, create linkages to other sectors of the national economy and thereby boost industry contributions to the growth of our National Gross Domestic Product. One of the ways of actualizing this dream will be to encourage and fund in-country researchers and universities on local raw material development. This will be a win-win for the Universities, the oil industry and the Country. Moreover, many African countries have now discovered oil and collaborative research efforts among the Universities in the continent will enhance capacity building, provide platform for quality training and applied research to address these regional challenges and promote specialization among participating universities. The University of Port Harcourt, through her strategic research plan and as a leading Centre of Excellence in petroleum studies, has cream of experts and renowned researchers to address this need of in-country oilfield chemicals research and development. We need sponsorship to make this happen. **A total of US \$7.5 million** is being solicited from the World Bank for the establishment of African Centre of Excellence in Oilfield Chemicals Research.

## SECTION 1: BASIC INSTITUTIONAL AND PROPOSAL INFORMATION

Originating Institution(s): **University of Port Harcourt, Port Harcourt, Nigeria**  
 Centre of Excellence Name (and acronym): **Centre for Oilfield Chemicals Research (CEFOR)**  
 Total Amount Requested (US\$): **Seven Million, Five Hundred Thousand Dollars (US \$7,500,000)**  
 Co-Financing from other sources both cash and in-kind contributions (including core funding) (US\$): **Estimated value of 7.0 Million, made up of TOTAL E&P Nigeria Ltd sponsorship and infrastructure development, land acquisition and Budgetary Allocation from UNIPORT and internally generated revenue (Short Courses & Training).**  
 Main Departments involved in the Center: **Institute of Petroleum Studies (IPS), Petroleum and Gas Engineering, Chemical Engineering, Industrial Chemistry, Mathematics/Statistics, Computer Science and Foreign Languages and Literature.**

### *Contact Details*

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Basic Institutional Information (this institutional data should include data from the last 5 years):

Main Departments participating in the center of excellence

<i>Name of Department</i>	<i>No. of Faculty (Full time equivalent)</i>	<i>Non-National</i>	<i>Faculty Qualifications</i>			<i>No. of Students</i>		
			<i>PhD (% of total)</i>	<i>Master (% of total)</i>	<i>Bachelor and below (% of total)</i>	<i>Total (2012 PG)</i>	<i>Female (% of total)</i>	<i>Non-national (% of total)</i>
Pet. & Gas Engineering	20	NIL	45	55	-	40	20	-
Chemical Engineering	18	NIL	55	45	-	30	15	-
IPS	50	8	60	40	-	50	22	4
Mathematics/Statistics	21	NIL	60	40	-	18	30	-
Computer Science	20	NIL	65	35	-	20	50	-
Foreign Language & Literature	18	NIL	40	60	-	22	60	-

## KEY PERSONS FOR THE PROPOSED CENTRE OF EXCELLENCE

### Research Teams, Leaders and Focus Areas

S/No	Research Team	Team Leader	Research Focus Area
1	Production	Professor J.A. Ajenka	Oilfield Chemicals in Flow Assurance Study
2	Reservoir	Professor M.O. Onyekonwu	Oilfield Chemicals in Enhanced Oil Recovery Study
3	Drilling/Cementing	Professor O.F. Joel	Oilfield Chemicals in Drilling/Completion Study
4	Industrial Chemistry	Professor O. Akaranta	Oilfield Chemicals Formulation/Raw Materials Substitution Study
5	Petrochemicals	Professor G. Igwe	Petrochemicals in Oilfield Chemicals Production Study
6	Bio-Fuels	Professor B.E. Okoli	Biofuels in Oilfield Chemicals Production Study
7	Environment	Professor I. L. Nwagozie	Eco-toxicity effects of Oilfield Chemicals Study
8	HOD and Team	Chemical Engineering	Reaction Kinetics of Oilfield Chemicals Study
9	HOD and Team	Petroleum and Gas Engineering	Field Applications of Oilfield Chemicals
10	Sub-surface Reactions of Oilfield Chemicals	Professor A. Dosumu	Modeling/Software Development
11	University-Industry Partnerships/ Collaborations	DVC (R&D)	Patenting/Commercialization of Research Outputs
12	Team Leader of Partner Institution	Professor K.A. Kassegne	University of Lome
13	Team Leader of Partner Institution	Professor A.E. Assogbadjo	Univ. of Abomey-Calavi, Benin Republic.
14	Team Leader of Partner Institution	HOD Petroleum Engineering	University of Mines and Technology, Tarkwa, Ghana.
15	Team Leader of Partner Institution	Professor S. Iyuke	University of the Witwatersrand, Johannesburg

## **SECTION 2. SWOT ANALYSIS OF THE PROPOSAL**

Establishment of African Centre of Excellence in Oil Field Chemicals Research and Development, will enhance capacity building, provide platform for quality training and applied research and promote regional integration of participating Institutions for economic growth.

However, there had been challenges facing utilization of local raw materials and effective implementation of efficient research collaborations in most African Countries where Oil Industries operate. The challenges include:

### **a) Lack of synergy between the academia and the industry**

For effective local content drive that will make for home based technology, the industry and academia must come together and decide on the way forward on research efforts. The present situation where there is lack of synergy between the universities and industry is a big set back towards fulfilling research and development efforts in oil field chemicals.

### **b) Lack of funding for research and development**

No meaningful technological breakthrough can be realized without financial commitment to research and development. The funding of research and development is not given adequate attention by the government and other stakeholders in most African countries. Our laboratories and research centers have ceased to function and this has affected development of chemical products in-country.

### **c) Poor quality products by local manufacturers**

The oil industry is a high risk venture. The use of sub-standard products poses a big problem in oil drilling and completion operations. Most of the locally made materials have poor quality and are inconsistent in performance. There is poor quality control/quality assurance (QC/QA) efforts resulting in poor performance of chemical products. This creates doubt on the ability of the local products to compete with imported ones. Most IOCs that work in African countries have poor perception of locally made materials in the countries they operate. To restore confidence in the mind of the operators, stringent QA/QC efforts and efficient production processes must be put in place to address these concerns.

### **d) Poor communication network on progress**

Individual researchers in various locations, scratching the surface in personally-funded research projects appear to be the norm. This type of research which lacks co-ordination and wide publicity can hardly lead to meaningful development and progress. The starting point of the local content policy drive with respect to oil field chemicals research and development in African Countries will be to encourage and fund in-country researchers and manufacturers on local raw material development. This will be a win-win for the researchers and the oil industry, and definitely create multiplier effect. Working with local producers and universities in oil field chemicals research in partnership with industries to enhance their research capabilities and establish efficient QA/QC system using International Best Practices will help them produce high quality products. Liaising with experts in some African Universities and using research institutes to undertake collaborative research works that will provide holistic answers to drilling, cementing, production and enhanced oil recovery operations will address these regional challenges and promote economic growth among participating institutions and in turn impact on the nations economy

## Strengths, Weakness and Opportunities

<b>Strengths</b>	
<ul style="list-style-type: none"> <li>• Location of the University in the oil rich Niger Delta region of Nigeria creates a wide range opportunities.</li> <li>• Strong University-Industry synergy</li> <li>• Strong collaboration with international universities</li> <li>• Commitment of the University Administration.</li> <li>• Good relationship with the host communities.</li> <li>• Quality of academic and support staff.</li> <li>• Enthusiasm of Alumni Association.</li> <li>• A befitting University Library.</li> </ul>	
<b>Weaknesses</b>	<b>Mitigation Measures</b>
<ul style="list-style-type: none"> <li>• Declining public funding.</li> <li>• Inadequate infrastructure.</li> <li>• Uncontrolled growth in students enrolment.</li> <li>• Lack of maintenance culture.</li> </ul>	<ul style="list-style-type: none"> <li>• Sourcing other internally and/or externally generated revenue will reduce the vulnerability. All centres at IPS are self-sustaining in terms of funding.</li> <li>• TOTAL/NNPC JV interventions in IPS have provided adequate infrastructure for quality learning, teaching and research at the institute.</li> <li>• All Centres in IPS have an upper limit of 25 students per class at the masters level to control growth in enrolment.</li> <li>• Due to the strong university-industry partnership in running IPS, industry maintenance culture is practised at the institute.</li> </ul>

<b>Opportunities</b>	
<ul style="list-style-type: none"> <li>• Strategic location <ul style="list-style-type: none"> <li>▪ Support from corporations, private individuals in forms of endowment, internship placement for staff and students.</li> <li>▪ Job placement opportunities for graduates.</li> <li>▪ Captive market for products of revenue generating units.</li> <li>▪ Town and Gown to meet.</li> <li>▪ University-industry partnerships.</li> <li>▪ Easy local and international travel.</li> <li>▪ Access to a pool of external experts for the development of the University.</li> </ul> </li> <li>• Collaborative Applied Research.</li> <li>• Access to industry/private laboratories.</li> </ul>	
<b>Threats</b>	<b>Mitigation Measures</b>
<ul style="list-style-type: none"> <li>• Declining quality of academic standards.</li> <li>• Epileptic power supply.</li> <li>• Brain drain.</li> <li>• Instability occasioned by labour unrest and student agitations.</li> <li>• Uncompetitive remuneration and low incentive.</li> <li>• Lack of adequate research facilities.</li> <li>• Limited staff development.</li> </ul>	<ul style="list-style-type: none"> <li>• Putting an upper limit of 25 students per class and using quality faculties from across the globe have helped to reduce the vulnerability.</li> <li>• Using automatic change over electricity generating sets as standby.</li> <li>• Engaging Nigerians in diaspora in brain circulation as a mitigation measure.</li> <li>• Labour unrest and student agitations do not affect university-industry collaborative programmes in the University.</li> <li>• Faculties of CEFOR will be given non-monetary incentives for maximum outputs.</li> <li>• Funding the establishment of CEFOR by World Bank will help in upgrading the facilities for oilfield chemicals research.</li> <li>• CEFOR will encourage staff capacity building for quality education and research outputs.</li> </ul>



### **SECTION 3. DEVELOPMENT CHALLENGE AND CENTRE OF EXCELLENCE OBJECTIVES**

Promotion of “Home Grown/Regional Research” will help in rapid development of human capital in Africa. At present there is minimal on-going research in Nigerian oil and gas industry and other African countries where oil has been discovered primarily due to the following:

- Insufficient Research Personnel
- Lack of Research Facilities
- Poor Research Management
- Lack of synergy between the universities and industry
- Acute competition for good academic staff considering the growing number of universities in Nigeria in particular and Africa in general and the impact of brain drain.

Most of the chemicals currently being used in Nigeria and other African countries where oil has been discovered are imported. The raw materials for these chemicals are available locally in large quantities and could be sourced, processed for use in oil field operations. At the moment there is no higher institution in the Gulf of Guinea capable of producing researchers competent to develop oil field chemicals in-country. The abandonment of research in this area has robbed the African nations, where oil is being produced, of enormous opportunities to create jobs, generate new knowledge and develop skills. The IOCs ignored African research institutes/ universities and rely on research Centres in their home countries. This is an avoidable export of jobs and encourages capital flight from the countries. With the discovery of oil and gas in many African countries, there is great need for human capital and applied research development among the locals in oil field chemicals research and development. Therefore, collaborative research efforts among the Universities in Africa will go a long way to enhance capacity building, provide platform for quality training and applied research to address these regional challenges and promote economic growth among participating institutions and in turn impact on the nation’s economy.

The University of Port Harcourt Strategic plan to establish a Centre of excellence in **Oil Field Chemicals Research and Development is in line with** “The Nigerian Content Act aspiration”, which came into effect in 2010. The board has commenced operations to realise the aspiration of the Federal Government of Nigeria to increase indigenous participation in the oil and gas industry, build local capacity, create linkages to other sectors of the national economy and boost industry contributions to the growth of our National Gross Domestic Product. The University of Port Harcourt through her strategic research plan and as a leading Centre of Excellence in Petroleum Studies, have cream of Experts and Renowned Researchers in **Oil field Chemicals and Development** to address this need

#### **OBJECTIVES OF THE PROPOSED CENTRE FOR OIL FIELD CHEMICALS**

- To apply global best practices in oil field chemicals research and development.
- Increase the capabilities of faculties and students in the sub-region to engage in applied research through quality education, knowledge transfer and internship programmes
- To supervise oil field chemicals research projects of the graduate students in petroleum Engineering, industrial chemistry, chemical engineering, and related disciplines.

- To serve as a centre for post doctorate fellowship and for oil field chemicals related research.
- To bridge the gap in research training programmes of the Institute of Petroleum Studies, University of Port Harcourt, as a training hub for oil and gas industry workforce in the Gulf of Guinea.
- To run short courses for industry staff on the characteristics and applications of oil field chemicals.
- To carry out consultancy services for local oil field chemicals producers.
- To ensure quality of locally produced oil field chemicals by bench marking locally available raw materials.
- To carry out research for the conversion of agro-wastes to value-added products for oil fields operations.

This Centre will be domiciled in the Institute of Petroleum Studies(IPS).The Institute of Petroleum Studies is an international Post Graduate institution established through a collaboration between Ecole du Petrole et des Moteurs (IFP School) France and the University of Port Harcourt Nigeria in the year 2003. IFP School on its own part is in international collaboration and partnership with world renowned universities spread across the globe. These universities include The Imperial College of Science & Technology, London (UK); Colorado School of Mines (USA); McGill University (Canada); Technical University, Delft (The Netherlands) and Universite Gubkin (Russia).

The University of Port Harcourt is also in international collaboration with leading universities in Africa, United States of America and Canada. These collaborations have brought together different cultures, academic programmes and technology applications. Some of the collaborations have resulted in curricula reviews and industrial involvement in the university's doctoral programmes.

**SECCION 4**

**RESULTS OF THE CENTER OF EXCELLENCE**

<b>Objective</b>	<b>Indicator</b>	<b>Baseline (2012)</b>	<b>Baseline (2013)</b>	<b>Annual Targets (2014)</b>	<b>Annual Targets (2015)</b>	<b>Annual Targets (2016)</b>	<b>Annual Targets (2017)</b>
1. Strengthen Education Capacity excellence – quality and productivity	No. of new students in ACE courses (30% must be regional students):						
	• New PhD students	3	7	40	50	60	70
	• New Master students.	20	22	100	150	180	200
	• New short term (min. 40 hours)	200	200	300	550	800	1000
	• No of regional students.	1	3	42	61	73	82
2. Strengthen Education Capacity & Development Impact.	No. of Students and/faculty with at least 1 month internship in a private sector company or a local institutions relevant to their field/sector	20	22	100	150	180	200

	No. of internationally accredited education programs including sub-regional accreditation.	1	2	3	3	3	3
3. Strengthen Research Capacity excellence – quality and productivity	Increase of internationally recognized research publications in disciplines supported by the ACE-Program	20	30	8	18	30	44
4. Strengthen education and research capacity (through increased financial sustainability and demonstration of value to students and partners.	Amounts of externally generated revenue by the ACE.	\$330,000	\$250,000	\$563,800	\$913,800	\$1,313,800	\$1,713,800

As at 2013, IPS has graduated 197 Masters Students in Petroleum Engineering and Project Management with 35(18%) being female and 104 Post Graduate Diploma Students in Petroleum Technology, with 11(11%) being female. Most of these graduates are employed by International Oil Companies like Baker Hughes, Halliburton Energy Services, Shell Petroleum Development Company (SPDC), Trans Ocean Oil, Nigerian National Petroleum Company (NNPC), Statoil Norway, Chevron Nigeria Ltd, Exxon Mobil, Schlumberger and TOTAL E&P Nigeria. Some of these employees of the International Oil Companies now participate in teaching and research activities of the Institute of Petroleum Studies, thereby bringing industry best practices to the academic institutions. This type of university-industry interactions leads to cross-fertilization of ideas that bring solutions to development challenges.

## **SECTION 5: ACE ACTION PLANS FOR EACH CORE ACTIVITY**

### **5.1 Learning excellence**

The Institute offers a conducive learning environment, full Internet access and virtual library. Students use industry software, and undertake numerous field visits. The Institute was established in 2003 at the University of Port Harcourt as a sustainable development, joint venture of Total Exploration and Production Nigeria Limited and the Nigerian National Petroleum Corporation. University of Port Harcourt and the IFP School France are the collaborating Institutions with the responsibility of producing world class manpower, grown locally, that are industry-ready on graduation.

The Institute started with the M.Sc. in Petroleum Engineering, which ran for five years; 2003-2008 before the inclusion of the Post Graduate Diploma in Petroleum Technology in 2009. At present, the Institute has a total of five centres. The courses are delivered in a modular pattern and examinations are held weekly. The teaching responsibility is shared between Uniport (40%), IFP School France (40%), and Industry (20%). In addition to the M.Sc. programmes, the Institute now runs a PhD programme in Petroleum Engineering. The PhD programme is usually sponsored and research oriented with a view to proffering solutions to industry problems. The Institute also runs short courses for active industry personnel in line with capacity building for sustainable development. There is major expansion to accommodate extra class rooms, laboratories and auditorium. In line with IPS mission, the Centre is poised to contribute to corporate success and sustainable development through the following four core activities:

- Graduate training;
- Continuing professional education;
- Applied research; and
- Capacity building

Some of the benefits to Oil & Gas Companies include:

- Cost effective training;
- Recruitment of operations-ready graduates.
- Competent and highly productive workforce; and
- Cost efficiency in operations.

The ACE Action Plan to achieve Learning Excellence shall contribute to admission and subsequent graduation of 57 PhD candidates within six years (with 30% being regional students),

107 masters students (with 32% being regional students) and 1,150 short term non degree trainees comprising, mostly, of industry professionals (out of which at least 30% shall be regional trainees). This Action plan is in line with the mission of IPS.

- Academic programmes in IPS shall be fortified at the master's and doctorate levels through academic and industry partnerships involving teaching and learning with multimedia learning/teaching aids. International students and scholars shall be attracted through students and staff exchange programmes. A major outcome of the CEFOR would be to position the University of Port Harcourt and the partnering institutions for the attainment of ISO certification, thereby making them more competitive in the comity of global centres of excellence in teaching, learning, research and training.

## 5.2 Research excellence

The Centre will be domiciled in the Institute of Petroleum Studies and has

- A building to house the Centre
- Library with relevant books and journals
- Teaching aids – multimedia projectors/electronic manuals.
- Petroleum software .Some were developed by IPS as products of applied research and some acquired by IPS.

There are also

- Workstations and computers
- Accommodation for visiting Lecturers/Researchers
- Laboratories facilities that need to be equipped
- Internet Facilities
- Experts on oil field chemicals drawn from the University and Industries. .

There is major expansion of the IPS infrastructure to include laboratories to undertake research projects in:

- Reservoir Engineering
  - Production Engineering
  - Drilling Engineering
  - Gas Engineering and Utilization
- with a focus in development of **oil field chemicals using local raw materials.**

Students and lecturers are motivated to write books, develop softwares and publish in highly ranked journals.

We have collaborations with many Universities in Africa and presently provide mentorship and supervision to young lectures and PhD students respectively for University of Mines and Technology, Tarkwa,Ghana.

In line with the expectations of African Centre of Excellence, the following benefits among others will be actualized.

- Provide excellent opportunities for the academia to demonstrate their research capabilities to industry and potential international partners and donor agencies.

- Provide opportunities for researchers to share their knowledge and expertise and propose new projects and future collaborations.
- Provide platform for future networking among universities, researchers and industry.
- Facilitate the diffusion of research and development output into the national economy and help develop human capital.
- Provide avenues for attracting support from the organized private sector of international agencies for on-going development - oriented researchers.
- Will help strengthen research capabilities and eventually turn intellectual capital into financial capital.

**Benefits to the Host Communities and Society:**

- Conversion of agro-wastes to value-added products for oil and gas production and processing.
- Earn some revenue from sales of agro-wastes.
- Utilization of bio-gas from agro-wastes for fish drying and “garri” frying. Garri is a local foodstuff produced from cassava tubers.
- The use of bio-gas will reduce the harvesting of mangrove trees usually used as fuels in the Niger Delta region, thereby enhancing environmental sustainability.
- Creation of employment and human capacity among the locals

The Action Plan for Research Excellence shall contribute towards achievement at least, 220 internationally recognized relevant papers published in higher impact journals (with at least 66 being regional contribution). This Action Plan is in line with the mission of IPS, “to meet the needs of the petroleum industry through a commitment to excellence in training, applied research, continuing education and capacity building”

Key requirements for achieving this action plan include upgrading of existing laboratories, equipping the newly built ones for improved research quality and outputs. Hence, we shall purchase laboratory equipment aimed at ensuring the reproducibility of research results. Also, staff development shall be given a boost through support for faculties to attend national and international specialized short-term trainings, workshops, conferences and symposia. Similarly students shall be trained to produce industry operations ready workforce and researchers that shall proffer solutions to industry operations challenges.

Faculties yet, to have their doctorate degrees shall be, partially or fully supported to acquire their PhD degrees for increased research capacity, through joint supervision of research by supervisors from collaborating partners, industry and academia. Joint split-site graduate programmes shall be supported to broaden the research horizon of graduates of the CEFOR postgraduate programmes. The PhD and Master’s programmes shall be enriched through existing industry-oriented training and research experiences to balance their theoretical background with real life practical solutions for efficient running of the industry.

### 5.3 EQUITY DIMENSIONS

The programmes in the Institute are tailored to meet the multidisciplinary nature of the subject and its current demands for best practices in the industry. With oil discovery in Ghana, Equatorial Guinea, Sao Tome, etc the Centre strategic plan is to be the Petroleum industry training and research hub for manpower in the Gulf of Guinea.

We have a multidisciplinary pool of consultants and experts in Nigeria and abroad who have many years of experience in oilfield operations, research and consultancy. With such a high caliber expertise, we can deliver professional and high quality service to industry through applied research and continuing education programmes.

The teaching responsibility is shared between Uniport (40%), IFP School France (40%), and Industry (20%).

IPS is in partnership with the following organizations

- Nigerian Institute of Management (NIM)
- Nigerian Environmental Society (NES)
- Society of Petroleum Engineers (SPE)
- National Registry of Environmental Practitioners (NREP)
- Nigerian National Petroleum Corporation (NNPC)
- Pollution Control & Environmental Management (POCEMA) Consultants
- Nigerian Society of Engineers (NSE)
- International Well Control Forum (IWCF)
- Nigeria Institute of Safety Professionals (NISPP)
- Emerald Energy Resources Limited
- Energy Information Services (EIS)
- Society for Underwater Technology (SUT)

This collaboration has contributed to effective mentorship and supervision of students, capacity building and production of industry-ready graduates. Establishment of the Centre of Oilfield chemicals research using the existing platform will help develop researchers to produce oilfield chemicals from local materials in the countries where oil has been discovered in Africa.

- The Action Plan regarding Equity Dimensions shall contribute towards
- Increased number of new students on the programmes, scientists and students exchange, and increased visibility of faculties, partner universities, and organizations.
- During the project concept development, partner institutions were able to identify their areas of contribution towards the successful implementation of the project with suggestions on the specific kinds of equipment and facilities they would need.
- Collaborating partners will be encouraged to ensure joint concept development and participation by a wide range of institutions in the sub-region.
- Thus, as CEFOR comes on board, efforts shall be made to involve more and more subject matter specialists from other countries in the sub-region to ensure that, as much as possible, more countries in the sub-region are represented in the teaching and research programmes of the centre, to make it truly regional.
- Faculties and students from the alternative institution shall be supported to attend on-the-spot training to build their capacity and facilitate the spread of the skills for efficient operations of the oil and gas industry within the sub-region and beyond.



## 5.4 ATTRACTING REGIONAL STUDENTS AND FACULTY

The mission of the Institute is to meet the needs of the petroleum industry through training, mentorship, supervision, applied research, continuing education and capacity building. The Centre also aims to serve as the facilitator of the Nigerian Local Content Initiative and propagate the culture of excellence in sustained learning, leadership, internationalism and research hub for research fellows in **Oil field Chemicals** in the Gulf of Guinea.

To attract Regional and oversea faculties, we have contacted Nigerians in Diaspora with higher degrees and professional experience to be appointed as Visiting lecturers and PhD Supervisors. The response was overwhelming. We also conducted a Road show to companies to highlight our activities. We also advertise in the internet and International Magazine to attract students from other African countries. In the current session of 2013/2014 we admitted three students from **Uganda** that will be sponsored by TOTAL E & P Nig. Ltd. This will enhance capacity building, provide platform for quality training and applied research to address the regional challenges in the countries where oil has been discovered in Africa.

Institute of Petroleum Studies have therefore envisaged a strategic plan as shown below

Sectors	Centres of Excellence	Post Graduate Programmes
Upstream	Petroleum Geosciences(Sponsor: MacArthur)	<ul style="list-style-type: none"> <li>■ M.Sc. in Petroleum Geosciences</li> </ul>
	Oil & Gas Technology (Sponsor: NNPC/TEPNG JV)	<ul style="list-style-type: none"> <li>■ M.Sc. in Pet. Engineering &amp; Project Development</li> <li>■ PGD in Petroleum Technology</li> </ul>
	Research & Advanced Studies (Sponsors: Industry Partners)	<ul style="list-style-type: none"> <li>■ PhD in Pet. Engineering &amp; Project Development</li> </ul>
	<b>Proposed Centre in Oil Field Chemicals (Being requested for Sponsorship)</b>	<ul style="list-style-type: none"> <li>■ As a support Centre to PhD Students/Research Fellows in IPS, Petroleum and Gas Eng., Chemical Eng, Industrial Chemistry, collaborating African Universities and Industry Partners for the purpose of carrying out research in all aspects of oil field Chemicals.</li> </ul>
	Offshore Technology (Sponsor: Global Marine Ltd)	<ul style="list-style-type: none"> <li>■ M.Sc. in Offshore Engineering</li> <li>■ M.Sc. in Pipeline Engineering</li> </ul>
Downstream	Gas, Refining & Petrochemicals	<ul style="list-style-type: none"> <li>■ M.Sc. in Petroleum Refining &amp; Petrochemical Engineering</li> </ul>
Corporate	Petroleum Economics, Policy & Strategic Studies (Sponsor: Emerald Energy Resources Ltd)	<ul style="list-style-type: none"> <li>■ M.Sc. in Petroleum Economics, Policy &amp; Strategy</li> <li>■ M.Sc. in Energy Management &amp; Policy</li> </ul>
HSE	Occupational Health, Safety & Environment (HSE School). (Sponsor: Part sponsorship by Fugro Nig.Ltd)	<ul style="list-style-type: none"> <li>■ M.Sc. in Environmental Technology &amp; Management</li> <li>■ M.Sc. in Occupational Health &amp; Safety</li> </ul>
	Information & Comm. Technology	ICT Systems & Software Engineering
	Continuing Education (Sponsor: The Institute of Petroleum Studies as source of revenue to support the Centre.	<ul style="list-style-type: none"> <li>■ Short Courses</li> <li>■ Workshop and seminars</li> <li>■ Professional Certification</li> </ul>

The Action Plan shall contribute towards increase of new students with about 30% being regional students, high number of students and faculties who are placed on a one month internship in any of our several partnering companies or local institutions relevant to the areas of interests of the interns. A key activity for attracting regional faculty shall be by providing internationally, competitive working environment to encourage scholarship such as provision of office and laboratory space conducive for work, attract grants and facilitate attraction of competitive and prestigious fellowships to CEFOR. Furthermore, CEFOR shall show increased online presence by enlisting the benefits of using social media tools for promoting the activities of the ACE, while ensuring cost-effective collaboration amongst faculties and students. Similarly, publishing the works of CEFOR in high impact journals, by building on existing international reputation of project team members, shall increase the visibility of the ACE, improve its reputation and thus, attract reputable regional faculties and students who shall be availed of the unique learning and research environments provided by CEFOR.

To support our Francophone and Anglophone colleagues who shall need interpretation and other short term language training to enable them work effectively, the University has a well-established Department of Foreign Languages and Literature with the teaching of French and English Languages as core courses and even as certificate programmes. Thus, staff from the department, who shall be on the project, would provide such interpretation services for visiting scholars and students to prevent undue lapses in project delivery period. Such services shall be provided to colleagues from Anglophone partners visiting Francophone partnering institutions for research project activities.

## **5.5 REGIONAL AND NATIONAL ACADEMIC PARTNERS**

The Institute (IPS) is an international post graduate institution with international collaboration & partnership with world renowned universities spread across the globe. These collaborations have brought together different cultures, academic programmes and technology applications. In addition we have Supervisors from other Nigerian Universities, and Nigerian experts in diaspora as well as from the oil and gas industry. This attests to internationalization of higher education at home.

### **Academic Institutions in the partnership**

- IFP School, France has an existing partnership with the University of Port Harcourt. It teaches 40% of the courses and award joint M.Sc. degree in Petroleum Engineering and Project Management with the University of Port Harcourt.

#### **The first of its kind in Nigeria by an European Higher Education Institution.**

- University of Mines and Technology, Tarkwa, Ghana has an existing MOU with the University. Having established a new department in Petroleum Engineering, it sends students and Lecturers to University of Port-Harcourt for mentorship and participate in collaborative research. In 2011 (75 students), 2012 (55 students) and 2013 (45 students) participated in the Institutes' annual six (6) weeks lectures/field trips at the university of Port Harcourt.

- University of Witwatersrand, Johannesburg (Wits), South Africa, has an existing MOU with the University). Started a new post graduate studies programme in Petroleum Engineering and requested University of Port Harcourt to help teach, supervise and mentor their lecturers and students.
- University of Abomey-Calavi, Benin Republic Existing MOU and letter of support
- University of Lome, Togo has given a letter of support for the African Centre of Excellence in Oil Field Chemical Research.
- The University is hosting the African Virtual University (AVU) in Nigeria. It is also a member of African Network for Internationalization of Education (ANIE), and West African Research and Innovation Management Association (WARIMA).
- Collaborative research efforts among the Universities will enhance capacity building, provide platform for quality training and applied research to address these regional challenges in oil field chemicals research and development.

## 5.6 REGIONAL AND NATIONAL SECTOR PARTNERS

The drive of the Nigerian Content vision is to transform the oil and gas industry into the economic engine for job creation and national growth by developing in-country capacity and indigenous capabilities. In order to enhance our research capabilities in oil field chemicals, the Institute has solicited from Nigerian Content Development and Monitoring Board (NCDMB) for the establishment of a **Professorial Chair in Oil Field Chemicals Research and Development from Local raw materials**.

This Chair when established will help to:

- Co-ordinate the research efforts of the local players in oil field chemicals
- Provide efficient QA/QC services to ensure that the locally made chemicals meet minimum specifications in line with IOCs expectations and results are reproducible.
- Offer Research Advisory roles to the local field chemicals manufacturers to ensure they adopt Global Best Practices in product development
- Act as liaison to the different stakeholders (IOCs, government, local researchers and manufacturers)
- Create sustainability by constantly researching on new products to meet up with new emerging technology in oil field chemical requirements.

### Industry Partners

- Total E & P Nig. Ltd (TEPNG) has an existing relationship with the University. It provides industry trainers, sponsors students and participates in field projects.
- Shell Petroleum Development Company (SPDC), Nigeria has existing relationship with the University. Has established Professorial Chair in Petroleum Engineering and provides industry trainers and participate in field projects.
- Schlumberger, Nigeria has an existing relationship with University. It provides the University with industry trainers and software
- FUGRO Nig. Ltd provides industry trainers in Health Safety and Environment (HSE) and has endowed a professional Chair in Environmental Management at the university.

To attract regional and national, as well as international partners, deliberate efforts shall be made to continue to diversify the human and physical base of the CEFOR to ensure that, as much as possible, persons from institutions in the sub-region are recruited.

Such persons may come from academic institutions and research organizations or private oil and gas companies with interest in oilfield chemicals. Already, the University has established some relationships in line with this action plan in order to fulfill one of the internationalization requirements for achieving Institutional ISO Certification. The University has MoU with the Songhai Farm in Porto Novo, Benin which is a centre of excellence with global best practices in place.

Specifically, the University has MoUs with:

- National Research Institute for Chemical Technology (NARICT), Zaria.
- National Office for Technology Acquisition and Promotion (NOTAP), Abuja.
- Petroleum Technology Development Fund (PTDF), Abuja.
- Tertiary Education Trust Fund (TETFund), Abuja.
- Federal Ministry of Education(FMOE)
- Federal Ministry of Petroleum Resources(FMPR)
- National Universities Commission (NUC)
- Nigeria National Petroleum Corporation (NNPC) (R&D)
- Nigeria Content Development & Monitoring Board (NCDMB)

## **5.7 INTERNATIONAL PARTNERS**

The Institute is an international post graduate institution with international collaboration & partnership with world renowned universities spread across the globe. These universities include; The Imperial College of Science & Technology, London (UK); Colorado School of Mines (USA); McGill University (Canada); Technical University, Delft (The Netherlands) and Universite Gubkin (Russia). The University of Port Harcourt is also in international collaboration with leading universities in South Africa, Ghana, United States of America and Canada. These collaborations have brought together different cultures, academic programmes and technology applications. In addition we have Supervisors from other Nigerian Universities, and Nigerian experts in diaspora as well as from the oil and gas industry. This attests to internationalization of higher education at home.

The University of Port Harcourt is also in international collaboration with leading universities in Benin Republic, Togo (Francophone), South Africa, Ghana, United States of America and Canada. These collaborations have brought together different cultures, academic programmes and technology applications. Many of the International Oil Industries (IOCs) are contacted to sponsor research and are members of our research advisory Board.

Some of the existing relationships include being a member of WARIMA, which was set up with the objective, “To strengthen research management activities in Higher Education Institutions (HEIs)” in the sub-region. In addition to that, the university subscribes to Research Africa based in Cape Town, South Africa and is a member of UN Sustainable Development Solutions Network (UNSDSN). An application is being processed for the institution to become accepted as a Regional Centre of Experts (RCE) in oil and gas exploration and production and related

activities which include, environmental sustainability through bioremediation of polluted/degraded sites. RCE is a project of the United Nations University.

## **5.8 MANAGEMENT AND GOVERNANCE**

This Action Plan shall contribute in the areas of prudent fiduciary management, centre sustainability, increased amount of externally generated revenues, and improved chances of sub-regional and international accreditation of the ACE programmes.

The CEFOR shall be allowed a good degree of autonomy to allow for recruiting best faculties and retaining them without unnecessary interference. All the centres in the Institute of Petroleum Studies, University of Port Harcourt enjoy this level of autonomy such that their programmes have remained uninterrupted by industrial actions and other such actions since inception thus, giving them global acceptability and continued funding from international grant-making agencies. The CEFOR shall promote ICT utilization for learning to encourage distance learning, where necessary and promote positive use of social media tools for coordination of research in the sub-region.

### **Governance**

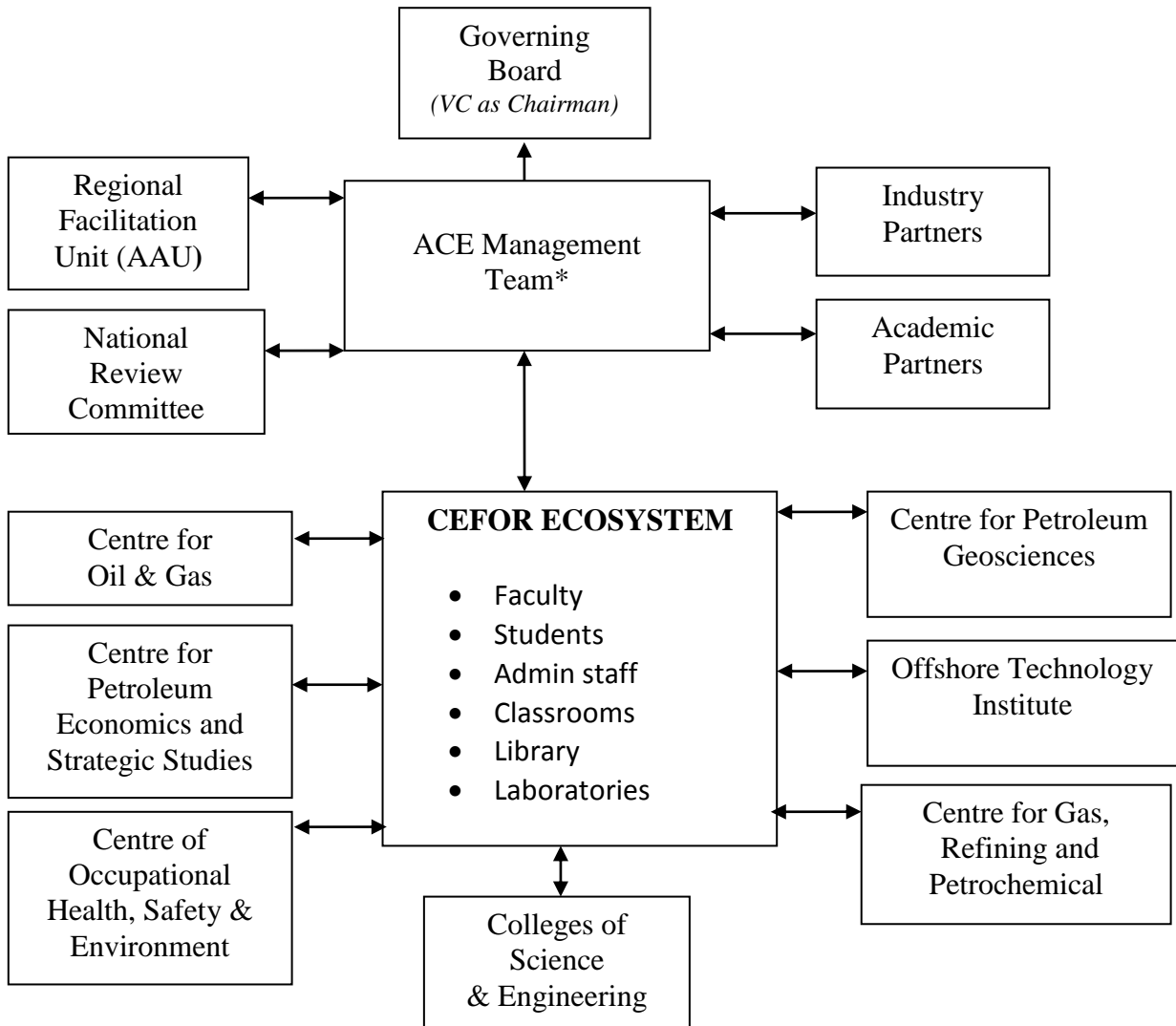
Generally the Centre has;

- a) Board of Trustees with Pro-chancellor of University of Port Harcourt as Chairman.
- b) Governing Board (made up of partnering institutions). The current Chairman of IPS Governing Board is Mrs. Edith Ofili-Okonkwo. She is a Geologist and has spent about 32 years in oil and gas activities by her employment with TOTAL E & P Nig. Ltd
- c) Academic Board with Director of IPS as Chairman, Directors of Centres in IPS and all lecturers in the Institute as members.
- d) Industry Advisory Board made up of industry stakeholders

Specifically, the proposed Centre for Oil Field Chemicals Research will be run by a Director and Management Team representing partnering institutions. This will ensure Quality Assurance/Quality Control. The Centre Management Team will see to the day to day management of the Centre.

Poor Research Management is a factor that affects productivity in an institution with research mandate. The University of Port Harcourt has **Centre for Research Management**. This Centre is affiliated to West African Research and Innovations Management Association (WARIMA) and WARIMA is affiliated to International Networks of Research Managers (INORMS).

Presently, we have collaboration with industrial laboratories, to enhance our capabilities to deliver quality service.



\* **ACE Management Team:** Centre Leader; Deputy Centre Leader, M&E Officer; Finance Officer/Project Accountant; Procurement Officer; Auditor.

## 5.9 SUSTAINABLE FINANCING

This action plan shall contribute towards increasing the amount of externally generated revenue and ensure centre sustainability beyond the funding being requested for the proposed CEFOR. In collaboration with our partners, the Centre shall continue to organize:

- Industry-relevant and demand-driven training to sustain funding.
- Technical short courses.
- Applied technology workshops to meet contemporary industry needs and certification of industry professionals in partnership with International Certification agencies.
- Conferences on topical issues relevant to the oil and gas industry.
- Proposals writing for research grants from national, regional and international grant-making agencies.
- Endowment of professorial research Chairs in oilfield chemicals research and related areas.
- CEFOR shall also engage in consultancy services.
- Contract research for national, regional and international oil and gas companies.
- All graduate programmes of CEFOR shall attract tuition fees.

Revenues accruing from these events shall be paid into CEFOR dedicated account to sustain the centre for more and more patronages from national, regional and international communities.

From the technical point of view, the CEFOR shall target the use of renewable energy in the form of biogas through the use of enormous agricultural residues available in the Niger Delta region. Also, the benefits of solar energy shall be exploited by the CEFOR as clean source to prevent greenhouse gas emission and minimize carbon emission to earn carbon credit with the advantage of securing more grants in the future to sustain the CEFOR, as we continue to improve on our practices.

### **Other sources of sustainable funding**

Petroleum Technology Development Fund (PTDF), Nigeria, will also sustain the CEFOR by sponsoring candidates for graduate programmes as an alternative to sending students abroad for postgraduate training.

The Nigerian Content Development and Monitoring Board (NCDMB) has also indicated willingness to invest in the Centre. We are also soliciting for other Organizations to:

- Sponsor graduate students for programmes of the centre;
- Sponsor collaborative applied research to find innovative solutions to development challenges;
- Sponsor industry experts to teach as visiting Lecturers and Professors;
- Endow professorial research Chairs for academics and retiring industry experts to impact their wealth of experience to young Science and Technology graduates;
- Donate research facilities and laboratory equipment.

The University of Port Harcourt has demonstrated its willingness to invest its resources in the activities of the proposed Centre. Post project sustainability will be guaranteed by statutory allocation of funds from the University. The end users of the products of this Centre, the oil and gas exploration and production firms are also ready to invest in the Centre provided good quality chemicals and graduates are produced/ guaranteed. The University of Port Harcourt benefited from the \$180M Science and Technology Development Grant to the Government of Nigeria by the World Bank. Some of the equipment purchased with the (\$500,000) grant of the STEP-B projects are assets to the proposed Centre.

## SECTION 6: EXISTING PHYSICAL RESOURCES

### Teaching and Research Laboratories

The Institute is expanding its facilities to include extra class rooms and research laboratories; however, she has access to the department of Petroleum and Gas Engineering laboratory sponsored by Petroleum Development Trust Fund (PTDF), Shell-Aret Adams Chair laboratory as well as in collaboration with other third party laboratories, like Nigerian National Petroleum Research Laboratory, Laser Engineering and POCEMA Ltd.

The laboratories in the Department of Petroleum and Gas Engineering include:

1. Reservoir Engineering
2. Production Engineering
3. Drilling Operations.

The laboratories are equipped with University funds, substantial donations from petroleum Technology Development Fund (PTDF), Education Tax Fund (ETF) now (TETFund). The Research Laboratory consists of computers and software for advanced petroleum engineering work.

The Reservoir Engineering Laboratory has basic equipment to undertake core, PVT as well as enhanced oil recovery analysis.

The Drilling Fluid Laboratory is well equipped and undertake required mud engineering and associated tests.

The Production Engineering laboratory is set for production enhancement and flow assurance testing.

### List of Laboratory Equipment in the Petroleum and Gas Engineering Laboratory

S/No	Name	Uses
1	Gas Permeameter	Measurement of Permeability of consolidated Core Section
2	Porosimeter	Measurement of Porosity of consolidated Core Sample
3	Core Holder for Resistivity meter	Measurement of Resistance to Flow of Core Samples in an Electrical Current
4.	Variable Viscometer	Measurement of Viscosity of fluids.
5	High Pressure, High Tem. Filter press	Testing Mud at Elevated Temperature and Pressure
6	Retort Kit (Oil and Water)	Solid and Liquid Content Determination
7	Core Dresser/Cutter	Cutting of Cores to the red length and Uniform Dressing
8	Hot wire Cutter	Cutting Wires to Length
9	Multi Mixer	For Homogenous mixing of Drilling Fluids Chemicals
10	Labline (Double Heater)	Heating and the Increasing of Fluid Temperature
11	Permeameter (Liquid)	Measurement of Liquid Permeability
12	Hamilton Beach Mixer	Mixing of Drilling Fluid
13	Fann Viscometer	Viscosity of Fluids
14	Filter Press 4 Units	Mud Test
15	pH Meter	Determination of pH of Drilling Fluids
16	Mud Balance	Density of Drilling Fluids
17	Marsh Funnel	Density of Drilling Fluids
18	Sand Content	Measurement oil Percentage of Sand in Mud



19	Resistivity Meter	For Measurement of Resistance to flow
20	Sand Drill Press	For Core Analysis
21	Stop Watch	Timer
22	Hydrometer	Specific Gravity Determination
23	Sieve Shaker (Motorized)	Sieving Analysis
24	Sieve Shaker (Manuel)	Sieving Analysis
25	Oven	Drying
26	Air Compressor	Natural air Generating System
27	Penetrometer	Penetration of Bituminous Material
28	Lab. Distillation Unit (3 DWS-1)	Practical Distillation of Crude Oil
29	Lab. Centrifuge model	Centrifugal Strength
30	Hot Plate	Heating
31	Flash Point Equip	To Maintain Temperature of Petroleum Production
32	Pour Point Equip	Cooling Temperature of Petroleum Production
33	Soxhlet Extractor	Extraction Process

### **Library Facilities**

The Institute has a well-equipped library as well as uses the University Central Library. It houses a large collection of engineering, science and other books. Books, periodicals/journals, students' projects in the relevant areas and other reading materials are available. Information and Communication Technology Centre (ICTC) for e-library are open to staff and students.

### **International Students Centre**

This Centre handles the Exchange and Linkage Programs for visiting scholars, foreign students, negotiations for memoranda of understanding. Shall serve as a liaison office for all visiting scholars, regional students, and all other logistics for their stay in Nigeria.

### **Information and Communication**

All ICT matters, seminars, workshops, conferences, meetings and training of visiting scholars and regional students.

### **University of Port Harcourt Online and Distance Learning Centre, the African Virtual University (AVU) Project**

Used for e-Learning and to facilitate open and distance learning in Nigeria and Africa.

### **Office of the Deputy Vice Chancellor and the Centre for Research Management (CEREM)**

Dedicated to the coordination of research activities by institutes and centres in the University to ensure effective service delivery.

## **SECTION 7: CAPACITY BUILDING AND VISITING/INDUSTRY FACULTY PLAN**

### **Faculty of Resources**

#### **University of Port Harcourt**

Professor J. A. Ajienska (Petroleum Engineering – Flow Assurance).  
Professor Dulu Appah (Petroleum Engineering – Production).  
Professor M.O. Onyekonwu (Petroleum Engineering – Reservoir Management).  
Professor Ify. Nwaagozie (Civil/Environment Engineering).  
Professor Ayo Kuye (Chemical Engineering).  
Professor A. Dosunmu (Petroleum Engineering – Drilling).  
Professor E.T. Iyagba (Chemical Engineering).  
Professor Ogbonna Joel (Petroleum/Chemical Engineering).  
Professor A.O. Ibe (Electrical/Electronic Engineering).  
Professor J.U. Okoli (Mechanical/Petroleum Engineering).  
Professor Godwin Igwe (Petrochemical/Chemical Engineering)  
Dr. S.S. Ikienesikimma (Petroleum Engineering).  
Dr. Boma Kinigoma (Fuel and Energy).  
Dr. R. Uhunmwangho (Electrical Engineering).  
Professor J. Ebeniro (Geophysics).  
Professor E.C. Nduka (Statistics).  
Professor V.U. Ukaegbu (Geology).  
Dr. F.T. Beka (Geology).  
Professor O. Akaranta (Industrial Chemistry).  
Dr. S.E. Ofodile (Analytical Chemistry).

#### **Other Nigerian Universities**

Professor J. Etu-Efeotor (Federal University of Petroleum Resources).  
Professor B. Obah (Federal University of Technology, Owerri).  
Professor Basil Onyekpe (University of Benin, Nigeria).  
Professor Godwin Chukwu (African University of Science and Technology, Abuja).

#### **IFP School, France**

Professor Bernard Michand.  
Didier Brigant.  
Samasundaran Sakthikumar.  
F. Fusier (IFP School Resident Coordinator at IPS).  
Fabien Manuel.  
Géral Gachet.  
Francis Saint Martin.  
Thibault Dr. Sorbier.

#### **Industry Lecturers**

A. Abolarin (TOTAL).  
Dr. N. Attah (TOTAL).  
P. Somiari (TOTAL).  
S. Oton (Ex. NAOC).  
Professor G.C. Ofunne (FUGRO).  
Dr. Ajee Mamman (RYEMEX).  
Obi Ekeh (Kappa Engineering).  
Dr. J.U. Ozurumba (NALCO).

Engr. Emeka Onwukwe (WELTEK).  
 L. Osakwe (NAOC).  
 Wilson-Air Erayamen (NLNG).  
 Chiji Emuchay (Ex-Shell).  
 Edith Akwaeke (ANSETT).

### **Visiting Professors (Nigerians in Diaspora)**

Professor Jude Amaefule (USA).  
 Professor O. Iledare (LSU, USA).  
 Professor David Ogba (Alaska).  
 Professor C. Ekweozor (Consultant).

### **Lecturers from Regional Academic Partners**

University of Lome, Togo.  
 University of Abomey – Calavi, Benin Republic.  
 University of Mines and Technology, Tarkwa, Ghana.  
 University of Witwatersrand, Johannesburg, South Africa.

There is collaborative research with students assigned to industry experts as co-supervisors.  
 There is major expansion to include laboratories to undertake research projects in:

- Reservoir Engineering
- Production Engineering
- Drilling Engineering
- Gas Engineering and Utilization

with a focus in development of **oil filed chemicals using local materials for drilling, cementing , production and enhanced oil recovery.**

We have a multidisciplinary pool of consultants and experts in Nigeria and abroad who have many years of experience in oilfield operations, research and consultancy. With such a high caliber expertise, we can deliver professional and high quality service to industry through applied research and continuing education programmes. The Institute is geared towards developing highly required manpower in the oil and gas industry. Our goal is to be a manpower development hub in the gulf of Guinea. We also need to develop highly technical people who are entrepreneurs. This will make for quality training and applied research to address these regional challenges and promote specialization among participating Universities.

To attract Regional and oversea faculties, we have contacted Nigerians in Diaspora with higher degrees and professional experience to be appointed as Visiting lecturers and PhD Supervisors.

### **PHD SUPERVISORS WHO ARE NIGERIANS IN DIASPORA**

1	Prof Daopu Numbere	<a href="mailto:numbere@yahoo.com">numbere@yahoo.com</a>
2	Dr. Charles Dawari	<a href="mailto:Dawari.charles@chevron.com">Dawari.charles@chevron.com</a>
3	Prof. Samuel Osisanya	<a href="mailto:s.osisanya@ou.edu">s.osisanya@ou.edu</a>
4	Dr. Solomon Inikori	<a href="mailto:Solomon.inikori@shell.com">Solomon.inikori@shell.com</a>
5	Dr. Charles Ohaeri	<a href="mailto:Charles.ohaeri@andarko.com">Charles.ohaeri@andarko.com</a>

6	Prof. Ekwere J. Peters	<a href="mailto:ejpeters@mail.utexas.edu">ejpeters@mail.utexas.edu</a>
7	Dr. Nnaemeka J. Ezekwe	<a href="mailto:lon.ezekwe@dvn.com">lon.ezekwe@dvn.com</a>
8	Dr. Henry Ohen	<a href="mailto:henry@hrvmethanes.com">henry@hrvmethanes.com</a>
9	Prof. Babs Oyeneyin	<a href="mailto:b.oyeneyin@rgu.ac.uk">b.oyeneyin@rgu.ac.uk</a>
10	Dr. Fabian Iwere	<a href="mailto:fiwere@slb.com">fiwere@slb.com</a>
11	Dr. Michael Adewumi	<a href="mailto:M2a@psu.edu">M2a@psu.edu</a>
12	Prof. David Ogbe	<a href="mailto:davidogbe@flowgridsltd.com">davidogbe@flowgridsltd.com</a>

## **7b: Main Areas for Faculty Development/Capacity Building**

### **1. Training on Project Management**

To enhance the Action Plans on Research Excellence, Equity Dimension, and Management and Governance.

### **2. Training on Writing Effective Grants Winning Proposals**

To facilitate Action Plans for Learning Excellence as faculties attend donor-funded trainings, for Research Excellence as faculties attract more donor-funded projects for project sustainability and to attract Regional Faculty and Students with available pool of grants, and for Sustainable Financing.

### **3. Training on Experimental Design, Data Management and Analysis**

To promote the Action Plans for Learning Excellence, and Research Excellence.

### **4. Training on Communication Skills and Interpersonal Relationship**

To support the Action Plans for Learning Excellence, for Research Excellence, for attracting Regional Faculty and Students, for Regional and National Sector Partners, and for Collaboration with International Partners.

### **5. Training on Fiduciary Management**

In Pursuance to the success of the Action Plans for Research Excellence, for equity Dimension, and for Sustainable Financing.

### **6. Training on Language (English and/or French)**

For effective achievement of Action Plans for Learning Excellence, for Research Excellence, for Regional and National Sector Partners, and for Collaboration with International Partners.

### **7. Training on ICT**

For faculties and students to support Action Plans for Learning and Research Excellences

### **8 Training in Laboratory Management/Equipment**

For QA/QC protocols, laboratory equipment operation and documentation

## **SECTION 8: IMPLEMENTATION CAPACITY, ARRANGEMENTS AND PLANS**

### **Project Implementation Team**

The Centre Director shall be Professor Ogbonna Joel (Oilfield Chemicals Specialist). He is currently the Deputy Director, Institute of Petroleum Studies (IPS) and shall be responsible for the day-to-day business of the CEFOR. He shall be assisted by the Principal Investigators of the research teams relevant to the activities of CEFOR. The key academic partnering institution is the University of Lome in Togo with the Directeur, de l'Ecole, Nationale Supérieure d'Ingenieurs de l'Université de Lomé (ENSI/UL), Professor Komlan A. Kassegne, as the key Francophone representative. A nominee of the Université de'Abomey-Calavi, République de Benin, Professor A.E. Assogbadjo, shall be a member of the Implementation Team. The key Departments in the Project are Departments of Chemical Engineering, Petroleum and gas Engineering, Industrial Chemistry, Mathematics/Statistics, Computer Science and Foreign Languages and Literature.

A representative of each of the department shall be a member of the implementation team. Other members of the implementation team shall include: the Procurement Officer, Finance Officer, Monitoring and Evaluation Officer, Technical Consultant (in this project shall be the Director, Institute of Petroleum Studies), and Communications Officer.

### **Academic Management**

CEFOR shall have an Academic Board made up of all Lecturers in the programmes of the Centre. The Office of the Deputy Vice Chancellor (Research and Development) as well as the Centre for Research Management, both in the Office of the Vice Chancellor, shall have oversight functions for the academic management of the Centre to ensure timely service delivery. The Directorate of Quality Assurance and Quality Control of the University is there to drive quality for eventual ISO certification of the Centre.

### **Administration, Financial, Procurement, and Monitoring and Evaluation Aspects.**

Administrative leadership shall be given by the Centre Director who, directly, supervises the Centre Administrative Secretary. The University has a Procurement Unit and the project shall have a dedicated procurement officer who shall further be trained on the World Bank procurement procedures. The financial management of CEFOR shall be handled by a dedicated Centre Finance Officer with the requisite working experience in financial management in an academic system. The Monitoring and Evaluation Officer shall function to ensure that the project is going on as contained in the implementation plan. Key Performance Indicators (KPIs) of projects shall be used in the monitoring and evaluation exercise.

### **Research Advisory Board**

The Research Advisory Board of the Institute of Petroleum Studies shall cover CEFOR on issues of research focus and the development of strategic research plan. This arrangement is to ensure successful implementation of the project, especially, in the areas of teaching and research, as well as the commercialization of patents registered by the Centre.

The staff of the Centre shall be trained on project management, writing grant winning proposals, pedagogical skills, to improve their teaching, research and management capabilities. More partner institutions would be contacted and incorporated once the centre is on ground, thereby attracting the best brains for project consolidation and sustainability.

The grant and generated funds will be used to purchase laboratory equipment, create public enlightenment through workshop, seminars, conferences and journal publications. Provision shall be made for post doctoral awards and sponsorship of research fellows and professors.

We have efficient operating procedures and management system for general and academic administrations, purchases and contract execution. There is also effective internal control mechanism for day to day running of the Institute. These operating procedures have helped us deliver high quality services and prudently manage the fund provided by TOTAL E&P Nig. Ltd for the past ten years.

The following operating procedures are in place.

**A. Cash purchases (consumables not above a pre-determined amount)**

- Requisition – by the user Unit
- Estimate for items requested/Material Specification – Technical Unit/User Unit
- Vetting of estimate by IPS Internal Control/Recommendation
- Requisition approval – Director/Assistant Director
- Purchases
- Receiving/verification – User Unit/IPS Internal Control
- Retirement of cash advanced/submission of purchase receipts

**B. Supply/Contract**

- Job/material requisition
- Job/material Specification – Technical Unit/User Unit.
- Cost Estimate – User Unit/Accounts Unit
- Call for/collection of quotation from vendors
- Comparison/vetting of quotations – IPS Internal control (Accounts/Requester)
- Recommendation of a vendor/price
- Technical Committee meet to approve vendor/prices
- Approval – Director/Assistant Director
- LPO (Award Letter)
- Receiving/Verification – by Technical Unit/User Unit
- Inspection/Certification - IPS Accounts/IA Uniport
- Completion certificate/Payment

**C For Internal control:**

- There is Internal Control pricing value with approved mark up
- Maximum amount of cash purchases is implemented
- Requesting Unit/Accounts Unit to verify items delivered before IA Uniport – where applicable
- Requesting Unit should not be involved in procurement of material
- There are approved vendors
- Items to be supplied by approved vendors and verified by Technical Unit/User
- Tender Committee is made up of (Accounts, Technical, Admin. Sec. and headed by Assistant/Director

**D. Capacity building from world bank STEP-B project**

Through the World Bank STEP-B projects executed at the University of Port Harcourt, the Institution now boasts of well trained staff in the following areas:

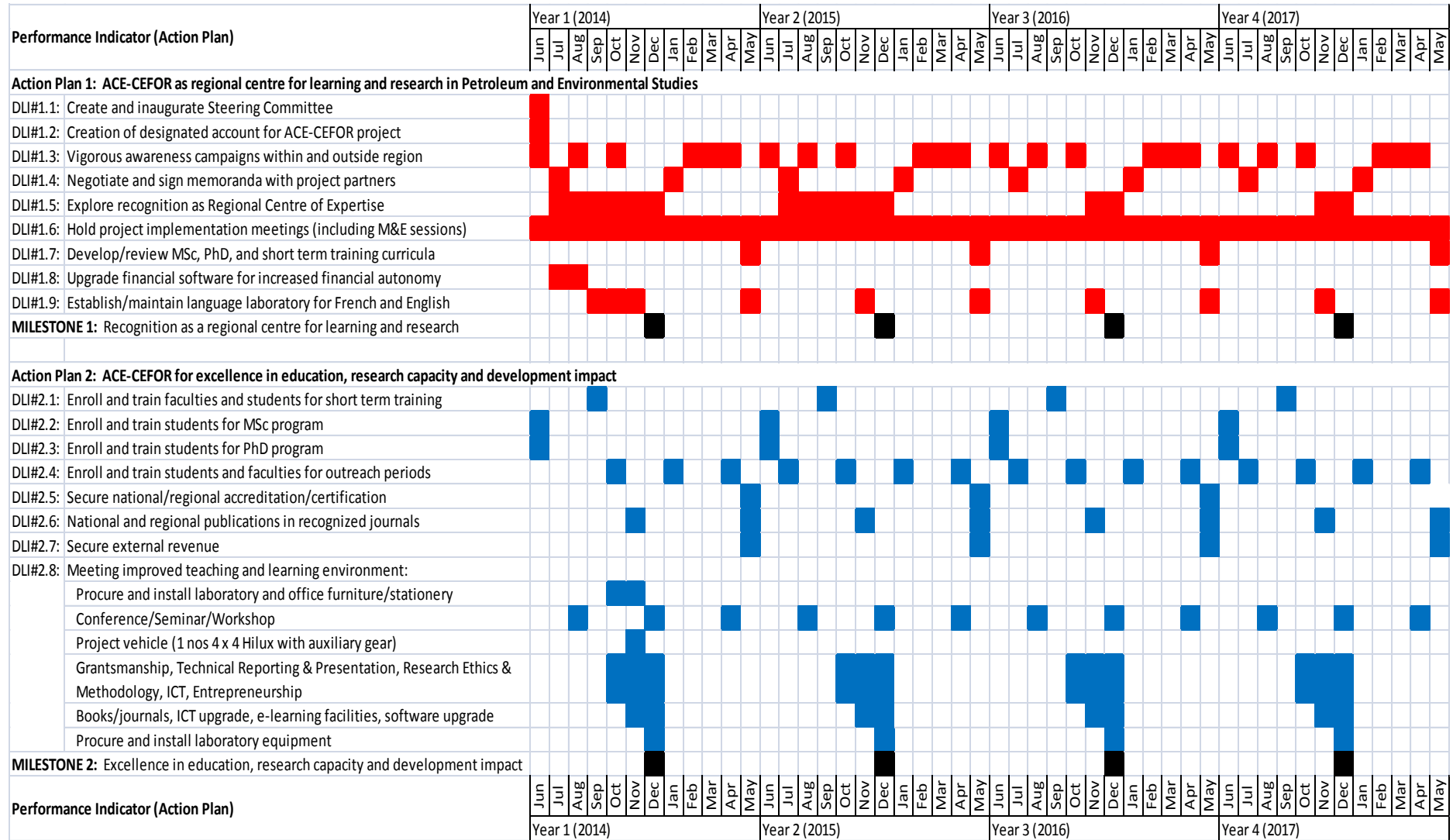
- a. Project Management – Project Manager of STEP-B
- b. Procurement - Procurement officer of STEP-B
- c. Financial Management- Finance officer of STEP-B
- d. Monitoring and Evaluation- M&E officer of STEP-B
- e. Auditing - Auditor of STEP-B project
- f. Communicating with project stakeholders- Communication officer of STEP-B
- g. Technical Services - Technical Consultant of STEP-B
- h. Programme Development - Programme Officer of STEP-B

## SECTION 9: IMPLEMENTATION PLAN

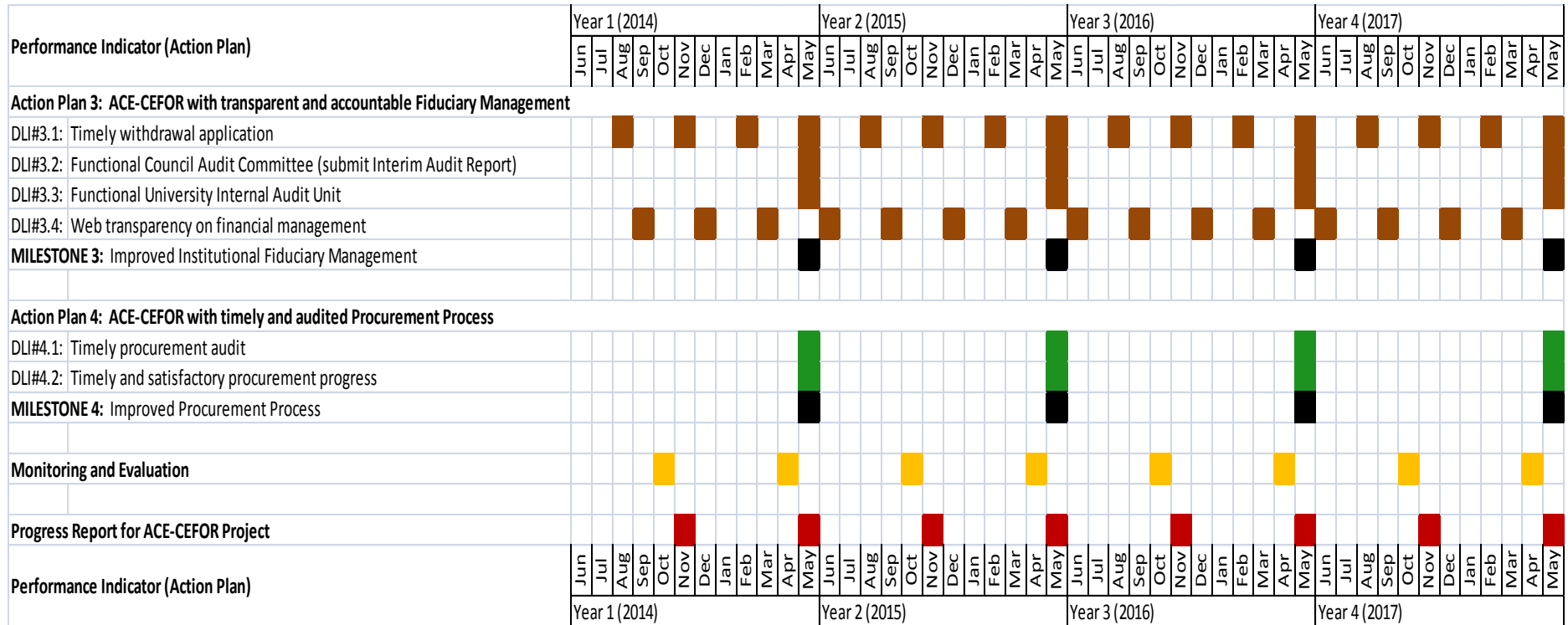
Description of Activities	2013				2014				2015
	1 <sup>st</sup> Qtr	2 <sup>nd</sup> Qtr.	3 <sup>rd</sup> Qtr.	4 <sup>th</sup> Qtr.	1 <sup>st</sup> Qtr	2 <sup>nd</sup> Qtr.	3 <sup>rd</sup> Qtr.	4 <sup>th</sup> Qtr.	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> and 4 <sup>th</sup> QTRS
Collaborate with industries /regional universities	Identify Industries, Universities and Research topics	Formalize relationship and set targets. Identify lab equipment needs	Building of laboratories and admission of students. Assign supervisors and topics.	Aggressive drive for sponsorship and branding. Hiring of Research fellows	Identify research needs of industries and local players. Training of lab personnel	Purchase of lab equipment, installation and training of research fellows	Aggressive research and engagement of regional students/ researchers. Progress report and monitoring.	Seminars, workshop and conferences. Progress report/ monitoring.	Consultancy, Research and Training. Seminars, Workshop and Conferences.
Human Capacity/ Petroleum Engineering Development in the Regional Universities	<ul style="list-style-type: none"> <li>• Strengthening research capability and staff development in the Regional Universities</li> <li>• Undertake collaborative research with other Universities to enhance capacity building, provide platform for quality training and applied research to address regional challenges and promote specialization among participating Universities.</li> <li>• Research on local raw materials to development <b>oil field chemicals</b> thereby enhancing local content aspiration of Governments in regions in Africa where oil has been discovered.</li> <li>• Fulfill the mission of the Institute as the industry training and research hub for manpower in the Gulf of Guinea as well as serve as the facilitator of the Nigeria local Content initiative.</li> <li>• Propagate the culture of excellence in sustained learning, leadership, internationalism and professionalism in the petroleum industry.</li> <li>• Short time faculty training in ICTC, presentation skills, project management, technical/proposal writing and lab mgmt/equipment</li> </ul>								



## Gantt Chart for the Four-Year (2014 – 2018) ACE-CEFOP Project



### Gantt Chart for the Four-Year (2014 – 2018) ACE-CEFOR Project (cont'd)



## SECTION 10: MAIN COSTS OF THE PROPOSAL

The focus will be research and development in oilfield chemicals. We have already constructed the physical structures of the laboratories. The first target shall be to purchase and install laboratory equipment for teaching, research and training. Other expenses shall include stipends for visiting faculties, research fellows and international collaborations and partnerships.

### Budget

Activity	Items required	Justification for the request	Cost in US \$
Training of staff	Training of laboratory technologists/technicians and other staff	To operate and maintain the laboratory equipment and ensure a proactive, effective and responsive administration through effective and efficient communication and information/data management	500,000
Workshops, Conference and Field trips	Attending of workshops and Conferences and Participation in field trips	The workshops and the conferences will enable the staff and students to be abreast with the best practices in oil field chemicals design and applications. Ensure that the graduate of this Centre are of comparable standards with those trained abroad. Paper presentations in such conferences and workshops may enlighten both staff and students in the emerging areas of the research in oilfield chemicals	300,000
Research Stipends	Research Fellows for two years	For applied research to find solutions to the industry problems thereby strengthening University-Industry linkages and enhance local content.	500,000
	Doctoral and Post-Doctoral students for two years	To carryout research projects that will position them as top rated university scholars.	400,000
Stipends for visiting professors from abroad (partnering institutions/ project supervisors)	Stipends and Air travel for ten (10) lecturers for three years	To teach, conduct research and supervise students.	500,000

Purchase and Installation of Laboratory Equipment and Electricity Generating sets	Laboratory Equipment and Generating sets	To have functional labs and enhance effectiveness in drilling/cementing, production, reservoir management and stimulation operations	4,000,000
Establishment of Language Laboratories/ Translation Equipment at the Universities Port Harcourt and Lome	Language Laboratory and Translation Equipment. Video conferencing machine	For effective Communication with Regional Partners	300,000
a) Chemicals/Raw Materials Purchase, Analysis and Processing. b) Project Vehicles (a car and a 4wheel pick-up) c) Operating cost	Chemicals and raw materials for research  Project vehicles  -	To develop oilfield chemicals and engage in field trials  For effective coordination in Regional Partners  Teaching aids For office consumables and fixtures, project coordination meetings, centre publications (newsletters, monographs and journals)	1,000,000
<b>Total</b>			<b>US \$7,500,000</b>

## SECTION 11: RISKS AND MITIGATION STRATEGIES

Completion of the centre of excellence physical structure and not equipping the laboratories of the Institute to position it for necessary research in oil filed chemicals using local raw materials and training of competent research fellows will amount to delay in achieving the strategic plan objectives. Many of the IOCs will continue to use foreign research institutes, hence will not help actualize the local content aspiration of the Governments in most of the African countries where oil has been discovered. To avoid this risk, the Centre has to be funded to equip the laboratories as well as train the needed human capacity. Provision of language transition facilities for effective collaboration with the Franco-Phone Institutions is critical, otherwise, there will be a communication gap

Below are other potential risks and mitigation measures

**Potential Risk:** Unwillingness of some centres and units with similar goals, within the sub-region, to participate in the project.

**Mitigation Strategy:** Continuous efforts to engage such centres and units in joint conference and or workshop activities at locations of their choice to ensure buy-in for project synergy.

**Potential Risk:** Likely changes in policies by national or regional Governments.

**Mitigation Strategy:** Ensure full participation of government intervention agencies and ministries, for Nigeria, the National Universities Commission and Ministries of Education, Science and Technology, to reduce impacts of changes in policies.

**Potential Risks:** Possible changes in exchange rate of the local currency against foreign currencies in case of procurements involving foreign currencies.

**Mitigation Strategy:** Timely engagement of donor agency for mutual agreement on remedial measure.

**Potential Risk:** Likely concerns about security situation.

**Mitigation Strategy:** TOTAL E&P Nigeria Ltd and the University of Port Harcourt have been fully involved in securing human and infrastructure resources at the Institute of Petroleum Studies. The IFP School representative at IPS, and other French Nationals from IFP School have been participating in teaching, research and Governing Board meetings at IPS for the past ten (10) years without security threats.

## **SECTION 12: ADDITIONAL INFORMATION RELEVANT TO THE EVALUATION OF THE PROPOSAL**

### **A. Projects Executed by the University of Port Harcourt through External Funding (2010–2016)**

1. Clerking Skills Laboratory Project of UNIPORT Teaching Hospital. Sponsored by MacArthur Foundation of USA.
2. Teacher Upgrading Project, Sponsored by MacArthur Foundation.
3. Automation of UNIPORT Library Project. Sponsored by MacArthur Foundation of USA.
4. Upgrading of University Bursary Facilities. Sponsored by MacArthur Foundation of USA.
5. University Wide Internet Project. Sponsored by MacArthur Foundation of USA.  
**Note: Projects 1-5 amounted to \$2,500,000.00 (see attached letter of grant award).**
6. Establishment of Centre for Petroleum Geosciences (A graduate School). Sponsored by MacArthur Foundation of USA (\$990,000).
7. Establishment of Institute of Natural Resources and Sustainable Development (A graduate school). Sponsored by MacArthur Foundation of USA (\$700,000).
8. Running the Institute of Petroleum Studies, UNIPORT for nine (9) years at an annual budget of \$1,200,000. Sponsored by TOTAL E&P Nig. Ltd.
9. SPDC Research Contracts through Shell-Aret Adams Professorial Chair in Petroleum Engineering at UNIPORT.
10. AGRA Rice Research Project at UNIPORT. (\$130,040).
11. Construction of Laboratories for (Production, Reservoir, Drilling and Oil field Chemicals Research and Development). Sponsored by TOTAL E&P, Nigeria Ltd.
12. World Bank STEP-B Projects at UNIPORT (\$3,500,000).

### **B. On Going Research on Oil Field Chemicals Related Projects in the Institute**

1. Comparative Study of Nigerian Local Bentonite with Imported Sample in Application of Oil Well Operations in Nigeria (Sponsored by TETFund, a Local Content Drive Effort).
2. Performance Evaluation of Local Clay with Imported Sample for Utilization in Drilling Operations in Ghana (A Ph.D Research Project at UMAT, Tarkwa, Ghana, being Supervised by a Professor at IPS, UNIPORT).
3. Formulation of Synthetic Base Fluid for Oil Drilling Operations in Nigeria (In collaboration with Shell Nigeria).
4. Hydrate Prediction and Management in Offshore Environment (A Ph.D Research Project, at IPS, being Sponsored by Nigerian Agip Oil Company and PTDF).
5. Control of Fines Migration in Oil Reservoirs using Nanoparticles (A Ph.D Research project, at IPS, being Sponsored by PTDF).
6. Research on Upgrade and Utilization of Local Barite for Oil well Drilling Applications in Nigeria (In collaboration with TOTAL E&P, Nig. LTD and AMAPOB).
7. Production of Oilfield Chemicals from Agricultural Wastes for Application in Oil Well Operations in Nigeria. (In collaboration with NNPC, R&D).
8. Research on upgrade of local cement for oil well cementing in Nigeria.

### C. New Area of Research Focus

In addition to the on-going research areas, the Centre shall establish a new research frontier in the area of increasing the durability of Asphalt as a road construction material in the humid coastal Niger Delta region and within the Africa.

### D. Completed IPS Graduate Students Research Projects (2004 – 2012)

S/N	Candidate Name	Project Topic	Project Supervisor	Year
1	Akpi, Foster	Criteria for Screening, Ranking and Selection of Oilfield production chemicals for flow assurance	Prof. J.A. Ajenka	2004
2	Oni, Olanrewaju Oladipo	Oilfield Drilling and production waste management	Dr. N. Attah	2004
3	Onuwaje, Shola O.E.	Waxy crude oil development (Development concept selection)	Prof. J.A. Ajenka	2004
4	Anabrabra, Wilson Andrew	Characterization of Emulsion Stabilizers using Dielectric Constant	Prof. J.A. Ajenka	2004
5	Akanno, Ugochituru .O.	Development of a software for screening, ranking and selection of demulsifiers	Prof. J.A. Ajenka	2005
6	Jackson, Christian Anthony	Mechanism and optimization of performance of drag reducers	Prof. J.A. Ajenka	2005
7	Madubuonwu, Francis .I.	Economics of chemical water and gas shut-off treatments	Prof. J.A. Ajenka	2005
8	Onugbolu, Olisaka .O.	Oilfield drilling waste management	Prof. J.A. Ajenka	2006
9	Owudumi, Omotola .L.	Use of thermal insulation to prevent hydrate and wax deposition	Prof. J.A. Ajenka	2006
10	Ideh, Raphael Emeka	Economics of matrix acidizing	Prof. D. Appah	2007
11	Igwebike, Chinedu Nnaemeka	Economics of water and gas shut-off treatment	Prof. J.A. Ajenka	2007
12	Nwamara, Ndubuisi Promise	Review of calcium oxide and magnesium oxide cements	Prof. D. Appah	2007
13	Olawunmi, Oduyemi .E.	Performance of matrix acidized horizontal wells	Prof. D. Appah	2008
14	Ajayi, Malik Busola	Effect of shaliness on matrix	Prof. J.A. Ajenka	2009

		acidizing		
15	Umeokafor, Chukwudubem V.	Modeling of cement thickening time at high temperatures with different retarder concentrations	Dr. Ogbonna Joel	2009
16	Chukukere, Izinne .C.	New software for selecting candidate wells for polymer water shut-off	Prof. J.A. Ajenka	2009
17	Akonye, Ugonna .U.	Modeling gel break-time in gravel pack as a function of breaker concentration and temperature	Dr. Ogbonna Joel	2009
18	Oladejo, Ganiyu O.	Determination of rheology of cement and flow regime production	Dr. Ogbonna Joel	2009
19	Adamasi, Emmanuel .A.	Optimizing liquid recovery from natural gas processing plants and LNG plants using nitrogen refrigerant	Engr. Wilson Air-Eyaramwen	2010
20	Asegame, Petter Ashanigbagbor	Efficient waste management processes for drilling and production operations (Niger Delta as a case study)	Dr. Ogbonna Joel	2010
21	Bamigbaiye, Ayokunle .O.	Optimizing gas dehydration in gas processing plant (LNG)	Prof. M.O. Onyekonwu	2010
22	Firima, Leela John	Improving on cascade liquefaction process through refrigeration thermodynamic approach	Mr. Wilson Air Erayamen & Dr. Sunday	2010
23	Ife, Doris Sylvester	Reducing foaming in an acid gas removal unit using thermodynamics analysis	Mr. Wilson Air Erayamen	2010
24	Oyetade, Taiwo Olanrewaju	Application of foaming cementing for enhanced mechanical properties and protection of weak formations	Dr. Ogbonna Joel	2010
25	Woha, Godwin (Jnr)	Advances in mud design and challenges in HPHT wells	Dr. Ogbonna Joel	2010
26	Asiodu, Ndidi .C.	Drilling waste management practices in Nigeria: Challenges and the way forward	Dr. Ogbonna Joel	2012
27	Salami, Jude Tayo	Software model for hydrate prediction and inhibition	Dr. S.S. Ikesikimama	2012
28	Sunmonu, Rasak .M.	Enhanced oil recovery using foam injection: A mechanistic approach	Prof.M. Onyekonwu	2012



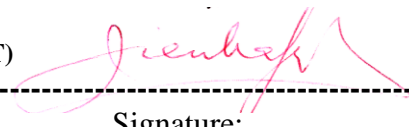
29	Awari, Better	Cost control and cost reduction in drilling mud engineering	Dr. Ogbonna Joel	2012
30	Nwadike, Ernest Ozindu	Quality assurance/ quality control in drilling fluids	Dr. Ogbonna Joel	2012
31	Maxwell, Ejikeme	Quality Assurance/and Quality Control in Cementing Operations	Dr. Ogbonna Joel	2012
33	Chinwah, Ernest	Quality assurance/ quality control in oilfield drilling waste management	Dr. B. Kinigoma	2012
34	Isomah, Obina Atkinson	Quality assurance and quality control on oil field production waste management	Prof. J.A. Ajenka	2012
35	Bassey, Arit Okon	Risk and uncertainties in drilling fluid engineering	Prof. A. Dosunmu	2012
36	Wilson, Isaac Chukwuka	Risk and uncertainties oilfield drilling waste management	Dr. Boma S. Kinigoma	2012
37	Zaccheaus, Awaji-Owa .	Risk and uncertainties in oilfield production waste management	Dr. Boma S. Kinigoma	2012
38	Emuchay, Daniel Chinaechem	Breaking of emulsion using locally formulated demulsifiers	Prof. Mike Onyekonwu	2012
39	Ojukwu, Chidiebele Ikemuefuna	Alkaline surfactant polymer (local) enhanced oil recovery process	Prof. Mike Onyekonwu	2012
40	Oladimeji Victor Ojo	Effect of viscosity of alkaline/surfactant/polymer on enhanced oil recovery in heterogeneous sand	Prof. Mike Onyekonwu	2012
41	Ikeagwu Chilekwe	Study of alcohol mixtures for enhanced oil recovery	Prof. Mike Onyekonwu	2012

#### **E. IPS Journal of Oilfield Chemistry/Publications**

Institute of Petroleum Studies, in 2007, organized a conference on oilfield chemistry in collaboration with Petroleum Technology Development Fund (PTDF) Chair in Petroleum Chemistry at Uthman Danfodio University, Sokoto, Nigeria. One of the outcomes of that conference was the floating of the Journal of Oilfield Chemistry. CEFOR will take over the management of the journals. Books in this area among others sponsored by IPS include: Design and Field application of Drilling, Cementing and Stimulation Fluids **and** Study Guide on Laboratory Practices and Management.

**SECTION 13: AGREEMENTS WITH KEY MEMBERS OF THE IMPLEMENTATION TEAM**

**PROF. J.A. AJIENKA (VICE-CHANCELLOR, UNIPOINT)**


 14/08/13

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Name and Role

Signature:

Date:

**PROF. M.O.ONYEKONWU (DIRECTOR, IPS)**

 14-8-13

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Name and Role

Signature:

Date:

**PROF. O.F.JOEL (PROPOSED CENTRE LEADER)**

 14/8/13

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Name and Role

Signature:

Date:

**Komlan A. KASSEGNE**  
*Dr. Ing. Génie Mécanique*  
*Maître de Conférences*

 12 Aout 2013

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Name and Role

Signature:

Date: