Government of Kuwait

ENVIRONMENT PUBLIC AUTHORITY
State of Kuwait – دولــة الكـــويت

الهيئــة العامـــة للبيئــة

UNDP
KUWAIT
الكـــويت

United Nations Development Programme

Country: Kuwait
Project Document

Project Title: Kuwait Integrated Environmental Management System (KIEMS)

Expected CP Outcome:

4.2: Compliance of public and private institutions in environmental regulations enhanced

Expected Outputs:

4.2.1 Providing technical expertise and international best practices to support the development and implementation of a regulatory based integrated management system KIEM

4.2.2 Support developing a strategic Action Plan with objectives, targets and performance indicators.

4.2.3 Support to enhance regulatory air emissions inventory,

4.2.4 Establish discharge and monitoring permit system for marine sources

4.2.5 Support enhancement of an integrated chemical management system, and finalizing the Integrated Environmental Management Systems.

Implementing Partner:

Kuwait Environment Public Authority (KEPA)

Responsible Party:

United Nations Development Programme

Brief Description

Kuwait Environment Public Authority (KEPA) seeks to design a clear regulatory framework that provides guidance for promulgation of Kuwait environmental law. Simply having environmental laws in place is not enough to address environmental problems. This project responds to issues related to air quality with expected outputs 4.2.1, 4.2.2, and 4.2.3. Expected outputs 4.2.4 and 4.2.5 related to waste, water and chemicals will be addressed in the Government Action Program. To respond to the country's urgent needs, an integrated air compliance and enforcement program will be established as part of a comprehensive environmental management cycle to ensure that the regulated community meets the requirements put forth in the environmental law and its implementing regulations. Ambient Air Quality Standards will set the foundation for the regulatory framework that comprises Chapter VII: Protection of the Ambient Air from Pollution. This project will establish the primary vehicle for implementing the law through development and implementation of a long-term national air quality improvement and management plan. An automated self reporting system will be set up to assist KEPA track and manage emissions and ensure plan implementation. A program infrastructure will be developed in KEPA supported by an automated Learning Management System (LMS) to track skill improvement and performance enhancement of KEPA staff.

Programme Period:	2009-2014	Total budget:	$2,060,000
Atlas Project Number:	00074036	UNDP allocated resources:	$2,000,000
Start date: End Date	2010 2014	General Management Fee:	$60,000
		In-kind Contributions KOC	$12,000,000
PAC Meeting Date:	March 9th 2010		

17/01/2012

Agreed by Implementing Partner (Kuwait Environment Public Authority)   Date:

Dr. Salah Al-Mudhi, KEPA Director General

15/01/2012

Agreed by Responsible Party (United Nations Development Programme)   Date:

Dr. Adam Abdelmoula, UNDP Resident Representative

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List of Acronyms and Abbreviations

AWP	Annual Work Plan
AQCZ	Air Quality Control Zone
CO	Country Office
COx	Carbon Monoxide
CP	Country Programme
ESO	Environmental Strategy Office
GHG	Green House Gases
GIS	Geographical Information System
GMS	General Management Support
GSSCPD	General Secretariat of the Supreme Council for Planning and Development
HACT	Harmonized Approach to Cash Transfer
HAP	Hazardous Air Pollutants
IEM	Integrated Environmental Management
IT	Information Technology
KIEIN	Kuwait Integrated Environmental Information Network
KEPA	Kuwait Environment Public Authority
KOC	Kuwait Oil Company
KNPC	Kuwait National Petroleum Company
LMS	Learning Management System
NOx	Nitrogen Oxides
PM2.5	Particulate Matter with less than or equal to 2,5 micron radius
PM10	Particulate Matter with less than or equal to 10 micron radius
PIC	Petrochemicals Industries Company
PPR	Project Progress Report
QPR	Quarterly Progress Report
SWOT	Strengths, Weakness, Opportunity, and Threats
SEMP	Sustainable Environment Management System
SO2	Sulfur Dioxide
UNDP	United Nations Development Programme
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

Project Title: Kuwait Integrated Environmental Management System (KIEMS)

ATLAS ID: 74036

2012 Work Plan

EXPECTED OUTPUTS	PLANNED ACTIVITIES	TIMEFRAME				RESPONSIBLE PARTY	PLANNED BUDGET		
		Q1	Q2	Q3	Q4		Funding Source	Budget Description	Amount (USD)
4.2.3. Support to enhance regulatory air emissions inventory Baseline: 1. Lack of regulatory management system for air quality 2. Lack of a national air emissions inventory	**Activity Result 4.2.3.1: Unified database established** **Activity Description:** Design of KIEM air quality management database that can integrate with KEPA system under development by KOC. The database will integrate all sources other than KOC with the KOC system to produce the national database.	√				PM	UNDP	Costs for GIS reporting and modelling database	65,000
						Activity budget lines			
Indicators: 1. Presence of a unified database for reporting and modelling 2. Presence of system to regulate air emissions in Kuwait 3. Availability of air emissions inventory 4 Reports and statistical analysis of hot spots 5. 20 of KEPA staff trained in operating emissions inventory	4.2.3.1.1: Procurement of software for database	√				System consultant (KOC)	UNDP	Cost of procurement of software	35,000
	4.2.3.1.2: Project plan and implementation	√				System consultant (KOC) and Project Team Project Team	UNDP	Contracts for Local/International consultants	26,000
	4.2.3.1.3: Software installation services for database	√				Team leader Reporting system consultant	UNDP	Contracts for Local/International consultants	4,000

Targets

1. Operational KIEMS GIS based air modelling and reporting system.

2. Kuwait air-emissions inventory established

4.2 Reports on hot spots established

5. 20 KEPA staff trained in operating emissions inventory

Related CP Outcome:
4.2: Compliance of public and private institutions in environmental regulations

Baseline: Nonconformity with international standards

Activity Result 4.2.3.2: Air-based geographical information system established for Kuwait **Activity Description:** Design/provide comprehensive, user-friendly, and accessible on-line Kuwait GIS based database management system to conveniently collate and analyze collected air quality data from sources other than KOC and integrate under the KEPA system under development by KOC consultant.				PM	UNDP	Costs for establishment of air-based GIS system for Kuwait	75,000
Activity budget lines							
4.2.3.2.1: Procurement of software for database	√			System consultant (KOC)	UNDP	Cost of procurement of software	35,000
4.2.3.2.2: Defining map data for Kuwait	√			System consultant (KOC) and Project Team	UNDP	Cost for developing map data	6,000
4.2.3.2.3: Evaluation of spatial location of pollution sources	√			System consultant (KOC) and Project Team	UNDP	Cost of evaluations	34,000

Activity Result 4.2.3.3: Emissions inventory data implemented Activity Description: collecting and estimating emissions data from all sources other than KOC in the south and integration under KEPA national emission inventory on the following criteria pollutants: SO2, CO, NOX, VOCs, PM10, PM2.5. This EI effort will also include data collection for ammonia (NH3), as a precursor of sulfate and nitrate PM2.5 formation, as well as for the toxic air pollutant, hydrogen sulfide (H2S).	√	√	√	√	PM	UNDP	Costs of developing inventory	267,000
Activity budget lines								
4.2.3.3.1: Procurement of software for database	√	√	√		System consultant (KOC)	UNDP	Cost of procurement of software	80,000
4.2.3.3.2: Emissions source data collation & pollutant identification	√	√	√	√	System consultant (KOC) and Project Team Project Team	UNDP	Cost of emissions data collection and pollutant identification	80,000
4.2.3.3.3: Evaluation of EI		√			System consultant (KOC) and Project Team	UNDP	Cost of EI data evaluation	37,000
4.2.3.3.4: Evaluation of Report data		√			System consultant (KOC) and Project Team	UNDP	Cost of report data evaluation	20,000
4.2.3.3.5: Emissions inventory delivery		√			System consultant (KOC) and Project Team	UNDP	Cost of delivering emissions inventory	20,000

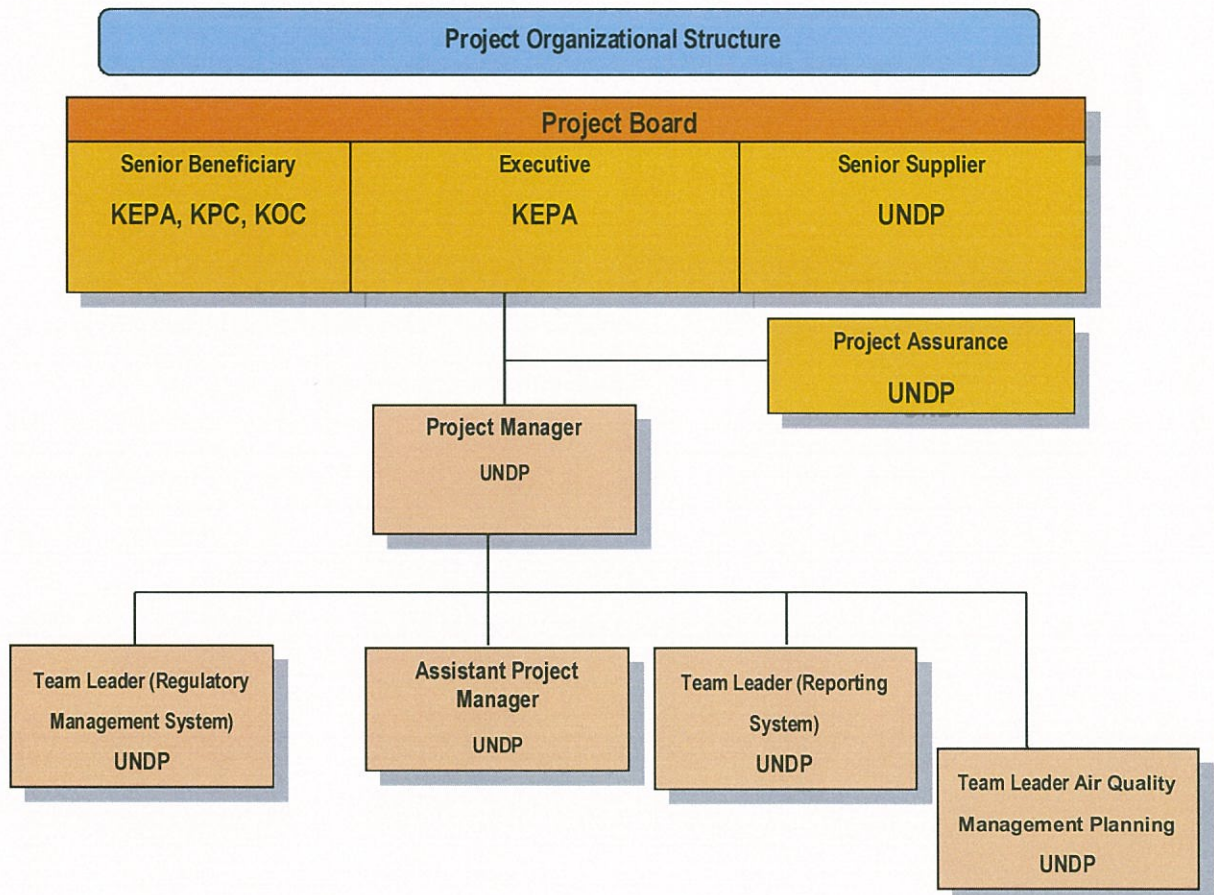| Activity / Budget line			Responsible party	Implementing	Description	Amount
4.2.3.3.6: Facility acceptance testing	√		System consultant (KOC) and Project Team	UNDP	Cost of facility acceptance testing	30,000
Activity Results 4.2.3.4: Hot Spot modelling and monitoring conducted **Activity Description: Air Dispersion Modelling (ADM) will be conducted to support "hot-spot" identification already underway by KOC consultant and the analysis and validation of monitored pollutant concentrations.**	√	√	UNDP	UNDP	Costs for modelling and monitoring of hot spots	105,000
Activity budget lines						
4.2.3.4.1: Procurement of software for database	√		System consultant (KOC)	UNDP	Cost of procurement of software	45,000
4.2.3.4.2: Analysis of available monitoring data	√		System consultant (KOC) and Project Team	UNDP	Cost of analysis of monitoring data	26,000
4.2.3.4.3: Monitoring of CEM data implementation	√		System consultant (KOC) and Project Team	UNDP	Cost of analysis of monitoring data	16,000
4.2.3.4.4: Statistical analysis and QA/QC	√		System consultant (KOC) and Project Team	UNDP	Cost of statistical analysis and QA/QC	16,000
4.2.3.4.4: Providing final delivery report	√		System consultant (KOC) and Project Team	UNDP	Cost of final delivery report	2,000

Activity Result 4.2.3.5: KEPA staff trained in operation of the emissions inventory

Activity Description: Provide training on system operations

	Activity budget lines			PM	UNDP		Amount
			√		UNDP	Costs of training KEPA staff in emissions inventory	12,000
4.2.3.5.1: GIS based emissions inventory			√	System consultant (KOC) and Project Team	UNDP	Cost of GIS based emissions inventory training	5,000
4.2.3.5.2: Training in operating the web-based database system			√	System consultant (KOC) and Project Team	UNDP	Cost of conducting web-based system training	5,000
4.2.3.5.3: Training in administration of database system			√	System consultant (KOC) and Project Team	UNDP	Cost of conducting system administration training	2,000
Monitoring & Evaluation Activities	√	√	√	UNDP	UNDP	Cost of M&E activities	30,000
Direct Project Costs							554,000
Project Staffing Costs							444,000
1. Project Manager [10,000 * 12 months]							120,000
2. Assistant Project Manager [9,000 * 12 months]							108,000
3. Team Leader (Regulatory management system) [9,000 * 12 months]							108,000
4. Team Leader (Reporting system) [9,000 * 12 months]							108,000
Total Project Cost							998,000
General Management Support (GMS)							29,940

II. Management Arrangements

The project will be implemented and managed by the Kuwait Environment Public Authority with operational support provided by UNDP. The KEPA has agreed to delegate support services to UNDP which will act in its capacity as a responsible party. The procurement of goods and services and the recruitment of project personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. KEPA will enter into a Letter of Agreement with UNDP to authorize it to conduct recruitment and procurement, and is annexed to this document. All financial payments processed under this project will be pursuant to UNDP's Financial Regulations and Rules as approved by UNDP's Executive Board on 28 January 2005.

The following is the project organizational structure to illustrate the institutional framework and relationships of the key stakeholders.

A. The Project Organizational Structure

Project Organizational Structure		
Project Board		
Senior Beneficiary KEPA, KPC, KOC	**Executive** KEPA	**Senior Supplier** UNDP

Project Assurance
UNDP

Project Manager
UNDP

Team Leader (Regulatory Management System) UNDP	Assistant Project Manager UNDP	Team Leader (Reporting System) UNDP	Team Leader Air Quality Management Planning UNDP

The Project Board: A Project Board will be established to take executive management decisions and to provide guidance to the Project Manager, including approval of project revisions and of the project's annual work plan. Project assurance reviews by this group are made at designated decision points during the running of the project or as necessary when raised by the Project Manager. The Board contains three roles: an Executive to chair the group, a Senior Supplier to provide guidance regarding the technical feasibility of the project, and a Senior Beneficiary to ensure realization of project benefits from the perspective of project beneficiaries. A Project Board TOR will be defined and authorized by the project executive for this project.

The group will meet on a necessary basis and will be composed of:
o The Executive Role: KEPA
o Senior Supplier: UNDP
o Senior Beneficiaries: KEPA, KPC, KOC
Ex officio: The Project Manager (UNDP)

The Project Manager will act as secretariat for the group (organization structure), being responsible for convening the meetings, preparing the agenda, overseeing preparation of materials for presentation to the meeting and for preparing and distributing minutes of the meetings.

Project Assurance: This role is held by UNDP and supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate management milestones are managed and completed.

The Project Manager is responsible for the day-to-day implementation of the project in coordination with different stakeholders and the project's team. This includes ensuring the quality and timeliness of all project activities and outputs and supervising the work of consultants; requesting the advancement of project funds; preparing Quarterly and Annual Progress Reports; liaising with the Project Assurance role, and requesting ad-hoc directions from the Project Board when required. The draft terms of reference are attached.

Project Support Unit:

The Project Support will provide project administration and management support to the Project Manager as required by the needs of the project or Project Manager.

B. _UNDP Support to Implementation:_ As implementation proceeds, UNDP will provide specific services to the implementing partner in support of delivering the expected outputs. The costs of these support services will be charged directly to the project budget.

C. _Facilities and Administration (F & A):_ The budget includes 3% Facilities and Administration to UNDP defined as General Management Support (GMS).

D. <u>Collaborative Arrangements with Related Projects:</u> This project will be executed in collaboration with Kuwait Oil Company (KOC). KOC plans to fund, through its Contracting System, a project for the development and implementation of a comprehensive air compliance management plan within the KEPA-KOC partnership for the improvement of Kuwait's regulatory system. The Partnership Agreement between KOC and KEPA is under preparation and will be finalized and signed by the end of 2009. KOC's project will support establishing a strong Air Regulatory Management System specific to Exploration and Production Operations to assist KEPA in enforcing regulatory requirements on KOC. KOC, on the other hand, will establish its Compliance Management System. KEPA participated in project design and, as agreed with KOC, KEPA will participate in the supervision of regulatory associated project tasks. It is also expected that KOC will provide KEPA with access to its EMIS which will lead to integration with KOC's system and creating KEPA's regulatory based air emissions reporting system.

III. MONITORING FRAMEWORK AND EVALUATION

Within the annual cycle

- A quality assessment shall record progress towards the completion of key results, based on quality criteria and methods captured in the Quality Management table below.

- An Issue Log shall be activated in Atlas and updated by the Project Manager to facilitate tracking and resolution of potential problems or requests for change.

- Based on the initial risk analysis submitted (see annex 1), a risk log shall be activated in Atlas and regularly updated by reviewing the external environment that may affect the project implementation.

- Based on the above information recorded in Atlas, a Project Progress Reports (PPR) shall be submitted by the Project Manager to the Project Board through Project Assurance, using the standard report format available in the Executive Snapshot.

- a project Lesson-learned log shall be activated and regularly updated to ensure on-going learning and adaptation within the organization, and to facilitate the preparation of the Lessons-learned Report at the end of the project

- a Monitoring Schedule Plan shall be activated in Atlas and updated to track key management actions/events

Annually

- **Annual Review Report**. An Annual Review Report shall be prepared by the Project Manager and shared with the Project Board and the Outcome Board. As minimum requirement, the Annual Review Report shall consist of the Atlas standard format for the QPR covering the whole year with updated information for each above element of the QPR as well as a summary of results achieved against pre-defined annual targets at the output level.

- **Annual Project Review**. Based on the above report, an annual project review shall be conducted during the fourth quarter of the year or soon after, to assess the performance of the project and appraise the Annual Work Plan (AWP) for the following year. In the last year, this review will be a final assessment. This review is driven by the Project Board and may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

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Quality Management for Project Activity Results
Year: 2010

OUTPUT 1: Regulatory Management System for Air Quality: Part 1. Management Approach		
1.1	**Baseline Assessment**	Start Date:01/01/2010 End Date: 30/06/2010
Purpose	Identification of Kuwait specific regulatory program goals	
Description	Analyses to document current environmental and administrative situation, law and legal requirements related to air quality control in Kuwait. It provides the basis for identification of actions needed in the design of new legal requirements.	
Quality Criteria	**Quality Method**	**Date of Assessment**
Challenges vs. Impacts	Checklist of challenges vs. Impact	29/02/2010
SWOT Analysis	SWOT Table	31/04/2010
Regulatory goal validity towards fulfilling Kuwait's needs	Checklist	15/06/2010
1.2	**Management approach to meet air regulatory program goals**	Start Date:01/07/2010 End Date: 30/12/2010
Purpose	Finding the right blend of approaches of air regulatory management in Kuwait	
Description	Assessment of management approaches (mandatory, voluntary, market-based) that make the framework underlying air regulatory program in Kuwait and reaching the adequate blend for Kuwait.	
Quality Criteria	**Quality Method**	**Date of Assessment**
Suitability of management approaches against identified regulatory program goals.	Checklist	31/08/2010
Appropriateness of management blend to Kuwait	Checklist	15/12/2010
OUTPUT 2: Air Emissions Management and Reporting System with integrated Air Emissions inventory plan		
2.1	**Emissions reporting and modelling system**	Start Date:01/01/2010 End Date: 30/12/2010
Purpose	Development of EPA's regulatory emissions management system	
Description	Design and implementation of air emissions reporting, modelling and air quality forecasting system	
Quality Criteria	**Quality Method**	**Date of Assessment**
Complete functional system	Checklists: - Design Document - Reporting hierarchy - Reporting requirements - Integration requirements - Site acceptance test	15/12/2010
2.2	**National air emissions inventory plan**	Start Date:04/07/2010 End Date: 30/12/2010
Purpose	Development of air emission inventory plan	
Description	Establish sector-based emission inevtory requirements, inventory team and communication tools with regulated entities responsible for emissions reporting	
Quality Criteria	**Quality Method**	**Date of Assessment**
Complete air emission inventory plan	Plan content checklist	15/09/2010
Prepared sector-based EPA inventory team	Sector-based inventory team checklist	15/12/2010

Year: 2011

OUTPUT 1: Regulatory Management System for Air Quality. Part 2: Program Design		
1.1	Regulatory air quality management program design	Start Date:02/01/2011 End Date: 30/12/2011
Purpose	Development of final design of air quality management program	
Description	Final design of management approach that makes up the framework underlying KEPA future enforcement and compliance program for air emissions. In addition, the program should include enforcement strategies and procedures. The new legal requirements (laws, regulations, permits, and policies) will be detailed and documented in Arabic and English.	
Quality Criteria	**Quality Method**	**Date of Assessment**
Clarity and necessity of each type of requirement	Checklist of requirement types	30/11/2011
Practicability of each type of standard	Checklist of standard types	30/11/2011
Completeness of the list of regulated entities towards applicable requirements and standards	Verification list of regulated entities using updated government information	30/11/2011
Effectiveness of compliance promotion approaches	List of compliance promotion approaches and evaluation checklist	30/11/2011
Effectiveness of identified enforcement processes of taking timely and appropriate enforcement actions	Effectiveness evaluation of enforcement mechanisms checklist	30/11/2011
OUTPUT 2: Initiation of the National Air Emissions Inventory		
2.1	**Emissions inventory Data Collection**	Start Date:02/01/2011 End Date: 30/12/2011
Purpose	Collection of source data from regulated entities and data entry	
Description	Initiation of emission inventory and reporting automation	
Quality Criteria	**Quality Method**	**Date of Assessment**
Adequate, complete and relevant data collection	Checklists	Monthly during 2011

Year: 2012

OUTPUT 1: Program Infrastructure and Capacity Building		
1.1	Effective Program Infrastructure	Start Date:01/01/2012 End Date: 30/12/2012
Purpose	Establish an organizational structure that can implement air regulatory program.	
Description	Develop skilled enforcement and audit teams with clear organizational roles and track competence to ensure high performance.	
Quality Criteria	**Quality Method**	**Date of Assessment**
Complete and relevant KEPA's learning Management System	Completely automated learning management system including all relevant courses and schedules to track skill development and competence enhancement. Verified by checklists	20/12/2012
Effective organizational design	Organization structure scenario checklists	15/12/2012
Qualified Staff	Training Q&A completeness checklist and exam scores	15/12/2012
OUTPUT 2: National Emission Inventory and Air Quality Mapping		
2.1	**Emissions inventory of point sources (continued)**	Start Date:01/01/2012 End Date: 30/12/2012
Purpose	Collection of source data from regulated entities	
Description	Continuation of data collection of sector specific emissions data	
Quality Criteria	**Quality Method**	**Date of Assessment**
Complete data collection	Completed data entry sheets	15/10/2012
Automated sector specific emissions estimation and continuous reporting	Site acceptance test checklists	15/12/2012
2.2	**Air Quality Mapping**	Start Date:01/07/2012 End Date: 30/12/2012
Purpose	Data entry into dispersion model	
Description	Initiate source, meteorological and other required data entry into dispersion modelling system	
Quality Criteria	**Quality Method**	**Date of Assessment**
Data entered in system	Visual data entry checks simultaneously used with checklists	20/12/2012

Year: 2013

OUTPUT 1: Air Quality Mapping		
1.1	**Air Quality Mapping**	Start Date:01/01/2013 End Date: 30/06/2013
Purpose	Dispersion modeling and establish GIS-based Air Quality Control Zones (AQCZs)	
Description	Data entry into dispersion modeling system and perform emission dispersion modeling for all sources and Define pollutant specific attainment and non attainment zones	
Quality Criteria	**Quality Method**	**Date of Assessment**
Kuwait Concentration maps	Clarity of concentration counters	30/06/2013
Pollutant specific air quality control zone maps	Statistical methods to define attainment and non attainment zones	01/12/2013
OUTPUT 2: Implementation of Regulatory Management System for Air Quality		
2.1	**Kuwait's Integrated Air Quality Improvement and Management Plan**	Start Date:01/07/2013 End Date: 31/12/2013
Purpose	Develop air quality plan to improve and manage zone specific air quality	
Description	Design a plan with zone specific control technology and monitoring requirements and set schedules to meet regulatory requirements.	
Quality Criteria	**Quality Method**	**Date of Assessment**
-	-	Activity will continue and checked the following year

Year: 2014

OUTPUT 1: Implementation of Regulatory Management System for Air Quality (Continued)		
1.1	**Kuwait's Integrated Air Quality Improvement and Management Plan**	Start Date:01/01/2014 End Date: 30/09/2014
Purpose	Develop air quality plan to improve and manage zone specific air quality	
Description	Design a plan with zone specific control technology and monitoring requirements and set schedules to meet regulatory requirements.	
Quality Criteria	**Quality Method**	**Date of Assessment**

Final Plan document	- Checklists for
	  • Sources of concern
	  • Pollutant specific improvement targets
	  • Control requirements
	  • Entity/sector specific compliance schedules
		01/09/2014

Government review	Approval by Kuwait Government	30/09/2014
1.2	**Compliance and enforcement indicators**	Start Date:01/07/2014 End Date: 31/12/2014
Purpose	Establish performance measurement and management methods	
Description	Identification, development and using performance indicators	
Quality Criteria	**Quality Method**	**Date of Assessment**
Performance indicator description and selection criteria	Checklist of identified indicators, their sources, limitation and utility in performance evaluation	15/12/2014

IV. LEGAL CONTEXT

This document together with the revised CPAP signed by the Government and UNDP on 25 July 2011, which is incorporated by reference constitute together a Project Document as referred to in the Revised Basic Agreement, signed on 13 February 1962 and all CPAP provisions apply to this document. Consistent with Article III of the Revised Basic Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

1. Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

2. Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

3. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement. 4. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

ANNEXES

1. **Risk Analysis**.

2. **Project Tree**

3. **Agreements**. Any additional agreements, such as cost sharing agreements, project cooperation agreements signed with NGOs[1] (where the NGO is designated as the "executing entity") should be attached.
    a. Memorandum of Understanding between KEPA and KOC (attached with two appendixes).
    b. Required Features of GIS Based Emissions Reporting and Modeling System Specifically Designed for Kuwait Environment Public Authority to Implement Air Regulatory System
    c. **(Agreement with system implementation consultant will be established after presentation by KOC consultant)**
    d. LOA between KEPA and UNDP for the provision of support services

4. **Terms of Reference for Project Personnel**

Project Title: Kuwait Integrated Environmental Management (KIEM) | **Award ID:** | **Date:**

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
1	Institutional/ Execution Capacity		Organizational	P = 3 I = 4	• Implement automated tracking of skill development • Set performance standards and conduct periodic performance evaluation • Take adequate timely actions when performance standards are not met	Manager of Environment Strategy office			
3	Implementation arrangements		Organizational	P = 2 I = 4	• Adopt integration methodology among team leaders, project manager and project support • Adopt clear communication plan • Ensure systematic reporting by team leaders to project manager • Conduct periodic meetings to ensure that team leaders are	Manager of Environment Strategy office			

#	Risk	Category	P / I	Mitigation	Owner
	Human resources Processes and Procedures	Organizational	P = 2 I = 5	responding to project requirement in a timely manner • Understanding of civil services regulations and ensuring compliance with these regulations • Submit a plan of resource utilization to human resources department with approval of EPA's director general. • Ensure that tasks are understood by staff and documented for follow-up with human resources department • Adopt problem solving approach in coordination among Environment strategy office, DG office and human resources department to prevent delays. • Set annual plans for resources utilization.	Manager of Environment Strategy office
4	Partnerships failing to deliver on time	Strategic	P = 2 I = 5	• Understand partner's internal requirements and set response	Project Manager

#					
				scenarios when delay occurs • Establish effective communication plan • Maximize effort integration and assign roles, responsibilities and accountabilities at an early stage	
5	Stakeholder Relations	Strategic	P=2 I=3	• Conduct awareness training • Establish effective communication plan • Maximize effort of integration among concerned parties and assign roles, responsibilities and accountabilities at an early stage.	Manager of Environment Strategy office

Annex 2

Project Objective Table

CPAP Expected Outcome: 4.2 Compliance of public and private institutions in environmental regulations enhanced

CPAP Expected Outputs	4.2.1 providing technical expertise and international best practices to support the development and implementation of a regulatory based integrated management system KIEM	4.2.2 Support developing a strategic Action Plan with objectives, targets and performance indicators.	4.2.3 support to enhance regulatory air emissions inventory.
Activity Results			
Year 2010	1.1 Mobilization		
Inputs	• Personnel: Project Manager • UNDP Country office • KEPA environmental strategy office		
Year 2011	1.1.Baseline Assessment 1.2. Management approach to meet air regulatory program goals		2.1. Emissions reporting and modeling system 2.2. National air emissions inventory plan

Inputs	• Personnel:
	  - Project Manager
	  - Team Leader: Air Regulatory Management System
	  - KEPA project team
	• All air regulatory related studies, reports and records.
			• Personnel:
			  - Project Manager
			  - Team Leader (Air Emissions Management and Reporting system
			  - KEPA project team
			• 10 high performance Personal computers
			• Qualified MIS provider
			• Emissions management and mapping software.

Year 2012	1.1 Regulatory air quality management program design		2.1. Emissions inventory data collection

Inputs	• Personnel:
	  - Project Manager
	  - Team Leader: Air Regulatory Management System
	  - KEPA project team		

Year 2013	1.1. Effective program Infrastructure	2.1. Emission inventory (continued) 2.2. Air quality mapping

Inputs	• Personnel:
	  - Project Manager
	  - Team Leader: Air Regulatory Management System
	  - KEPA project team
	• 5 Personal computers
	• Qualified LMS provider
	• Learning Management System
		• Personnel:
		  - Project Manager
		  - Team Leader (Air Emissions Management and Reporting
		  - System KEPA project team
		• 10 high performance Personal computers
		• Qualified MIS provider
		• Emissions management and mapping software.

Year 2014	2.1. Kuwait's Integrated Air Quality Improvement and Management Plan	1.1 Air quality mapping

Inputs	• Personnel:
	  - Project Manager
	  - Team Leader (Air Quality Management Planning)
	  - Team Leader (Air Regulatory Management System)
	  - Team Leader (Air Emissions Management and reporting System)
	  - KEPA project team
	• 10 high performance Personal computers
	• Qualified MIS provider
	• Emissions management and mapping software.
		• Personnel:
		  - Project Manager
		  - Team Leader (Air Emissions Management and Reporting
		  - System KEPA project team
		• 10 high performance Personal computers
		• Qualified MIS provider
		Emissions management and mapping software.

Year 2015	1.1. Kuwait's Integrated Air Quality Improvement and Management Plan 1.2. Compliance and enforcement indicators	

input	• Personnel:
	  - Project Manager
	  - Team Leader (Air Quality Management Planning)
	  - Team Leader (Air Regulatory Management System)
	  - Team Leader (Air Emissions Management and reporting System)
	  - KEPA project team
	• 10 high performance Personal computers
	• Qualified MIS provider	

2

- Emissions management and mapping software.

3

ANNEX 3

مذكرة تفاهم

الشراكة بين الهيئة العامة للبيئة وشركة نفط الكويت للمحافظة على
جودة الهواء في مناطق عمليات الشركة والمناطق المحيطة بها

١- تعريفات:

يقصد بالمصطلحات الواردة في مذكرة التفاهم التالي :

الهيئة: الهيئة العامة للبيئة   (EPA)

الشركة: شركة نفط الكويت (KOC)

المعايير: المعايير والمقاييس والاشتراطات الواردة في اللوائح التنفيذية الصادرة عن الهيئة العامة للبيئة.

٢- نبذة مختصرة عن المشروع

٢-١ تتطلع الهيئة من خلال خطتها الإستراتيجية البيئية إلى التكامل بين حماية صحة الإنسان والاستدامة الايكولوجية. وتعتمد هذه الخطة على تحقيق عدة أهداف رئيسية أهمها تفعيل تطبيق القوانين واللوائح البيئية من خلال وضع أطر الإلزام و التقيد بالنظم والتشريعات البيئية.

٢-٢ واستجابة لتحقيق أهداف هذه الخطة وضعت الشركة المحافظة على البيئة وحماية صحة الإنسان في قمة أولوياتها من خلال تطوير وتطبيق برنامج لضمان عدم تأثير عملياتها على جودة البيئة المحيطة.

٢-٣ كما أن الشركة حريصة على التعاون المستمر مع الهيئة من خلال مساندتها في إنجاح مهامها لحماية البيئة والمحافظة على صحة الإنسان وبذلها الجهود الواضحة لإنجاح الهيئة

في تحقيق أهدافها الإستراتيجية المتعلقة بإيجاد نظام فاعل لتنفيذ ومتابعة التقيد بالنظم و التشريعات البيئية.

٤-٢ وحيث أن الهيئة هي الجهة المسئولة عن اتخاذ الإجراء المناسب لتطبيق القانون البيئي وذلك لمنع أية انعكاسات سلبية على صحة الإنسان والبيئة للأنشطة القائمة والمشاريع المستقبلية.

٥-٢ ومن أجل المساهمة في تحسين جودة الهواء بدولة الكويت حرصت كل من الهيئة و الشركة على وضع إطار للتعاون فيما بينهما ينظم ويساعد الهيئة في فرض الالتزام بتطبيق القوانين واللوائح البيئية.

٣- **شروط الاتفاقية**

بناء على ما تقدم :

فقد اتفقت الشركة مع الهيئة على بلورة إطار التعاون من خلال بناء الشراكة فيما بينها للمحافظة على تحسين جودة الهواء الجوي في مناطق عمليات الشركة و المناطق المحيطة بها بهدف تسهيل مهمة الهيئة في إلزام الشركة بنظم ومعايير المحافظة على جودة الهواء ومساعدة الشركة في جهودها للتقيد بهذه النظم و المعايير، وبناء على ذلك:

فقد اتفق الطرفان على القيام بمشروع " تطوير و تطبيق خطة شاملة لإدارة الانبعاثات الجوية من عمليات وأنشطة الشركة من خلال بناء نظام إداري للالتزام والتقيد بالنظم والمعايير البيئية بتمويل من الشركة حسب الأسس العامة والقواعد الأساسية التالية :

١-٣ يتم إنجاز المشروع حسب الشروط المرجعية للمشروع في المرفق رقم ١ .

٢-٣ توزيع المهام والمسئوليات بين الجهتين خلال مدة إنجاز المشروع وتكون مخرجات المشروع حسب ما جاء في المرفق رقم ٢.

٣-٣   يتم تطوير وتطبيق نظام لإدارة التدريب البيئي لخدمة الجهتين على المدى   الطويل.

٣-٤   يتم إنجاز المشروع بالتكامل مع الجهود التي تبذلها الشركة حاليا المتمثلة بما يلي:

أ   مشروع وضع نظام لإنشاء قاعدة بيانات للملوثات المنبعثة من مصادرها
المختلفة من مرافق عمليات الشركة وتقييم المخاطر البيئية والصحية
(Environmental Management Information and Web-based
Reporting System: EMIS/Contract No.32203)

ب   مشروع تقييم القانون الحالي للهيئة (Evaluation of Kuwait EPA
Regulations for the Oil and Petrochemical Industries-
Contract No. LVC-38678)

٣-٥   ضرورة التنسيق والموافقة المسبقة بين الطرفين لإنجاز مهام المشروع .

٣-٦   إن النظم الداخلية للشركة هي التي تحكم وتدير تنفيذ أي مشروع أو دراسة   تصب
في إطار   الشراكة بين الجانبين.

٣-٧   أن الشركة هي المسئول المباشر عن متابعه تنفيذ مهام المشروع بالتشاور
والتعاون مع الهيئة .

توقيع الطرفين

عن: شركة نفط الكويت

الاسم: سامي فهد الرشيد

المسمى الوظيفي: رئيس مجلس الإدارة والعضو المنتدب

التاريخ: _____ ٢٢/١٢/٢٠٠٩

عن: الهيئة العامة للبيئة
رئيس مجلس الإدارة
د.صلاح ناجي فهد المضحي

الاسم: الدكتور/ صلاح المضحى

المسمى الوظيفي: مدير عام الهيئة العامة للبيئة

التاريخ: _____ ٢٣/١٢/٢٠٠٩

ATTACHMENT (1)

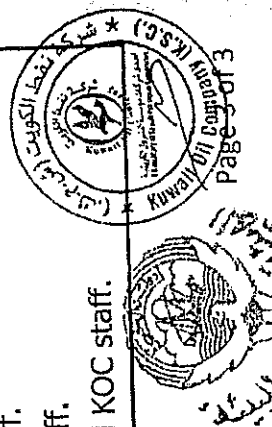| Item No.	Task	Description
1.	Mobilization	Setting final projection plan, identification and categorization of EPA and KOC project teams, establish communication plan between KOC and EPA and allocate space with computer/networking facilities.
2.	Baseline review	Swat (strength, weaknesses, opportunities and threats) analysis to document current environmental and administrative situation, law and legal and requirements related to air quality control in Kuwait. It provides the basis for identification of actions needed as specified in the task 4 below.
3.	EPA's Air enforcement and compliance management program (AEMP) development	Final design of management approach that makes up the framework underlying KEPA future enforcement and compliance program for air emissions from KOC operations and establishment of audit protocols. In addition, the program should include the program should include (laws, regulations, enforcement strategies and procedures. The new legal requirements (laws, regulations, permits, and policies) shall be detailed and documented in Arabic and English. Development of Kuwait specific regulatory criterion/citation database. The program management system shall also identify the structure of EPA's air quality management group responsible for administering the regulatory requirements. The group shall include members that will participate in project execution as EPA/KOC joint project team.
4.	Awareness Training Program	Design and implementation of awareness training program for EPA and KOC staff selected for project team. The program shall deliver Air quality management training courses to project groups identified during mobilization period by KEPA/KOC.
5.	EPA integrated air emission inventory management	Development of regulatory based emission inventory of criteria pollutant, HAPs and GHG, and integrate with KOC's Environmental Management Information System (EMIS) to establish KOC's electronic reporting within EPA's air inventory reporting system.

ATTACHMENT (1)

Item No.	Task	Description
6.	Regulatory based Air shed modeling and human health risk assessment from all KOC sources	Completion of comprehensive dispersion modeling of emissions from all KOC point sources and prediction of one (1) hour and annual concentrations of criteria and reprehensive HAPs at receptors of concern.
7.	Ambient air monitoring	Conduct one year of ambient monitoring for pollutants of concern and calculate one (1) hour and annual averages in selected residents areas based on hot spot identification from task 6.
8.	Regulatory based air compliance management planning	Design and finalize KOC air compliance plan with program to address applicable requirements for control of criteria pollutant, HAPs source performance, control technology requirement analysis, pertaining requirements, recordkeeping and reporting requirements. The plan shall also include implementation schedules and environmental calendar to respond to applicable requirements and meet standards such as AAQ, NSPS, technology, practice and information standards. The plan shall include a compliance audit program and protocols.
9.	Regulatory compliance management	Implement compliance programs outlined in Task 8 with a system that enables KOC to manage air quality responsibilities more easily and efficiency and access the latest regulatory updates directly from within the system. The system involves delegation and monitoring compliance activities and improves compliance automatically. The Company shall submit the system reports for KEPA's approval.
10.	Regulatory audit management	Implement automated audit management system that integrates with KOC EMIS and Compliance management system. This system manages all stages of environmental audit process including (1) assigning audit protocols outlined in Task 8, schedule audits and verify proper audit resource, (2) recording field audit results, document findings, recommendations and assign corrective actions, (3) tracking one or more corrective actions and tasks assigned to a checklist item, finding or audit, (4) generating a variety of standard reports to track risk, findings, history and corrective actions for ongoing process review. Management process must involve: (1) assignment and tracking of findings, recommendations, observations, best practices and corrective actions, (2) recording of costs and generation of internal purchase orders associated with each audit, citation, and corrective action.

Development and Implementation of KOC's Comprehensive Air Compliance Management Plan within the EPA-KOC Partnership for the Improvement of Kuwait's Regulatory System
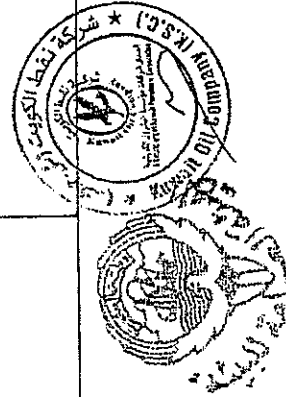
ATTACHMENT (1)

Item No.	Task	Description
11.	Regulatory reporting and record keeping	Final EPA integrated electronic reporting and record keeping management system shall include the following: • Inventory of the emission of all regulated pollutants and all pollutants for which the facility is classified as a major source. • Description of all emissions points. • Emissions rates. • Description of fuels and how they are used, as well as a description of raw materials used. • Description of all pollution control equipment. • Description of any operating limitations or restrictions on work practices that affect the emissions of regulated pollutants. • Description of all applicable EPA air pollution control requirements, including those that shall become effective during the term of the permit and that have been promulgated at the time of the permit application. • Description of any test methods that shall be used to determine compliance with each pollution control requirement. • Monitoring and reporting specified in the permit.
12.	Regulatory performance management	Design and implement KOC integrated, automated communications capability that shall transform air management data into concise, meaningful information that helps KOC drive operational improvements and supports solid management analysis and decision making.
13.	Special training to KOC and EPA on compliance management, auditing and performance monitoring	Provide three types of training on compliance management, auditing and performance monitoring including:- Type 1. Regulatory Authority Training designed to KEPA staff. Type 2. Regulated community Training designed to KOC staff. Type 3. General communications training for both KEPA and KOC staff.

Development and Implementation of KOC's Comprehensive Air Compliance Management Plan within the EPA-KOC Partnership for the Improvement of Kuwait's Regulatory System
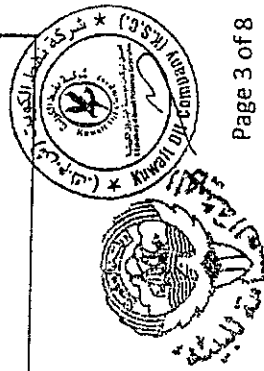
Page 1 of 8

ATTACHMENT (2)

Item No.	Task	Description	Supervision	Beneficiary	Deliverables
1.	Mobilization	Setting final project plan, identification and categorization of EPA and KOC project teams, establish communication plan between KOC and EPA and allocate space with computer/networking facilities.	KOC	KEPA, KOC	• Final project plan and agreed upon project schedule • EPA project team plan • KOC project team plan • Communication plan • Space utilization plan
2.	Baseline review	SWOT (strengths, weaknesses, opportunities and threats) analysis to document current environmental and administrative situation and law and legal requirements related to air quality control in Kuwait. It provides the basis for identification of action needed in Task 4.	KEPA	KEPA	A document including a baseline review based on SWOT analysis: • Strengths: Internal elements within the system which are helpful to achieve the desired future objective. • Weaknesses: Internal elements within the system which are harmful to achieving the desired future objective. • Opportunities: External conditions that are helpful to achieving the desired future objective. • Threats: External conditions that could harm the desired future objective.

Development and Implementation of KOC's Comprehensive Air Compliance Management Plan within the EPA-KOC Partnership for the Improvement of Kuwait's Regulatory System

Page 2 of 8

ATTACHMENT (2)

Item No.	Task	Description	Supervision	Beneficiary	Deliverables
3.	EPA's Air enforcement and compliance management program (AEMP) development	Final design of management approach that make up the framework underlying KEPA future enforcement and compliance program for air emissions from KOC operations. In addition program shall include enforcement strategies and procedures. Legal requirements (laws, regulations, permits and policies) shall be detailed and documented in Arabic and English. Development of Kuwait specific regulatory criterion/citations database. The program management system shall also identify the structure of EPA's air quality management group responsible for administering the regulatory requirements. The group shall include members that will participate in project execution as EPA project team.	KEPA	KEPA	Document in (Arabic and English) including design of enforcement and compliance management program for air emissions management from KOC operations. The document shall contain the following standards and requirements and enforcement mechanisms for KOC: **Standards:** • Ambient air quality (AAQS) for criteria pollutants • Source Performance for non criteria pollutants • Technology • Practice • Information **Requirements:** • Air pollution prevention and control regulations • Regulations for preservation of existing clean air resources regulations • Regulations for Attainment of AAQS in areas where air quality has deteriorated • Regulations for prevention of chemical accidents • Operation permits • Guidance and policies to meet to interpret regulatory requirements • Audit protocols and requirements

Development and Implementation of KOC's Comprehensive Air Compliance Management Plan within the EPA-KOC Partnership for the Improvement of Kuwait's Regulatory System
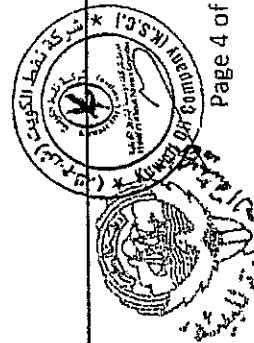
ATTACHMENT (2)

Item No.	Task	Description	Supervision	Beneficiary	Deliverables
4.	Awareness Training Program	Design and implementation of awareness training program for EPA and KOC staff selected for project team. The program shall deliver air quality management training courses to project groups identified during mobilization period	KOC	KEPA, KOC	EPA and KOC project staff prepared to carry out responsibilities within project tasks. Still need to be developed as follows: • Principles of air quality management • Air Pollution Dispersion Models-Application • Control of Gaseous Emissions • Control of Particulate Emissions • Fundamentals of New Source Review and Prevention of Significant Deterioration • Operation Permits Workshop • Sources and Control of Volatile Organic Air Pollutants
5.	EPA integrated air emissions inventory management	Development of regulatory-based emission inventory of criteria pollutants, HAPs and GHG, and integrate with KOC's Environmental Management Information System (EMIS) to establish KOC's electronic reporting within EPA's air inventory reporting system.	KEPA/KOC	KEPA	• Completed web-based regulatory emission inventory of both criteria pollutants and GHG integrated with KOC EMIS. • EPA's air inventory reporting system integrated with KOC EMIS.

Development and Implementation of KOC's Comprehensive Air Compliance Management Plan within the EPA-KOC
Partnership for the Improvement of Kuwait's Regulatory System
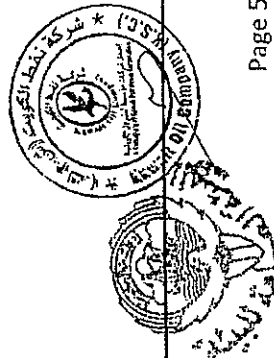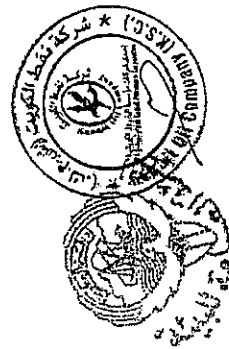
ATTACHMENT (2)

Item No.	Task	Description	Supervision	Beneficiary	Deliverables
6.	Regulatory based Air shed modeling and human health risk assessment from all KOC sources	Completion of comprehensive dispersion modeling of emissions from all KOC point sources and prediction of one (1) hour and annual concentrations of criteria and reprehensive HAPs at receptors of concern.	KOC	KEPA, KOC	• Data gathering templates • Maps containing concentration contours • Hot spots and receptors of highest concern • Health risk assessment report
7.	Ambient air monitoring	Conduct one year of ambient monitoring for pollutants of concern and calculate one (1) hour and annual averages in selected residential areas.	KOC	KEPA, KOC	• Monthly Reports including Daily average of pollutants at site • One Year Report including Daily/Monthly average of pollutants at site
8.	Regulatory based air compliance management planning	Design and finalize KOC air compliance plan with programs to address applicable requirements for control of criteria pollutants, HAPs source performance, GHG reduction measures, control technology requirement analysis, permitting requirements, record keeping and reporting requirements. The plan shall also include implementation schedules and an environmental colander to respond to applicable requirements and meet standards such as AAQS, NSPS, Technology, practice and information standards. The plan shall include a compliance audit program and protocols.	KOC	KOC	• Compliance program design document including action items • Compliance program execution plan and environmental calendar • Organizational structure responsible for undertaking compliance program in KOC • Site specific compliance guidance for area supervisors • Audit program document • KPI's • Reporting and record keeping formats

ATTACHMENT (2)

Item No.	Task	Description	Supervision	Beneficiary	Deliverables
9.	Regulatory compliance management	Implement compliance programs outlined in Task 8 with a system that enables KOC to manage air quality responsibilities more easily and efficiently and access the latest regulatory updates directly from within the system. The system involves delegation and monitoring compliance activities and improves compliance automatically. The Company shall submit the system reports to KEPA.	KOC	KOC	• Implementation design document • Automated compliance management system • Trained KOC staff on operating system
10.	Regulatory audit management	Implement automated audit management system that integrates with KOC EMIS and Compliance Management system. This system manages all stages of environmental audit process including: 1) Assigning audit protocols outlined in Task 8, schedule audits and verify proper audit resources. 2) Recording field audit results, document findings, recommendations and assign corrective actions.	KOC		• Implement design document. • Automated audit management system. • Trained KOC staff on operating system and carrying out field audits.

ATTACHMENT (2)

Item No.	Task	Description	Supervision	Beneficiary	Deliverables
10. Cont'd		3) Tracking one or more corrective actions and tasks assigned to a checklist item, finding or audit. 4) Generating a variety of standard reports to track risk, findings, history and corrective actions for ongoing process review. Management process shall involve the following: 1) Assignment and tracking of findings, recommendations, observations, best practices and corrective actions. 2) Recording of costs and generation of internal purchase orders associated with each audit, citation, and corrective action.			

ATTACHMENT (2)

Item No.	Task	Description	Supervisio n	Beneficiary	Deliverables
12.	Regulatory performance management	Designing and implementing KOC integrated, automated communications capability that transforms air management data into concise, meaningful information that helps KOC drive operational improvements and supports solid management analysis and decision making.	KOC		• Implementation design document. • Automated Regulatory Performance System.
13.	Special training to KOC and EPA on compliance management, auditing and performance monitoring	Provide three types of training on compliance management, auditing and performance monitoring including:- Type 1. Regulatory Authority Training designed to KEPA staff. Type 2. Regulated community Training designed to KOC staff. Type 3. General communications training for both KEPA and KOC staff.	KOC		• Trained EPA staff on enforcement. • Trained KOC staff on compliance. • Trained EPA and KOC staff on communication skills between EPA and KOC.

ATTACHMENT (2)

Item No.	Task	Description	Supervision	Beneficiary	Deliverables
11.	Regulatory reporting and record keeping	Final EPA integrated electronic reporting and record keeping management system shall include the following : • Inventory of the emissions of all regulated pollutants and all pollutants for which the facility is classified as a major source. • Description of all emissions points. • Emission rates. • Description of fuels and how they are used, as well as a description of raw materials used. • Description of all pollution control equipment. • Description of any operating limitations or restrictions on work practices that affect the emissions of regulated pollutants. • Description of all applicable EPA air pollution control requirements, including those that shall become effective during the term of the permit and that have been promulgated at the time of the permit application. • Description of any test methods that shall be used to determine compliance with each pollution control requirement. • Monitoring and reporting specified in the permit.	KOC		• Implementation design document • Automated regulatory reporting and recordkeeping system. • Trained KOC staff on operating system and carrying reporting and recordkeeping duties.
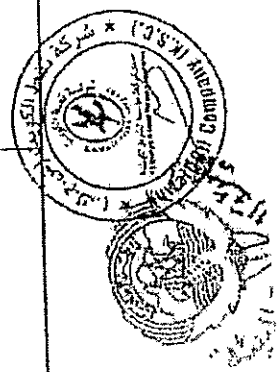
ANNEX 4

Required Features of GIS Based Emissions Reporting and Modeling System Specifically Designed for Kuwait Environment Public Authority to Implement Air Regulatory System

1. INTRODUCTION:

Below are detailed features and capabilities that must be available in the GIS Based Emissions Reporting and Modeling System needed to support the Environment Public Authority (KEPA) Emission Reporting and Modeling System for Kuwait (SYSTEM).

1. Data Management Issues

    a) Consolidated Date Storage
    b) Secure system
    c) Web-based access
    d) QA \ QC of reported data
    e) Control of monitored data
    f) Air resource tools to support decision making
    g) Increase productivity through IT
    h) National and international reporting
    i) Scalable environmental management system
    j) Support for future growth

2. Technical Capabilities

    a) Emissions inventory, including GHG reporting
    b) Air modeling
    c) Prognostic weather forecasting to assess future air quality issues
    d) Locating and optimization of ambient monitoring network
    e) Monitoring of air pollutants
    f) Assessment of "hot-spots"
    g) Provision of Air Quality Indexes

3. Air Dispersion Modeling

    a) Identification of hot-spots
    b) Urban smog photochemical studies
    c) Implementation of modern policies
    d) Identification and prioritization of critical sources of emissions
    e) Establish and management and air quality control zones
    f) Long Range Atmospheric Transport – Including Cross-Border

4. Training

        a) In-depth training of technical staff as professional trainers
        b) Hands on training of management and technical users

Figure 1 displays the relationships between the various air issues and capability requirements in Kuwait. Emissions inventory is a corner stone in the effort to:

1) Optimize the benefits of existing system and program accomplishments,
2) Strengthen institutional capacity and efficiencies,
3) Further advance Kuwait's regulation based air quality management program and
4) An accurate and complete emissions inventory and supporting user-friendly IT solution will play a key role in driving other critical programs such as climate change, permitting, and enforcement initiatives.
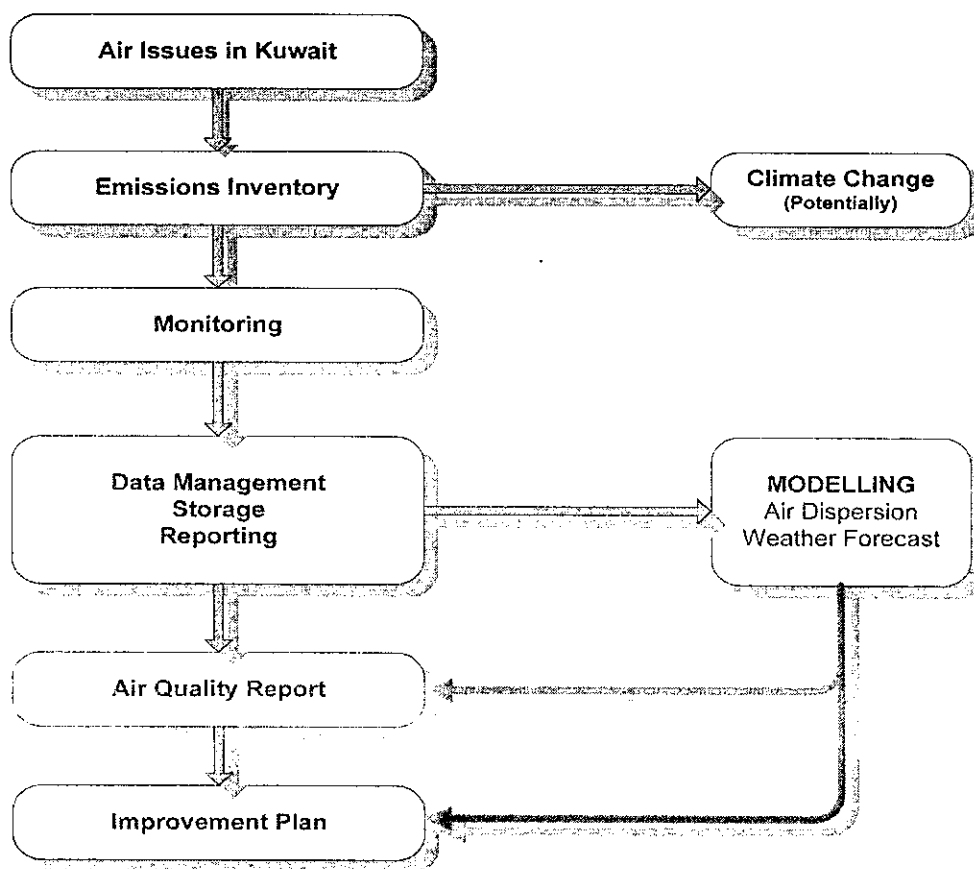

Figure 1 Air issues in Kuwait.

2

2. TECHNICAL SPECIFICATIONS

2.1 Emissions Inventory System

The SYSTEM must guide experienced and inexperienced users alike through the process of calculating emissions estimates. The SYSTEM must integrate all related emissions guidance and models into one central, unified interface where results and computations are compiled and stored in an SQL database. A central interface must be provided to maintain ease-of-use for the user and to properly store emissions data in order to perform effective data analyses and visualization.

It must have a user friendly interface that enables KEPA users to quickly perform any modeling or calculations and readily visualize the results in a graphical GIS environment. It is from this interface that data must be entered; analyzed or new emissions must be modeled. To facilitate emissions calculations, USEPA models and calculators based on AP-42, EIIP, MOBILE and other related models must be fully integrated into the SYSTEM. Furthermore, emissions inventories can then be exported to various National Emissions Inventory Input File format NIF3.0, shape files, and metafiles that conform to the current Content Standard for Digital Geospatial Metadata.

The components that must make up the SYSTEM are outlined in the following sections including the emissions calculators, USEPA emissions models, data extraction and embedded GIS technologies.

2.2 Source Categories

The SYSTEM must enable inventorying of data from a variety of emission categories including the following required source categories:

- **Stationary Sources** –These are defined as those facilities that have potential emission rates equal to or greater than 25 TPY of defined criteria pollutants [lead excepted], ammonia and hydrogen sulfide, but less than 100 TPY of carbon monoxide. Regarding HAP's, stationary point sources will be defined as those facilities that have potential emission rates equal to or greater than 5 TPY of any individual HAP compound [including lead]. Sources with emissions less than these thresholds will be considered in the area source category.

  Major stationary point sources must be defined as those facilities that have potential emission rates equal to or greater than 100 TPY of any defined criteria pollutant, ammonia and hydrogen sulfide. Regarding HAP's, major stationary point sources must be defined as those facilities that have potential emission rates or equal to or greater than 10 TPY of any individual HAP compound (25 TPY aggregate total HAP's).

  It is understood that "Type A" large stationary point sources will be those that emit actual emissions as shown in the following table:

3

Pollutant	Actual Emissions (TPY)
SO_2	2500
VOC	250
NO_x	2500
CO	2500
PM_{10}	250
$PM_{2.5}$	250

Stationary source categories could include those shown in the following table:

Table I: Tier 1 & 2 Stationary Source Categories	
Tier 1	**Tier 2**
FUEL COMBUSTION -ELECTRIC UTILITIES	Coal
	Oil
	Gas
	Other
	Internal Combustion
FUEL COMBUSTION -INDUSTRIAL	Coal
	Oil
	Gas
	Other
	Internal Combustion
FUEL COMBUSTION -COMMERCIAL/RESIDENTIAL	Commercial/Industrial Coal
	Commercial/Industrial Oil
	Commercial/Industrial Gas
	Misc. Fuel Combustion (except residential)
	Residential Wood

	Residential Other
CHEMICAL & ALLIED PRODUCT MFG	Organic Chemical Manufacturing
	Inorganic Chemical Manufacturing
	Polymer & Resin Manufacturing
	Agricultural Chemical Manufacturing
	Paint, Varnish, Lacquer, Enamel Manufacturing
	Pharmaceutical Manufacturing
	Other Chemical Manufacturing
METALS PROCESSING	Nonferrous
	Ferrous
	Not elsewhere classified (NEC)
PETROLEUM & RELATED INDUSTRIES	Oil & Gas Production
	Petroleum Refineries
	Natural Gas Processing Plants
	Natural Gas Collection/Transmission

Table 1: Tier 1 & 2 Stationary Source Categories	
Tier 1	Tier 2
OTHER INDUSTRIAL PROCESSES	Agriculture, Food, & Kindred Products
	Textiles, Leather, & Apparel Products
	Wood, Pulp & Paper, & Publishing Products
	Rubber & Miscellaneous Plastic Products
	Mineral Products
	Machinery Products
	Electronic Equipment
	Transportation Equipment
	Construction

5

	Miscellaneous Industrial Processes
SOLVENT UTILIZATION	Degreasing
	Graphic Arts
	Dry Cleaning
	Surface Coating
	Other Industrial
	Non-Industrial
	Solvent Utilization (NEC)
PETROLEUM/CHEMICAL STORAGE & TRANSPORT	Petroleum & Petroleum Product Bulk Terminals & Plants
	Petroleum & Petroleum Product Storage
	Petroleum & Petroleum Product Transport
	Gasoline Service Stations
	Organic Chemical Storage
	Organic Chemical Transport
	Inorganic Chemical Storage
	Inorganic Chemical Transport
	Bulk Materials Storage
	Bulk Materials Transport
WASTE DISPOSAL & RECYCLING	Incineration
	Open Burning
	Publicly Owned Treatment Works
	Industrial Waste Water
	Treatment Storage and Disposal Facility
	Landfills
	Other
MISCELLANEOUS	Agriculture & Forestry

	Catastrophic/ Accidental Releases
	Cooling Towers
	Health Services
	Mining
	Repair Shops
	Food Processing

Fugitive emissions from activities located at stationary point sources, such as leaking equipment seals, tank vents or wind erosion of stockpiles (coal, construction materials & other industrial dry products), must be included in the emissions totals from that stationary point source, along with tailpipe emissions generated from off road mobile source equipment operated at such facilities.

- **Area Sources** – Sources that emit less than 100 TPY of carbon monoxide, less than 25 TPY of defined criteria pollutants, ammonia or hydrogen sulfide; or less than 5 TPY of any HAP (lead included).

It should be noted that options exist for Point and Area source reconciliation. There are instances where point source and area source inventories include emissions from the same process. In such cases, the point source contributions must not be included in the Area source activity. THE SYSTEM must be able to readily handle point and area source reconciliation scenarios. This must be further facilitated by the use of visually defining point and area source within the SYSTE*'s* GIS environment.

Area sources could include industrial, commercial or residential sized sources such as those shown below:

- Agricultural Animal Feed Lots & Other Domestic Animal Ownership Practices
- Agricultural Fertilizer Usage
- Architectural/Industrial Surface Coating Operations
- Asphalt Cement Paving Operations
- Asphalt Roofing Operations
- Auto Body or Other Commercial Paint Shops
- Commercial Bakeries
- Commercial Breweries/Distilleries
- Commercial Dry Cleaners
- Construction Operations
- Gasoline/Diesel/Other Fuels: Distribution & Marketing Systems (bulk plants, service stations, aircraft refueling, truck stops, bus barns, LUST remediation, etc.)

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- Landfills
- Oil & Gas Production Industry (compressors, heaters, dehydrators, etc.)
- Open Burning (Public, Agricultural, Commercial, FLM Lands Management)
- Printers or Other Graphic Arts Establishments
- Publicly Owned Treatment Works
- Residential/Commercial/Industrial Domestic Chemical Usage
- Residential/Commercial/Industrial Small Engine Usage (i.e. lawnmower, chainsaw, etc)
- Residential/Commercial/Industrial Solvent Use (Degreasing Operations)
- Residential/Commercial/Industrial Space Heating & Other Fuel Combustion
- Restaurant Grilling Operations/Cooking Vents
- Road Dust
- Structural Fire
- Traffic Marking Operations
- Wind Erosion Fugitive Dust
- Fugitive Dust from Construction, Mining or Agricultural Practices

- **Mobile Sources** – Include On-Road vehicles and Off-Road Vehicles. Support for these emissions includes incorporation of MOBILE6, MOBILE6.1 and NONROAD as detailed further in sections 2.6 - *Major Features of MOBILE6 Interface* and 2.7 - *Major Features of NONROAD Integration.*

On-Road Mobile Sources are comprised of those in 8 categories shown in the following list:

ON-ROAD VEHICLES*

- Light-Duty Gasoline Vehicles (LDGV)
- Light-Duty Gasoline Trucks {up to 6,000 lb.} (LDGT1&2)
- Light-Duty Gasoline Trucks {6,001 - 8,500 lb.} (LDGT3&4)
- Heavy-Duty Gasoline Vehicles (HDGV)
- Light-Duty Diesel Vehicles (LDDV)
- Light-Duty Diesel Trucks (LDDT)
- Heavy-Duty Diesel Vehicles (HDDV)
- Motorcycles (MC)

*on-road vehicle emissions include both exhaust (tailpipe) & non-exhaust (tire & brake wear) sources

Although this list may not be all inclusive, Non-Road Mobile Sources could include:

NON-ROAD SOURCES

- **Off-highway Gasoline** {both 2 & 4 stroke engines}

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(ie/ agriculture/ industrial/construction use vehicles such as motor graders, bulldozers, scrapers, cranes, tractors, harvesters, etc.; recreational vehicles such as ATV's, motorcycles; & small engines such as lawnmowers, chainsaws, etc.)

- **Off-highway Diesel**
  (i.e./ agriculture, industrial & construction equipment)

- **Aircraft** (military, civil, commercial)
- **Marine Vessels**

- **Biogenic/Geogenic Sources** – These include emission sources that are naturally occurring from biological and physical process of the earth. The Biogenic Emission Inventory System (BEIS) model must be supported by *SYSTEM* to ensure easy incorporation of biogenic emissions data. Sources of pollutants include:

  - **VOC:** vegetation
    Oil & gas seeps

  - **NH$_3$:** non-domestic animals
    Vegetative matter decomposition

  - **PM:** wind erosion fugitive dust
    Geothermal activity

  - **NO$_X$:** lightning
    Geothermal activity

    Soil microbial activity

  - **SO$_2$:** Geothermal activity

  - **H$_2$S:** Geothermal activity
    Vegetative matter decomposition

  - **CO:** Lightning
    Geothermal activity

    Soil microbial activity

2.3 National Emissions Inventory & Reporting Support

The SYSTEM must contain full support for the National Emissions Inventory, enabling users to quickly set up their emissions inventories while ensuring all required data is present.

In addition to export of data for submission to the National Emissions Inventory, the SYSTEM must contain a series of structured wizards to guide users through preparing and editing an

emissions inventory that contains all necessary data. The SYSTEM must indicate mandatory data fields and implement the required QA/QC checks.

Complete support for the emissions standards must be implemented in the SYSTEM, ensuring proper data storage and easy export for rapid submission to the National Emissions Inventory.

The SYSTEM must also contain extensive reporting options for professional generation of hard copy reports of selected emissions inventory data. Support for all the requested summary reports must be included. Complete previews of reports must be available to ensure reports are complete prior to hard copy generation.

In addition to the technical specifications presented in this section, the overall database system must rely on the use of unique identifiers to accurately describe and mange reported information. At a minimum unique facility- and source-identifiers must be assigned. This information may already be available in existing databases.

Additional input is often required before a final technical specification can be implemented and must include consideration of the following:

1. Review of existing procedures, data quality, and completeness
2. Review of available GIS programs, especially designation of geopolitical boundaries and regulatory management zones
3. Industry sectors and source category definitions
4. Existing permitting system and regulatory definitions
5. Standards currently utilized in large EMIS systems

As part of the overall effort to implement an effective emission management system, widely recognized process designation schemes to categorize information based on logical facility and emission source attributes must be utilized. Examples include the Source Classification Code (SCC) and the North American Industry Classification System (NAICS). By assigning additional descriptive attributes within supporting database tables, the identification and management of individual sources or source groupings must befurther enhanced.

2.4 AP-42 Emissions Calculators

A complete series of user-friendly calculators based on the latest USEPA AP-42 guidance must be included and utilized in the SYSTEM. AP-42 emission factors are representative values, which relate the quantity of a pollutant released to the atmosphere with a particular activity or process. Each calculator must consist of a *Process Info* dialog and one or more *Results* dialogs depending on the source category. In the *Process Info* the user specifies the applicable category from a pull-down list, amount of refuse and related options and when complete, presses the *Calculate* button. The results must be computed and the user can then view them by clicking on the desired *Results* button.

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The data produced by all of the calculators must then be recognized by the SYSTEM central interface and results are stored accordingly, including details such as date and time of emissions estimation. The data can then be ultimately visualized, reported and exported to any necessary formats.

All the calculators must work as a wizard, where small data input steps are integrated with comprehensive background information already available through the UI.

2.5 Additional Emissions Calculators

There are several Emissions Inventory documents that outline approaches to emission estimation. The Emission Inventory Improvement Program (EIIP) was established in 1993 to promote the development of procedures for calculating, storing, reporting and sharing air emissions data. This ongoing work currently consists of some 7 volumes covering point sources, area sources, mobiles sources, biogenic sources, quality assurance and data management. This information must also be included in SYSTEM

2.6 Major Features of MOBILE6 Interface

MOBILE6 is a road emissions estimating model. It was developed by the Office of Transportation and Air Quality (OTAQ) of the U.S. Environmental Protection Agency. Highway motor vehicle emissions calculations include:

- Oxides of nitrogen (NO_x)
- Hydrocarbons (HC)
- Carbon Monoxide (CO)

MOBILE6 is a significant improvement over previous versions (MOBILE5) for motor vehicle fleets under a range of conditions. This latest version accounts for, among other factors, the following:

- Vehicle age distribution
- Annual mileage accumulation rates
- Diesel gasoline, and natural gas powered vehicle

- Vehicle activity patterns
  - Vehicle mile traveled (VMT) according to various classifications
  - Vehicle engine start patterns

- Fleet sub-classification – characteristics
  - Presently 28 vehicle classifications such as light-duty gasoline passenger cars to class 8b heavy-duty diesel truckers.

- Fuel type and composition
  - Volatility
  - Oxygen content

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- Sulfur
- Additives

- Emissions type classifications (6 categories)

- Roadway Classifications

2.7 Major Features of NONROAD Integration

The USEPA NONROAD model provides emissions estimations for mobile non-road sources. Non-road emission sources encompass a wide variety of vehicles and equipments, and the NONROAD model enables emission estimation for:

- Recreational vehicles (i.e. all-terrain vehicles and off-road motorcycles)
- Logging equipment (i.e. chain saws)
- Agricultural equipment (i.e. tractors)
- Construction equipment (i.e. graders and back hoes)
- Industrial equipment (i.e. fork lifts and sweepers)
- Residential and commercial lawn and garden equipment
- Recreation marine vessels

Non-road emission sources can be large contributors of VOC, NO_x, and PM emissions and as a result should not be overlooked in emissions inventories. The NONROAD model is currently distributed with a fully functional graphical user interface and reporting system. As a result, the NONROAD model, with its graphical interface must be integrated into the SYSTEM. Users must be able to launch the NONROAD model through the SYSTEM and perform their analyses in the standard NONROAD graphical user interface. Emissions estimation results must then be compiled and stored in the primary database within the SYSTEM for further analysis and visualization.

The NONROAD model incorporates default values for regions from the national level to country level across the U.S.A. These default values must enable users who do not have access to specific non-road data to still perform emissions estimations for their geographic location of interest.

2.8 Additional Emissions Model Integration

The SYSTEM must incorporate several emissions estimation and projection models. In addition to MOBILE6, MOBILE6.1 (PART5), MOBILE6.2 and NONROAD, the following models must be supported within the SYSTEM framework:

- **BEIS** - Estimates hourly emissions of biogenic volatile organic compound and soil nitrogen oxide emissions for any county in the contiguous United States. This system was developed by the USEPA's Office of Research and Development via collaboration

between the National Risk Management Research Laboratory, Emissions and Modeling Branch and the National Exposure Research Laboratory, Atmospheric Modeling Division.

- **TANKS** - Estimates volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions from fixed- and floating-roof storage tanks. TANKS is based on the emission estimation procedures from Chapter 7 of USEPA's Compilation of Air Pollutant Emission Factors (AP-42).

- **WATER9** - Estimates air emissions of individual waste constituents in wastewater collection, storage, treatment, and disposal facilities; a database listing many of the organic compounds; and procedures for obtaining reports of constituent fates, including air emissions and treatment effectiveness.

- **LAEEM** - Estimates emissions of methane, carbon dioxide, nonmethane organic compounds, and hazardous air pollutants from municipal solid waste landfills. These emissions are generated by decomposition of refuse in landfills.

- **PM CALC** - Calculates controlled emissions for filterable $PM_{2.5}$ and filterable PM_{10} for point sources.

2.9 System Administration

The SYSTEM must utilize modern administration tools and database management practices. The SYSTEM must be designed to support multiple user roles based on areas of responsibility and functional role within the agency. Access to SYSTEM functionality and data must be based on assigned user roles and permissions granted. SYSTEM administration capabilities must provide the resources necessary to manage both internal and external system access needs. Quality Assurance/ Quality Control

The SYSTEM must implement a variety of Quality Assurance checks. Defining emissions inventory reporting requirements, including the development of data acquisition protocols to coordinate data requests from the regulated community is needed. The process must be designed with consideration of the desire for inventory completeness and the requirement for high quality data. The use of automated procedures to facilitate self reporting based on standardized reporting requirements and data entry forms must be an acknowledged requirement. As part of this effort, the SYSTEM must integrate data quality controls defined in the requirements documentation to ensure adherence to data quality criteria. Examples of control mechanisms may include:

- Range Checks

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- Missing Value Checks
- Statistical Checks
- Double Entry Protection

All data submitted for inclusion in must pass QA/QC protocols before being accepted by KEPA. This SYSTEM must be designed to identify data quality issues and provide concise reporting of issues identified. To facilitate the communication between KEPA and the regulated community; and to provide required permit management capabilities, the SYSTEM must support the capability to send and receive email notifications. Multiple technical options exist to meet this requirement, however, final implementation will require additional information to better define requirements and understand the ability to integrate with current system architectures. The model and emissions estimation data must be performed within the SYSTEM and outside of it, by independent parties, to further ensure compliance with data quality requirements.

2.10 Embedded GIS Technologies

GISs technology must be extended through the use of customized GIS tools, such as SVG, that enables the software to have embedded GIS technologies. This is advantageous in that the user does not require a third-party GIS product such as ArcView to work with GIS data. The embedded SVG GIS technologies must seamlessly integrate with the SYSTEM central interface and enable easy visualization and editing of the emission estimation data within a geographic context.

2.11 Spatial/Temporal Allocation of User-Defined Selections

Spatial allocation of county-level emission estimates must be accomplished through the use of spatial surrogates or spatial allocation factors (SAFs) for each emission source category or group of source categories. Spatial surrogates are typically based on the proportion of a known region-wide characteristic variable, which exists within the region of interest. Traditionally, the development of spatial gridding surrogates for dispersion modeling applications has been performed by a variety of methods depending on the emission source category being considered, the required spatial resolution, the geographic extent of the domain, and the particular characteristics of the geospatial data available. The same spatial allocation methodologies can also be applied to general arbitrary regions. Spatial surrogates must define the percentage of zone level emissions from a particular source category that is to be allocated to some spatial region, typically a modeling grid cell. For most area and off-road sources, these percentages are based on areas of a particular land use/land cover type while for on-road mobile source categories, the percentages are usually based on total length of a certain road type or a transportation network. Often human population is also used as a spatial surrogate for certain emission source categories.

Spatial surrogates can be developed from several sources of spatial data describing the Land Use/Land Cover (LULC), transportation networks and population characteristics.

The processing and development of gridding surrogates must be performed using GIS. To develop spatial surrogates, or SAFs, the appropriate surrogate databases (i.e., land use,

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population, roadways, railways, etc), the user-specified region, and the regional/county boundaries are first imported into the GIS as geospatial coverage. Through intersecting, or overlaying, this coverage, the appropriate areal and/or linear percentages can be calculated.

3. AIR DISPERSION MODELING – ADM

The atmosphere is very dynamic with time scales on the order of seconds, especially where air flows are unconstrained. Therefore, atmospheric measurements are not as definitive as groundwater, with time scales of decades, or rivers, which run constrained by shores and have time scales on the order of a day or longer. Atmospheric pollution monitors are not uniformly or continually impacted by the same sources, chemicals or over the same temporal or spatial scale and therefore only represent a measurement taken at a single point in time and space. To address this limitation, air dispersion models are utilized to predict air concentrations and deposition rates over geospatial areas representative of various temporal resolutions. Furthermore, modern air dispersion models have been demonstrated to predict air concentrations with great accuracy. Based on the overall scope and consideration of system capabilities, it is strongly recommended the incorporation of AERMOD and CALPUFF into the SYSTEM solution. Plug-in software modules must be available to meet these requirements including AERMOD and CALPUFF. Both models have advantages and disadvantages depending on a multitude of technical considerations and intended modeling objectives. In general AERMOD must be utilized to develop baseline modeling results in near-field applications, with CALPUFF being reserved for refined or special case modeling efforts, or advanced applications such as real-time or forecast modeling.

3.1 Weather Modeling and Forecast

The main elements in data process flow for the atmospheric predictions are, in a simplified form, the following:

1. Met data assimilation from met towers and from global numerical models
2. MM5 / WRF – Weather Forecasting Models
3. "Global" model daily download from NOAA
4. Current day and two forecast days (48 hours)
5. All modeling variables calculated
6. Forecast results tabulated with frequency up to every six hours

3.2 Flare Modeling

An accurate emission flaring system must be employed to avoid un-realistic high impacts from flares, caused by very conservative models. This flare emissions model must compute potential emission from a flare and estimate the equivalent point source to be used in the air dispersion model.

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4. REPORTING

4.1 Queries and Reporting

The following sub-sections describe the querying and reporting capabilities. These Reports must include:

1) Summary Reports – Hourly, Daily, Seasonal, and Annual Emissions
2) Emissions Trend Analysis
3) Air Quality Index – Present and Forecast
4) Total Emissions Grouped by Source Categories
5) Stationary Point Source Reports
   o NEI Format
   o Actual and Potential Emissions
   o Summation of the Cumulative Total of Emissions from Each Point Source.
6) Segregated report on emissions
   o On-road Mobile
   o Non-Road Mobile
   o Flare
   o Biogenic / Geogenic
   o Industrial
   o Commercial

4.2 Report Generation

The system must have the capability to generate standardized analyses, reports and maps. Potential examples would be total SYSTEM emissions; breakdown to local level; dis-aggregation of point, area, mobile sources, others such as agricultural, natural, etc.; and potentially groupings of certain contaminants (precursors, toxics).

Reporting on custom analyses are also important in order for agencies to query and generate custom reports. This must enable them with the ability to respond to requests for such information from the public.

An important component of the SYSTEM inventories is trend analysis, including "backcasting" of historical data and "forecasting" of future years. Backcasts and forecasts are important to allow equitable comparison of emission trends over time. In addition, backcasts are especially important when emission estimation methodologies change. Backcast and forecast scenarios can be typically developed as a reporting feature of an emission inventory system, by populating the system with key statistics and indicators.

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5. DATA BASE ARCITUCTRE:

The SYSTEM must be a desktop, stand-alone system. However, to make the delivered software system more scalable, an advanced database must be embedded into SYSTEM.

The embedded database architecture must be based on a solid design and extensively tested application. This architecture, and its implementation, must have been employed in various large scale information systems.

The database architecture must be compatible with web-enabling technologies, Client/Server SQL systems, and Internet based systems, such as .NET. Some of the minimal set of components that must be intrinsic to the SYSTEM is described below:

- Client / Server SQL architecture – To serve as a central storage for data.
- Web-Enabling Layer – To allow remote KEPA users to access existing emissions inventory databases.
- Data level security – To set permissions on the use of specific sensitive data.

The rationale for these minimum requirements is described in the following sections.

5.1 Web Server SQL

The Server database is the mechanism that stores and retrieves data. Such a name is derived from the fact that the data is stored centrally, at the Server. The Client, a web browser such as Internet Explorer, must be the part of the system that remotely requests data from the Server. This data could be accessed simultaneously by administrative staff to support regulatory reporting, and by the manager to evaluate potential community impacts. In this case, the Server must be centrally located and the administrator staff and the manager will be the clients of the system.

The need to contain all the data, in the current proposed implementation and potential future modification projects, at a central base, requires a Web-Enabled SQL architecture that can be designed in three ways:

1. Traditional Client / Server database
2. Distributed n-Tier Database
3. Web-Based

In the traditional Client / Server design, the Server is accessed within a local LAN. The Distributed n-Tier Database allows for the communications to be through LAN, WAN, or even the Internet. We propose the use of a Web-Based system, because it will generate codes that can scale in complexity as the project grows and will make it easier to port the code to support future Web based interactions and design.

The SYSTEM must have the capability to support ORACLE, Microsoft SQL-Server (2005 or 2008), and many other full-featured SQL database management system.

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5.2 Secure Internet Communications

Due to the sensitive nature of the data, access to the SYSTEM requires some level of security. A practical example is the use of the SYSTEM database by the system administrator, managers, and general staff. KEPA SYSTEM administrator may access all the information in it, but some clients may only access a portion of it. Managers and system administrators can add records or edit existing records, while the general KEPA user may only view a portion of the stored data, in a pre-established format.

The proposed database architecture, and its implementation, must operate with automated encryption and firewalls. Firewalls are well-established measures to protect access to data stored in connected computers.

Each of the required security components needs to work flawlessly all the time. Present technology would use the "Secure Socket Layer" (SSL). It is recommended that Secure Socket Layer technology be implemented to permit user access rights, and for the transfer and storage of sensitive environmental data.

Other alternatives exist, such as using complex COM+ data security objects, but these would limit the use of the data to specific operating systems. For example, COM+ could only be used where the client and the server use Microsoft Windows operating systems.

5.3 Complete *SYSTEM* Architecture

Figure 2 outlines the complete Web-based (also potentially .NET) structure that would be transparent to the user and could be included in the SYSTEM.
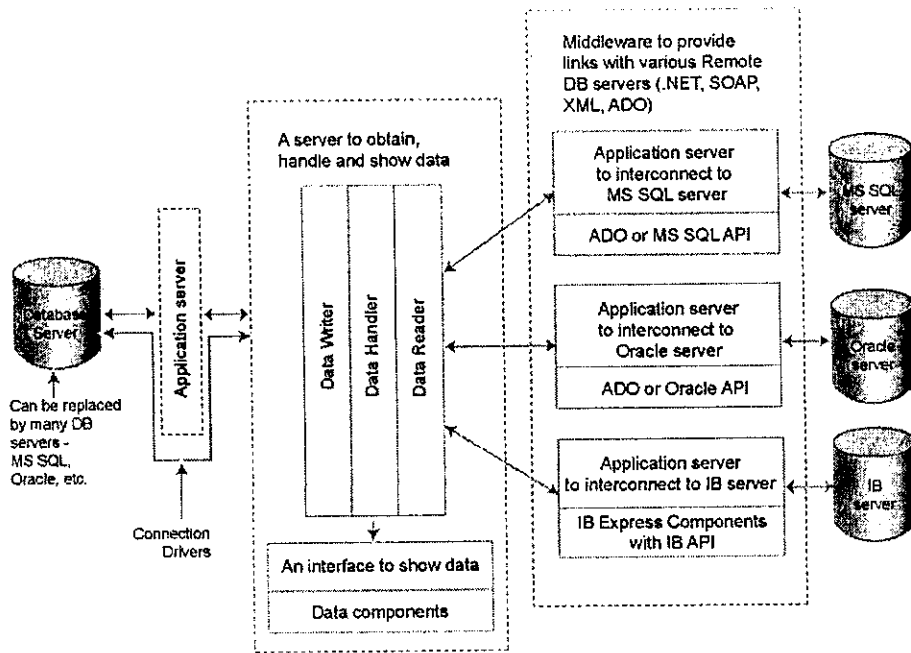
Figure 2 – Distributed system architecture – Web enabled and .NET compatible.

ANNEX 5

TERMS OF REFERENCE

Project Manager for "Kuwait Integrated Environmental Management (KIEM)" Project

I Background

The State of Kuwait and the United Nations Development Programme (UNDP) have a rich history of partnership and cooperation that dates back to 1968. The latest manifestation of this partnership has the Country Programme Action Plan (CPAP) which covers the period from 2009 to 2013. The CPAP addresses four important development priorities namely: Governance and Development Planning, Gender and Social development, Economic and Private Sector Development, and The Environment.

II Objectives

The EPA's strategic action plan calls for the better management of the environment through Regulatory-Based Integrated Environmental Management (IEM) at the local level in Kuwait. UNDP will provide support by recommending and creating an integrated environmental management system characterised by strategic management of the environmental impacts of air emissions of all activities based on a well defined air quality improvement and management plan within the entire country. The approach will be built upon cross-departmental and sector cooperation, engagement with all relevant stakeholders, and integration of local, regional and national regulations. The approach will take a holistic, structured and step-wise approach that identifies key challenges, assesses the status quo, sets targets for policy, assesses available policy options, engages stakeholders and leads to the implementation of effective air regulatory system.

III. Methodology
- Meetings with the UNDP Programme Team
- Meetings with relevant partners and target beneficiaries
- Reporting to Project Board
- Desk review of relevant documents: CPAP, programme reports, evaluation reports, survey/study reports;

The UNDP Country Office will provide the consultant with the necessary briefings

IV. Expected Outputs
At the end of the exercise, the consultant will produce the following:
- Regulatory Management Program for Air Quality for Kuwait with Program infrastructure and skilled and competent EPA enforcement staff.
- Complete web-based self reporting air emissions management populated with baseline emission inventory and capable and ready for ongoing reporting
- Integrated air quality management and improvement plan

V. Duration of Assignment
The total duration of the consultancy is 5 years. This would include the management of the entire project and project teams.

Applicants must have the following qualifications:

- PHD in the field of Environment. with at least 10 years experience in Programme and Project Planning and Design, Monitoring and Evaluation
- Good knowledge of and experience with UNDP practice areas;
- Good Knowledge in local environmental laws and legislation
- Substantive experience working on environmental regulations and enforcement/compliance framework design;
- Substantive experience working with local environment-related regulated sectors such as oil production and processing sectors.
- Substantive experience working with Government partners on the implementation of complex and politically sensitive programs;
- Good knowledge and experience of working with communities;
- Strong writing, communications, interpersonal, and facilitation skills;
- Solid knowledge of English and Arabic is required.
- Previous experience working with UNDP is an added advantage

TERMS OF REFERENCE

Project Manager Assistant in Environmental Law in "Kuwait Integrated Environmental Management (KIEM)" Project

I. Background

The State of Kuwait and the United Nations Development Programme (UNDP) have a rich history of partnership and cooperation that dates back to 1968. The latest manifestation of this partnership has the Country Programme Action Plan (CPAP) which covers the period from 2009 to 2013. The CPAP addresses four important development priorities namely: Governance and Development Planning, Gender and Social development, Economic and Private Sector Development, and The Environment.

II. Objectives

The EPA's strategic action plan calls for the better management of the environment through Regulatory-Based Integrated Environmental Management (IEM) at the local level in Kuwait. UNDP will provide support by recommending and creating an integrated environmental management system characterised by strategic management of the environmental impacts of air emissions of all activities based on a well defined air quality improvement and management plan within the entire country. The approach will be built upon cross-departmental and sector cooperation, engagement with all relevant stakeholders, and integration of local, regional and national regulations. The approach will take a holistic, structured and step-wise approach that identifies key challenges, assesses the status quo, sets targets for policy, assesses available policy options, engages stakeholders and leads to the implementation of effective air regulatory system.

III. Methodology

- Facilitating the legal understanding of: 1.Decision No. 210/2001 Pertaining to the Executive By-Law of the Law of Environment Public Authority," Kuwait Al Youm, Appendix of Issue No. 533 – Year 47 Tuesday, 2/10/2001, and 2.other legal documents related to environmental protection in Kuwait to the project man ager and team leaders.
- Studying articles related to air quality protection, examine their applicability and extract currently implemented environmental legal requirements.
- Coordinating regulatory training activities.
- Coordinating and Interacting with all team leaders.
- Meetings with and reporting to Project Manager.
- Following up on project task execution and ensure timely quality criteria evaluation.

IV. Expected Outputs

At the end of the exercise, the consultant will produce the following:

- Completed legal evaluation of: 1. Decision No. 210/2001 Pertaining to the Executive By-Law of the Law of Environment Public Authority," Kuwait Al Youm, Appendix of Issue No. 533 – Year 47 Tuesday, 2/10/2001, and 2. other legal documents related to environmental protection in Kuwait.
- Full support in daily activities and evaluation of completed tasks.

V. Duration of Assignment

The total duration of the duty is 5 years. This would include full legal assistance of project manager in his/her daily supervision and organization of the project.

Applicants must have the following qualifications:

- B. A. in Law, or related field or an equivalent combination of education, training, and experience with 8 or more in working with environmental related legal issues.

    - Study local, regional and international environmental laws and establish environmental legal requirements.
    - Environmental rule making process

- Must speak Arabic fluently and understand legal Arabic language,
- Must have excellent personal interaction, oral and written communication skills, and be focused to appropriately identify and respond to internal project needs and facilitate the presentation of recommendations.
- Must demonstrate the ability to interface effectively and collaborate with peers, project personnel and all levels of management to develop solutions.
- Must demonstrate the ability to take initiative and accountability for results.
- Must be proficient in use of typical computing software tools.

TERMS OF REFERENCE

Team Leader of Air Emissions Management and Reporting System Task in "Kuwait Integrated Environmental Management (KIEM)" Project

I. Background

The State of Kuwait and the United Nations Development Programme (UNDP) have a rich history of partnership and cooperation that dates back to 1968. The latest manifestation of this partnership has the Country Programme Action Plan (CPAP) which covers the period from 2009 to 2013. The CPAP addresses four important development priorities namely: Governance and Development Planning, Gender and Social development, Economic and Private Sector Development, and The Environment.

II. Objectives

The EPA's strategic action plan calls for the better management of the environment through Regulatory-Based Integrated Environmental Management (IEM) at the local level in Kuwait. UNDP will provide support by recommending and creating an integrated environmental management system characterised by strategic management of the environmental impacts of air emissions of all activities based on a well defined air quality improvement and management plan within the entire country. The approach will be built upon cross-departmental and sector cooperation, engagement with all relevant stakeholders, and integration of local, regional and national regulations. The approach will take a holistic, structured and step-wise approach that identifies key challenges, assesses the status quo, sets targets for policy, assesses available policy options, engages stakeholders and leads to the implementation of effective air regulatory system.

III. Methodology

- Selecting, training and supervising EPA's Air Emissions Management and Reporting System team during Task execution
- Working closely with Air Reporting Information System implementer
- Coordinating and Interacting with other team leaders
- Meetings with and reporting to Project Manager
- Desk review of relevant documents: evaluation reports, survey/study reports

IV. Expected Outputs

At the end of the exercise, the consultant will produce the following:

- Completed air emission inventory of point sources in Kuwait
- Complete web-based self reporting air emissions management with capability for on going reporting

V. Duration of Assignment

The total duration of the consultancy is 4 years. This would include the management of the entire Air Emissions Management and Reporting System Task and supervise the implementation team.

Applicants must have the following qualifications:

- M.Sc. in Environmental Science, Engineering, or related field or an equivalent combination of education, training, and experience with 8 or more in implementing similar projects in Kuwait with specialization in the following areas.
    - Implementation of Air Emissions Management and Reporting System,
    - Integration of Emissions Inventory Reporting Databases,
    - Air Emissions Estimation Methodologies,
    - Air Emissions Data Quality,
    - Customization of Regulatory Reports,
    - Training Program
- Must have excellent personal interaction, oral and written communication skills, and be focused to appropriately identify and respond to internal project needs and facilitate the presentation of recommendations.
- Must demonstrate the ability to interface effectively and collaborate with peers, project personnel and all levels of management to develop solutions.
- Must demonstrate the ability to take initiative and accountability for results.
- Must be proficient in use of typical computing software tools.

TERMS OF REFERENCE

Team Leader of Air Quality Management Planning Task in "Kuwait Integrated Environmental Management (KIEM)" Project

I. Background

The State of Kuwait and the United Nations Development Programme (UNDP) have a rich history of partnership and cooperation that dates back to 1968. The latest manifestation of this partnership has the Country Programme Action Plan (CPAP) which covers the period from 2009 to 2013. The CPAP addresses four important development priorities namely: Governance and Development Planning, Gender and Social development, Economic and Private Sector Development, and The Environment.

II. Objectives

The EPA's strategic action plan calls for the better management of the environment through Regulatory-Based Integrated Environmental Management (IEM) at the local level in Kuwait. UNDP will provide support by recommending and creating an integrated environmental management system characterised by strategic management of the environmental impacts of air emissions of all activities based on a well defined air quality improvement and management plan within the entire country. The approach will be built upon cross-departmental and sector cooperation, engagement with all relevant stakeholders, and integration of local, regional and national regulations. The approach will take a holistic, structured and step-wise approach that identifies key challenges, assesses the status quo, sets targets for policy, assesses available policy options, engages stakeholders and leads to the implementation of effective air regulatory system.

III. Methodology

- Selecting, training and supervising EPA's Air Quality Management Planning team during task execution
- Coordinating and Interacting with other team leaders
- Meetings with and reporting to Project Manager
- Desk review of relevant documents: evaluation reports, survey/study reports

IV. Expected Outputs

At the end of the exercise, the consultant will produce the following:

- Compete air quality management and improvement plan containing:
    - Pollutant specific air quality control zone maps
    - Control technology requirements in each zone
    - Environmental compliance calendar
    - Reporting and recordkeeping requirements from the regulated community

V. Duration of Assignment

The total duration of the consultancy is 2 years. This would include the management of the entire Air Quality Management Planning Task and supervise the implementation team.

Team Leader of Air Regulatory Management System Task in "Kuwait Integrated Environmental Management (KIEM)" Project

I. Background

The State of Kuwait and the United Nations Development Programme (UNDP) have a rich history of partnership and cooperation that dates back to 1968. The latest manifestation of this partnership has the Country Programme Action Plan (CPAP) which covers the period from 2009 to 2013. The CPAP addresses four important development priorities namely: Governance and Development Planning, Gender and Social development, Economic and Private Sector Development, and The Environment.

II. Objectives

The EPA's strategic action plan calls for the better management of the environment through Regulatory-Based Integrated Environmental Management (IEM) at the local level in Kuwait. UNDP will provide support by recommending and creating an integrated environmental management system characterised by strategic management of the environmental impacts of air emissions of all activities based on a well defined air quality improvement and management plan within the entire country. The approach will be built upon cross-departmental and sector cooperation, engagement with all relevant stakeholders, and integration of local, regional and national regulations. The approach will take a holistic, structured and step-wise approach that identifies key challenges, assesses the status quo, sets targets for policy, assesses available policy options, engages stakeholders and leads to the implementation of effective air regulatory system.

III. METHODOLOGY

- Selecting, training and supervising EPA's Air Regulatory Management System team during Task execution
- Coordinating and Interacting with other team leaders
- Meetings with and reporting to Project Manager
- Desk review of relevant documents: evaluation reports, survey/study reports

IV. Expected Outputs

At the end of the exercise, the consultant will produce the following:

- A document including a baseline review of current air regulatory system in Kuwait EPA based on SWOT analysis
- Document in (Arabic and English) including design of enforcement and compliance management program for air emissions management in Kuwait containing relevant standards, requirements and enforcement mechanisms.
- Program infrastructure and skilled and competent EPA enforcement staff.

V. Duration of Assignment

The total duration of the consultancy is 5 years. This would include the management of the entire Air Regulatory Management System Task and supervise the implementation team.

Applicants must have the following qualifications:

- PhD in Environmental Policy, Engineering, or related field or an equivalent combination of education, training, and experience:
- Typically possesses 8 or more years experience in organizational programs, policy analysis and relations with environmental regulatory agencies, including five or more years of supervisory or project management experience.
- Demonstrated experience in the rulemaking process
- Demonstrated experience in Air Litigation Support, Agency Negotiations, Air Quality Compliance Assistance and Regulatory compliance analyses.
- Demonstrated experience to accurately analyze information, integrate people processes, systems, and technologies, and make strategic decisions regarding project scope, impact, policy, development, and implementation.
- Demonstrated experience with environmental project or program oversight.
- Demonstrated experience with legislative review.
- Demonstrated knowledge of environmental regulatory aspects of large E&P Oil and Gas, Refineries, Petrochemicals, including power generation and transmission/distribution systems.
- Must have excellent personal interaction, oral and written communication skills, and be focused to appropriately identify and respond to internal project needs and facilitate the presentation of recommendations.
- Must demonstrate the ability to interface effectively and collaborate with peers, project personnel and all levels of management to develop solutions.
- Must demonstrate the ability to take initiative and accountability for results.
- Must be proficient in use of typical computing software tools.