



Rocky Mountain Project Management Symposium
Navigating the Waves of Change: Learn. Lead. Succeed.

An Environmental Management Information System (EMIS) Project

From Government Regulations to
Reporting



Objectives

- Walk through a fictitious project from Regulations to Reporting – **“Big Oil”**
- Point out along the way:
 - What may be different about an Environmental Project with respect to the PMBOK
 - “EMIS Drivers”
 - Magnitude of the detail required for a project
 - A mixture of examples and alternatives
- So you know a little more about EMIS Projects



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PMBOK Focus

Knowledge Areas	1. Initiating	2. Planning	3. Executing	4. Monitor & Control	5. Closing
Integration	Charter		Direct & Manage		
Scope		Scope			
Time					
Cost					
Quality				Quality Control	
HR			Acquire Team		
Communication	Stakeholders				
Risk					
Procurement			Procurement Select Vendor		



“Big Oil” Project

- Multi Billion \$\$\$ Company
- UpStream, MidStream operations
- Operates 16 countries and 12 USA states
- Wants to be seen as an Environmental Leader
- Requires Enterprise Solution
- Global implementation
- High level of complexity
- Position for Cap and Trade Legislation



Charter - Project Sponsor

- VP Environmental Health and Safety

Driven by:

- Multiple Government and Business Regulations
(current and future)
- Fines
- Company Vision
- Board Reporting Requirements (SEC Carbon)
- Stakeholder Awareness
- Public Opinion
- Sensitivity of the Information



Stakeholders

- Environmental Health and Safety (EH&S)
- Executive Management
- Information Technology
- Operating Units
- Steering Committee
- Board
- External Auditors



Scope - inputs

- Operating in 16 Countries in 8 divisions
 - USA , Canada, Australia, Germany, UK, China, Malaysia, Brazil and more
- 20 Refining Facilities
- 150 Resource Plays
- 4,500 Wells on 3,200 Pads
- One Corporate and 20 Regional Offices
- VP EH&S Drivers



Scope - inputs

- 120,000 Emission Sources
- 21 Emission Source Types (many types of each)
 - Wells (pads)
 - Engines, Turbines, Boilers, Heaters
 - Dehydrators, Amine Units
 - Chemical Injection Pumps, Pneumatic Controllers, Pressure Relief Valves
 - Meters
 - Tanks
 - Flares, Fugitives
 - Compressors, Pipelines, Vessels, Well Blowdowns, Starts or Tests
 - Fleet, Dust
 - Electricity usage – (Offices)



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Scope - inputs

- Some of the World Wide Regulations:
 - USA
 - American Petroleum Institute (API) – 2004 Compendium + 2009 Revision for greenhouse gas (GHG) emission methodologies
 - EPA – AP 42, Clean Air Interstate Rule (CAIR) National Pollutant Discharge Elimination System (NPDES)
 - SEC – Carbon Disclosure
 - Regional Greenhouse Gas Initiative (RGGI) Climate Registry
 - California – AB32 Global Warming Solutions Act of 2006
 - Europe
 - European Union Emission Standards
 - European Union Emission Trading Scheme (EU ETS)
 - Australian
 - National Greenhouse and Energy Reporting Act (NGERS)
 - Carbon Pollution Reduction Scheme (CPRS)
 - Canada
 - National Pollutant Release Inventory (NPRI)
 - Alberta – Greenhouse Gas Reporting



Scope – inputs

- Compliance
 - EPA Title V operating permits
 - State permits
- Pollutants
 - Greenhouse Gases – CO₂, CH₄, N₂O, CFC, HCFC, CH₃CCl₃, CCl₄, HFC, SF₆, CF₄, C₂F₆
 - Criteria – CO, HC, NO_x, O₃, Pb, SO_x, PM₁₀, VOC
 - Hazardous – over 100
 - Water – organic, inorganic, macroscopic



Scope - outputs

- Inventory Management Plan (IMP)
- Enterprise Software Solution
- Compliance Tasks and Reporting
- Regulatory Reporting
- Corporate Reporting
- Trained EH&S & Operational Users
- Satisfied Stakeholders



Acquire a Team

- Core Team that knows:
 - **The science, regulations and reporting**
 - EH&S Resources
 - External Environmental Specialists
 - **The technology**
 - IT Representative
 - IT Business Analyst
 - Software Vendor
 - Specialists (Architect, DBA, infrastructure, access, Crystal Reports, etc. *members of the extended team*)
 - **The business processes**
 - Business Process Trusted Expert
 - Operations members world wide – (*members of extended team*)
 - **The project process**
 - PMI Project Manager



Implementation Method

- Prepare IMP with Reporting Requirements
- Select Software and Implementation Vendor
- Prepare Design
- Collect Data
- Configure Vendor's System
- Load Data
- System & User Acceptance Testing
- Deploy and Report
- Project Close



Requirements

- Prepare Inventory Management Plan (IMP - also called Functional Requirements)
- Determines the science required to meet each regulation - For Example:
 - How to calculate emissions for each source type:
 - Types of Sources (e.g. tanks)
 - Fuel type or Operating hours
 - Fuel volumes
 - Units of Measure
 - Emission Factors
 - Mathematical Expressions
 - Etc....



Procurement

- **Select**
 - Enterprise Software Vendor
 - Implementer
- **High Level Requirements**
 - Scalability across the world
 - Meet all Regulatory Requirements (now and future)
 - Languages
 - Technology
 - Roll up Reporting to One Corporate Report
 - Ability to calculate emissions per IMP
 - Ability to support compliance processes



Prepare Design

- Project Team on-site, one room, 2 to 3 days
 - Detailed Agenda
 - Agreement on how Design meets the Inventory Management Plan's requirements
 - Determine reporting hierarchy
- Design Document Drives
 - What data is collected
 - IT Environment (in-house, hosted, as a service)
 - Vendor System Configuration



Design Hierarchy

- Big Oil – Top Level
 - Division
 - Country – State
 - Facility or Resource Play
 - » Pad
 - » Emission Source
 - » Control Device



Data Collection

- Prepare Collection Strategy and Tools
- Collect data for
 - 120,000 emission sources
 - Types of emission sources
 - Locations
 - Serial numbers etc
 - Source information (e.g. manufacturing information such as engine horsepower)
 - Fuel types/Volumes or operating hours per source
 - Unit of Measure (UOM)
 - Emission Factors, expressions and other IMP data



Collection Methods

- Source information - Teams collecting the data from facilities or well pads using spreadsheets
- Interface to Fixed Asset system
- Fuel information – interface into existing Production Accounting information
- Process systems interface information
 - Continuous Environmental Monitoring Systems (CEMS)
 - Supervisory Control And Data Acquisition (SCADA) System
 - Other control systems



Configure Vendor System

- Install software
- Configure per Design
 - Hierarchy
 - Emission Libraries
 - Each Emission Source Type
 - Create Each Emission Source
 - Data Loading Scripts
 - Emission Expressions
 - Compliance Tasks
 - Regulation and Compliance Reports



Emission Expression

The general equation for emissions estimation is:

$$E = A \times EF \times (1 - ER/100)$$

Where:

- E = emissions;
- A = activity rate;
- EF = emission factor, and
- ER = overall emission reduction efficiency, %

An **emissions factor** is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

Source: EPA Website



Compliance Task Example

Description	Enter Effluent Parameters Per Big Oil NPDES Permit and submit DMR to be completed by Operator-AF (AlexisMerydith) before 08/21/2009
Due Date	08/21/2009
Number of Days Left	0
Model	ALPHA
Tickler	T-0- Big Oil Example_2588
Triggered By	0- Big Oil Example_2009-08-21



Quality Control

- Data Cleansing
 - Accuracy
 - Completeness
 - Data rules



Data Loading

Significant volumes of data

- Interfaces with other systems
- SQL Scripts
 - Spreadsheets loaded done directly into the Vendor Software's database
- Data entry screens



Administration

- **Technical Application Administrator** – DBA to modify the configuration and write SQL Scripts
- **Super User** – to create the emission sources
- **End User** – to enter the operating data (fuel/operating hours)



Testing

- Vendor demonstrates working system with “Big Oil” Data
- Systems Testing
- User Acceptance Testing



Reporting Testing

- Report on a Facility or Pad
 - Calculate emissions using spreadsheet or by hand
 - Compare answers
 - Does it meet tolerance targets?
- Roll up to next reporting level
 - Check for reasonableness, compare to previous reporting
- Roll up to “Big Oil” Level
 - Check for reasonableness
- External Audit of Reporting Results



Training

- By Role
- Global
- Language issues
- Travel
- Technology issues



Deploy

- **Worldwide Rollout Strategies**
 - By regulatory reporting/constraints
 - By compliance requirement
 - Pilot – Early Adopters
- **Ongoing responsibility**
 - Application Administration function in EH&S (Science)
 - IT Support (Technology)



Project Close

- Lessons Learned after six months –
Feedback on how well reports comply with regulations